Webster County Schools

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8th Grade

Packet 7

Read this article. Then answer the questions that follow.

Excerpt from *Birdology*

By Sy Montgomery

In this excerpt, the author talks about introducing her chickens to her yard.

1 At first I was afraid they'd run away or become lost. We had a cozy, secure home for them prepared in the bottom storey of our barn, with wood shavings scattered over the dirt floor, a dispenser for fresh water, a trough for chick feed, some low perches made from dowels, and a hay-lined nest box made from an old rabbit hutch left over from one of the barn's previous denizens, in which they could lay future eggs. Chickens need to be closed in safe at night to protect them from predators, but by day we didn't want to confine them; we wanted to give them free run of the yard. But how could they possibly understand that they lived here now? Once we let them out, would they even recognize their space in the barn and go back in it? When I was in seventh grade, my family had moved, once again, to a new house; my first afternoon there I literally got lost in my own backyard. Could these six-week-old chicks be expected to know better?

2 Gretchen assured me there would be no problem. "Leave them in the pen for twenty-four hours," she told me. "Then you can let them out and they'll stick around. They'll go back in again when it starts to get dark."

3 "But how do they know?" I asked.

4 "They just do," she said. "Chickens just know these things."

5 When before dusk, I found them all perched calmly back in their coop, I saw that Gretchen was right.

6 In fact, chickens know many things, some from the moment they are born. Like all members of the order in which they are classified, the Galliformes, or game birds, just-hatched baby chickens are astonishingly mature and mobile, able to walk, peck, and run only hours after leaving the egg.

7 This developmental strategy is called precocial. Like its opposite, the

altricial strategy (employed by creatures such as humans and songbirds, who are born naked and helpless), the precocial strategy was sculpted by eons of adaptation to food and predators. If your nest is on the ground, as most game birds' are, it's a good idea to get your babies out of there as quickly as possible before someone comes to eat them. So newborn game birds hatch covered in down, eyes open, and leave the nest within twenty-four hours. (An Australian game bird known as the malleefowl begins its life by digging its way out of its nest of decaying vegetation and walks off into the bush without ever even meeting either parent.)

8 That chickens hatch from the egg knowing how to walk, run, peck, and scratch has an odd consequence: many people take this as further evidence they are stupid. But instinct is not stupidity. (After all, Einstein was born knowing how to suckle.) Nor does instinct preclude learning. Unlike my disoriented seventh-grade self (and I have not improved much since), young chickens have a great capacity for spatial learning. In scientific experiments, researchers have trained days-old chicks to find hidden food using both distant and nearby landmarks as cues. Italian researchers demonstrated that at the tender age of fifteen days, after just a week's training to find hidden food in the middle of their cage, chicks can correctly calculate the center of a given environment—even in the absence of distinctive landmarks. Even more astonishing, they can do it in spaces they have never seen before, whether the area be circular, square, or triangular. How? The chicks "probably relied on a visual estimate of these distances from their actual positions," wrote University of Padova researcher L. Tommasi and co-authors in the *Journal of Comparative Physiology,* ". . . [but] it remains to be determined how the chicks actually measure distances in the task."

9 We never determined how our first chickens knew their new home was theirs, either. We never knew how they managed to discern the boundaries of our property. But they did. At first, they liked to stay near the coop. But as they grew, they took to following me everywhere, first cheeping like the tinkling of little bells, later clucking in animated adult discussion. If I was hanging out the laundry, they would check what was in the laundry basket. If I was weeding a flower bed, they would join me, raking the soil with their strong, scaly feet, then stepping backward to see what was revealed.

(Whenever I worked with soil, I suspect they assumed I was digging for worms.) When my husband, Howard, and I would eat at the picnic table under the big silver maple, the Ladies would accompany us. When my father-in-law came to help my husband build a pen for Christopher Hogwood, then still a piglet, the Ladies milled underfoot to supervise every move. The hens were clearly interested in the project, pecking at the shiny nails, standing tall to better observe the use of tools, clucking a running commentary all the while. Before this experience, Howard's dad would have been the first to say that he didn't think chickens were that smart. But they changed his mind. After a few hours I noticed he began to address them. Picking up a hammer they were examining, he might say, directly and respectfully, "Pardon me, Ladies"—as if he were speaking to my mother-in-law and me when we got in the way.

10 But when their human friends are inside, and this is much of the time, the Ladies explore on their own. A chicken can move as fast as nine miles an hour, which can take you pretty far, and ours are free to go anywhere they like. But ours have intuited our property lines and confine their travels to its boundaries. They have never crossed the street. And for years, they never hopped across the low stone wall separating our land from that of our closest neighbor. That came later—and it was not the result of any physical change in the landscape, but the outcome of a change in social relationships among their human friends.

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43. Paragraph 1 **best** support the idea that the author

A. is fearful the chicks will be vulnerable to predators
B. is unsure about what she can expect the chicks to understand
C. wants the chicks to explore the yard she has set up for their needs
D. has not planned how she will teach the chicks to adjust to a new environment

44. Based on paragraphs 2-5, which statement **best** describes the exchange between Gretchen and the author?

A. Gretchen proves a point, and the author feels embarrassed.
B. Gretchen gives the author advice, and the author learns from it.
C. Gretchen comforts the author, and the author feels more confident.
D. Gretchen shares her personal experiences, and the author criticizes them.

45. What does paragraph 7 indicate about the developmental strategy of chickens?

A. Chickens are adapted to food availability and pressure from predators.
B. Chickens are born ready and require no further maturing.
C . Chickens have a faster growth rate than other birds.
D. Baby chickens spend no time with their parents.

46. Paragraph 9 develops the key idea that chickens raised by humans

A. are curious about the activities of their caregivers
B. become a nuisance to the other projects of their owners
C. grow to prefer the company of people over other chickens
D. develop their intelligence more than chickens raised by hens

47. Which claim does paragraph 10 support?

A. The chickens stay where they do as a direct result of what the author has taught them.
B. The chickens do what they do because of their interactions with their

environment.
C. The chickens stay where they do because they are unfamiliar with other areas.
D. The chickens do what they do as a result of trial and error.

48. Read these lines from paragraph 8 from the passage.

In scientific experiments, researchers have trained days-old chicks to find hidden food using both distant and nearby landmarks as cues. Italian researchers demonstrated that at the tender age of fifteen days, after just a week's training to find hidden food in the middle of their cage, chicks can correctly calculate the center of a given environment—even in the absence of distinctive landmarks. Even more astonishing, they can do it in spaces they have never seen before, whether the area be circular, square, or triangular.

How do these lines relate to these lines in paragraph 9?

A. The lines from paragraph 8 express an opinion, and the lines from paragraph 9 provide support.
B. The lines from paragraph 8 identify why something happens, and the lines from paragraph 9 describe what happens.
C. The lines from paragraph 8 present facts, and the lines from paragraph 9 support the facts with a personal experience.
D. The lines from paragraph 8 provide a comparison, and the lines from paragraph 9 provide evidence for the comparison.

49. How does the author's attitude toward the chickens change from the beginning of the passage to the end?

A. It varies from fear for their safety to gratitude for winning over the author's father-in-law.
B. It shifts from being uncertain about their abilities to being amazed at their complex ways.
C. As she observes the behavior of the chickens, she realizes their learning keeps pace with the risks they take.
D. As she gains confidence in her ability to raise her chickens, she comes to appreciate their self-sufficiency.

Source: Mississippi Testlet
Read this passage. Then answer the questions that follow.

"After Twenty Years"

by O. Henry

1 The policeman on the beat moved up the avenue impressively. The impressiveness was habitual and not for show, for spectators were few. The time was barely 10 o'clock at night, but chilly gusts of wind with a taste of rain in them had well nigh de-peopled the streets.

2 Trying doors as he went, twirling his club with many intricate and artful movements, turning now and then to cast his watchful eye adown the pacific thoroughfare, the officer, with his stalwart form and slight swagger, made a fine picture of a guardian of the peace. The vicinity was one that kept early hours. Now and then you might see the lights of a cigar store or of an all-night lunch counter; but the majority of the doors belonged to business places that had long since been closed.

3 When about midway of a certain block the policeman suddenly slowed his walk. In the doorway of a darkened hardware store a man leaned, with an unlighted cigar in his mouth. As the policeman walked up to him the man spoke up quickly.

4 "It's all right, officer," he said, reassuringly. "I'm just waiting for a friend. It's an appointment made twenty years ago. Sounds a little funny to you, doesn't it? Well, I'll explain if you'd like to make certain it's all straight. About that long ago there used to be a restaurant where this store stands—'Big Joe' Brady's restaurant."

5 "Until five years ago," said the policeman. "It was torn down then."

6 The man in the doorway struck a match and lit his cigar. The light showed a pale, square-jawed face with keen eyes, and a little white scar near his right eyebrow. His scarfpin was a large diamond, oddly set.

7 "Twenty years ago to-night," said the man, "I dined here at 'Big Joe' Brady's with Jimmy Wells, my best chum, and the finest chap in the world. He and I were raised here in New York, just like two brothers, together. I was eighteen and Jimmy was twenty. The next morning I was to start for the West to make my fortune. You couldn't have dragged Jimmy out of New York; he thought it was the only place on earth. Well, we agreed that night that we would meet here again exactly twenty years from that date and

time, no matter what our conditions might be or from what distance we might have to come. We figured that in twenty years each of us ought to have our destiny worked out and our fortunes made, whatever they were going to be."

8 "It sounds pretty interesting," said the policeman. "Rather a long time between meets, though, it seems to me. Haven't you heard from your friend since you left?"

9 "Well, yes, for a time we corresponded," said the other. "But after a year or two we lost track of each other. You see, the West is a pretty big proposition, and I kept hustling around over it pretty lively. But I know Jimmy will meet me here if he's alive, for he always was the truest, stanchest old chap in the world. He'll never forget. I came a thousand miles to stand in this door to-night, and it's worth it if my old partner turns up."

10 The waiting man pulled out a handsome watch, the lids of it set with small diamonds.

11 "Three minutes to ten," he announced. "It was exactly ten o'clock when we parted here at the restaurant door."

12 "Did pretty well out West, didn't you?" asked the policeman.

13 "You bet! I hope Jimmy has done half as well. He was a kind of plodder, though, good fellow as he was. I've had to compete with some of the sharpest wits going to get my pile. A man gets in a groove in New York. It takes the West to put a razor-edge on him."

14 The policeman twirled his club and took a step or two.

15 "I'll be on my way. Hope your friend comes around all right. Going to call time on him sharp?"

16 "I should say not!" said the other. "I'll give him half an hour at least. If Jimmy is alive on earth he'll be here by that time. So long, officer."

17 "Good-night, sir," said the policeman, passing on along his beat, trying doors as he went.

18 There was now a fine, cold drizzle falling, and the wind had risen from its uncertain puffs into a steady blow. The few foot passengers astir in that quarter hurried dismally and silently along with coat collars turned high and pocketed hands. And in the door of the hardware store the man who had

come a thousand miles to fill an appointment, uncertain almost to absurdity, with the friend of his youth, smoked his cigar and waited.

19 About twenty minutes he waited, and then a tall man in a long overcoat, with collar turned up to his ears, hurried across from the opposite side of the street. He went directly to the waiting man.

20 "Is that you, Bob?" he asked, doubtfully.

21 "Is that you, Jimmy Wells?" cried the man in the door.

22 "Bless my heart!" exclaimed the new arrival, grasping both the other's hands with his own. "It's Bob, sure as fate. I was certain I'd find you here if you were still in existence. Well, well, well!—twenty years is a long time. The old restaurant's gone, Bob; I wish it had lasted, so we could have had another dinner there. How has the West treated you, old man?"

23 "Bully; it has given me everything I asked it for. You've changed lots, Jimmy. I never thought you were so tall by two or three inches."

24 "Oh, I grew a bit after I was twenty."

25 "Doing well in New York, Jimmy?"

26 "Moderately. I have a position in one of the city departments. Come on, Bob; we'll go around to a place I know of, and have a good long talk about old times."

27 The two men started up the street, arm-in-arm. The man from the West, his egotism enlarged by success, was beginning to outline the history of his career. The other, submerged in his overcoat, listened with interest.

28 At the corner stood a drug store, brilliant with electric lights. When they came into this glare each of them turned simultaneously to gaze upon the other's face.

29 The man from the West stopped suddenly and released his arm.

30 "You're not Jimmy Wells," he snapped. "Twenty years is a long time, but not long enough to change a man's nose from a Roman to a pug."

31 "It sometimes changes a good man into a bad one," said the tall man. "You've been under arrest for ten minutes, 'Silky' Bob. Chicago thinks you may have dropped over our way and wires us she wants to have a chat with

you. Going quietly, are you? That's sensible. Now, before we go on to the station here's a note I was asked to hand you. You may read it here at the window. It's from Patrolman Wells."

32 The man from the West unfolded the little piece of paper handed him. His hand was steady when he began to read, but it trembled a little by the time he had finished. The note was rather short.

33 *Bob: I was at the appointed place on time. When you struck the match to light your cigar I saw it was the face of the man wanted in Chicago. Somehow I couldn't do it myself, so I went around and got a plain clothes man to do the job. JIMMY.*

1. What is the meaning of the word intricate as used in paragraph 2?

a. plain
b. complicated
c. forceful
d. private

2. This item has two parts. First answer Part A. Then answer Part B.

Part A What is the impact of the words and phrases used to describe the policeman in paragraphs 1 and 2?

a. The words and phrases reveal his arrogance.
b. The words and phrases create a respectful tone.
c. The words and phrases describe his movements.
d. The words and phrases highlight the character's flaws.

Part B
Select a line from the passage to support the correct answer to Part A.

a. "The policeman on the beat moved up the avenue..." (paragraph 1)
b. "Trying doors as he went, twirling his club..." (paragraph 2)
c. "...the officer, with his stalwart form and slight swagger, made a fine picture of a guardian of the peace..." (paragraph 2)
d. "The light showed a pale, square-jawed face with keen eyes..." (paragraph 6)

3. What impact does the author's shift in tone in paragraph 3 have on the passage?

a. Words like "quickly" and "darkened" create a passionate tone.
b. Words like "suddenly" and "quickly" develop an angry tone.
c. Words like "darkened" and "unlighted" create an ominous tone.
d. Words like "unlighted" and "suddenly" develop a complimentary tone.

4. Which of the following statements should be included in an objective summary of the passage?

a. Bob is a very flashy man who enjoys expensive items. Jimmy realizes what type of man Bob is and arrests him.
b. Twenty years ago, two friends were exactly the same type of people. Now they are nothing alike. They meet up together and discover their differences.
c. Two old friends made an appointment twenty years ago to meet at the exact time and place they departed. One friend has lived a life of crime while the other has lived a life of law enforcement.
d. A policeman discovers that his long-time friend who he is supposed to meet up with after a twenty-year absence is a criminal. The criminal does not know his friend is a policeman.

5. How does the incident in paragraph 6 determine Jimmy's actions?

a. It allowed Jimmy to recognize Bob as the wanted man, so Jimmy had him arrested.
b. It helped Jimmy realize that the waiting man was not Bob, which made him leave the scene.
c. It made Jimmy upset that Bob did not recognize him, so Jimmy decided to end the friendship.
d. It showed Jimmy that Bob was going to steal money from him, which made Jimmy decide to arrest him.

6. Which of the following pieces of dialogue from the passage support the claim that Bob's life in the West was different than Jimmy's life in New York?

a. "'He and I were raised here in New York, just like two brothers, together.'" (paragraph 7)
b. "'Well, yes, for a time we corresponded...'" (paragraph 9)
c. "'He was a kind of plodder, though, good fellow as he was.'" (paragraph 13)
d. "'I was certain I'd find you here if you were still in existence.'" (paragraph 22)

7. Which line of dialogue from the passage foreshadows the resolution of the conflict?

a. "'Until five years ago,' said the policeman. 'It was torn down then.'" (paragraph 5)
b. "'Three minutes to ten,' he announced. 'It was exactly ten o'clock when we parted here at the restaurant door.'" (paragraph 11)
c. "'I'll be on my way. Hope your friend comes around all right. Going to call time on him sharp?'" (paragraph 15)
d. "'Doing well in New York, Jimmy?'" (paragraph 25)

8. The author develops a theme that the values and choices of people determine their fate. How does the author develop this theme over the course of the passage?

a. by making New York the setting of the story
b. by highlighting the differences between Bob and Jimmy
c. by emphasizing how both characters made a decision to leave their home
d. by describing the differences in Jimmy's appearance from when he was younger

9. This item has two parts. First answer Part A. Then answer Part B.

Part A
Based on the dialogue and incidents throughout the passage, what inference can be made about Jimmy?

a. Jimmy has a different set of values than Bob.
b. Jimmy was always in a hurry wherever he went.
c. Jimmy did not struggle with doing what he felt was right.
d. Jimmy was sad for missing the meeting with his long-time friend.

Part B
Which of the following sentences from the passage supports the correct answer to Part A?

a. "The waiting man pulled out a handsome watch, the lids of it set with small diamonds." (paragraph 10)
b. "...then a tall man in a long overcoat, with collar turned up to his ears, hurried across from the opposite side of the street." (paragraph 19)
c. "'Twenty years is a long time, but not long enough to change a man's nose from a Roman to a pug.'" (paragraph 30)
d. "His hand was steady when he began to read, but it trembled a little by the time he had finished." (paragraph 32)

Answer Key: From Engage NY Released items 2019 and 2017 and Mississippi Testlet

1	B		1	CCSS.ELA-Literacy.RI.8.4
2	B		1	CCSS.ELA-Literacy.RI.8.8
3	D		1	CCSS.ELA-Literacy.RI.8.5
4	C		1	CCSS.ELA-Literacy.L.8.4
5	C		1	CCSS.ELA-Literacy.RI.8.3
6	B		1	CCSS.ELA-Literacy.RI.8.2
7	D		1	CCSS.ELA-Literacy.RI.8.6
8	B		1	CCSS.ELA-Literacy.RL.8.4
9	B		1	CCSS.ELA-Literacy.RL.8.2
10	B		1	CCSS.ELA-Literacy.RL.8.3
11	C		1	CCSS.ELA-Literacy.RL.8.3
12	B		1	CCSS.ELA-Literacy.RL.8.4
13	C		1	CCSS.ELA-Literacy.RL.8.2
14	A		1	CCSS.ELA-Literacy.RL.8.6
15	B		1	CCSS.ELA-Literacy.RI.8.4

16	A		1	CCSS.ELA-Literacy.RI.8.4
17	A		1	CCSS.ELA-Literacy.RI.8.5
18	B		1	CCSS.ELA-Literacy.RI.8.6
19	A		1	CCSS.ELA-Literacy.RI.8.3
20	B		1	CCSS.ELA-Literacy.RI.8.3
21	C		1	CCSS.ELA-Literacy.RI.8.2
22	A			CCSS.ELA-Literacy.RL.8.4
23	D			CCSS.ELA-Literacy.RL.8.3
24	C			CCSS.ELA-Literacy.RL.8.1
25	A			CCSS.ELA-Literacy.RL.8.3
26	D			CCSS.ELA-Literacy.RL.8.3
27	C			CCSS.ELA-Literacy.RL.8.2
28	D			Literacy.RL.8.1
29	C			CCSS.ELA-Literacy.RI.8.4
30	B			CCSS.ELA-Literacy.RI.8.8
31	A			Literacy.RI.8.4

				CCSS.ELA-
32	D			CCSS.ELA-Literacy.RI.8.5
33	C			CCSS.ELA-Literacy.RI.8.1
34	B			Literacy.RI.8.3
35	D			CCSS.ELA-Literacy.RI.8.3
36	B			CCSS.ELA-Literacy.RI.8.2
37	B			Literacy.RI.8.5 CCSS.ELA-
38	C			Literacy.RI.8.1 CCSS.ELA-
39	A			CCSS.ELA-Literacy.RI.8.8
40	D			CCSS.ELA-Literacy.RI.8.8
41	A			CCSS.ELA-Literacy.RI.8.5
42	D			CCSS.ELA-Literacy.RI.8.3
43	B			CCSS.ELA-Literacy.RI.8.1
44	B			CCSS.ELA-Literacy.RI.8.3
45	A			CCSS.ELA-Literacy.RI.8.1
46	A			CCSS.ELA-Literacy.RI.8.2

47	B			CCSS.ELA-Literacy.RI.8.8
48	C			CCSS.ELA-Literacy.RI.8.5
49	B			CCSS.ELA-50Literacy.RI.8.6
1	B			RL.8.4
2	B,C			
3	C			
4	C			
5	A			
6	C			
7	C			
8	B			
9	A,A			

Answer Key: From Engage NY Released items 2019 and 2017

1	B		1	CCSS.ELA-Literacy.RI.8.4
2	B		1	CCSS.ELA-Literacy.RI.8.8
3	D		1	CCSS.ELA-Literacy.RI.8.5
4	C		1	CCSS.ELA-Literacy.L.8.4
5	C		1	CCSS.ELA-Literacy.RI.8.3
6	B		1	CCSS.ELA-Literacy.RI.8.2
7	D		1	CCSS.ELA-Literacy.RI.8.6
8	B		1	CCSS.ELA-Literacy.RL.8.4
9	B		1	CCSS.ELA-Literacy.RL.8.2
10	B		1	CCSS.ELA-Literacy.RL.8.3
11	C		1	CCSS.ELA-Literacy.RL.8.3
12	B		1	CCSS.ELA-Literacy.RL.8.4
13	C		1	CCSS.ELA-Literacy.RL.8.2
14	A		1	CCSS.ELA-Literacy.RL.8.6
15	B		1	CCSS.ELA-Literacy.RI.8.4

16	A		1	CCSS.ELA-Literacy.RI.8.4
17	A		1	CCSS.ELA-Literacy.RI.8.5
18	B		1	CCSS.ELA-Literacy.RI.8.6
19	A		1	CCSS.ELA-Literacy.RI.8.3
20	B		1	CCSS.ELA-Literacy.RI.8.3
21	C		1	CCSS.ELA-Literacy.RI.8.2
22	A			CCSS.ELA-Literacy.RL.8.4
23	D			CCSS.ELA-Literacy.RL.8.3
24	C			CCSS.ELA-Literacy.RL.8.1
25	A			CCSS.ELA-Literacy.RL.8.3
26	D			CCSS.ELA-Literacy.RL.8.3
27	C			CCSS.ELA-Literacy.RL.8.2
28	D			Literacy.RL.8.1
29	C			CCSS.ELA-Literacy.RI.8.4
30	B			CCSS.ELA-Literacy.RI.8.8
31	A			Literacy.RI.8.4

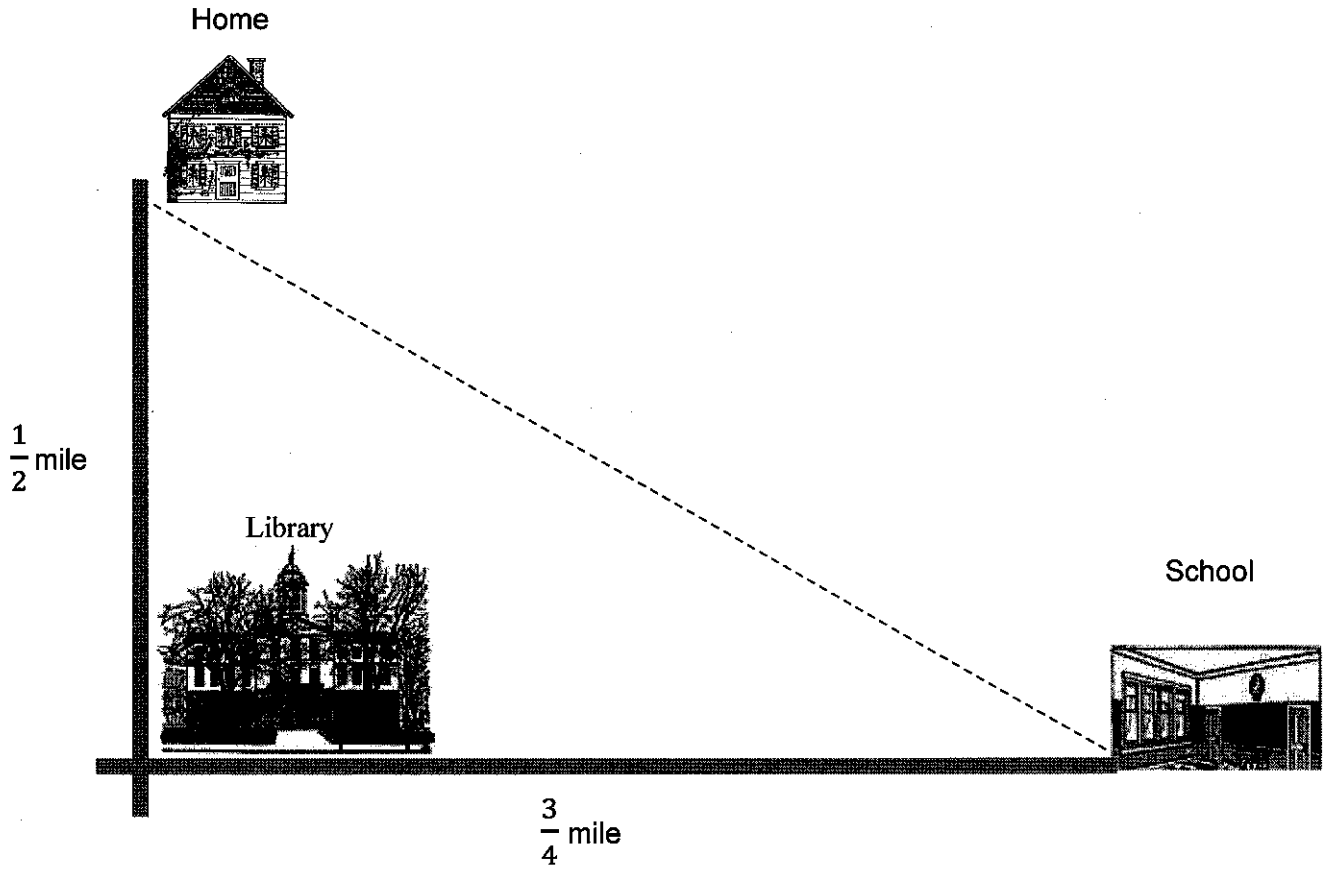
				CCSS.ELA-
32	D			CCSS.ELA-Literacy.RI.8.5
33	C			CCSS.ELA-Literacy.RI.8.1
34	B			Literacy.RI.8.3
35	D			CCSS.ELA-Literacy.RI.8.3
36	B			CCSS.ELA-Literacy.RI.8.2
37	B			Literacy.RI.8.5 CCSS.ELA-
38	C			Literacy.RI.8.1 CCSS.ELA-
39	A			CCSS.ELA-Literacy.RI.8.8
40	D			CCSS.ELA-Literacy.RI.8.8
41	A			CCSS.ELA-Literacy.RI.8.5
42	D			CCSS.ELA-Literacy.RI.8.3
43	B			CCSS.ELA-Literacy.RI.8.1
44	B			CCSS.ELA-Literacy.RI.8.3
45	A			CCSS.ELA-Literacy.RI.8.1
46	A			CCSS.ELA-Literacy.RI.8.2

47	B			CCSS.ELA-Literacy.RI.8.8
48	C			CCSS.ELA-Literacy.RI.8.5
49	B			CCSS.ELA-50Literacy.RI.8.6

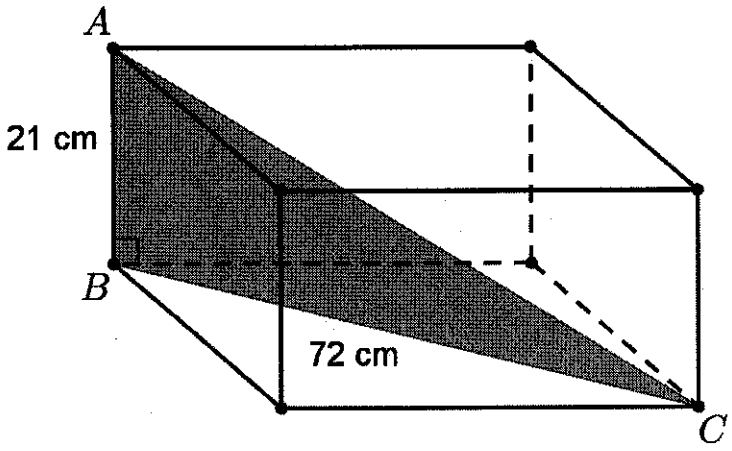
MAFS.8.G.2.7

A CALCULATOR IS ALLOWED

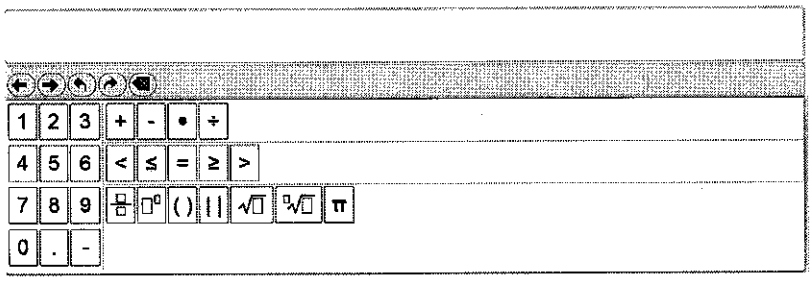
1. Lily and Matthew are walking from home to school. Matthew has to return a library book on the way and follows the sidewalk. Lily walks directly to school. Assume the path from home to the library is perpendicular to the path from the library to school. Use the lengths in the diagram to determine how far Lily walks. Show your work and explain how you determined your answer.



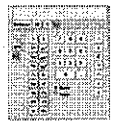
2. Find the length of $\overline{AC}$ given a right rectangular prism that has measurements in centimeters as shown in the diagram. Show your work and explain how you determined your answer.



3. After deciding to remodel his house a little, Mr. Feeney bought a 15-foot handrail for his new staircase. If the second story of the house is 12 feet above the first floor, how long (horizontally) should Mr. Feeney's staircase be?

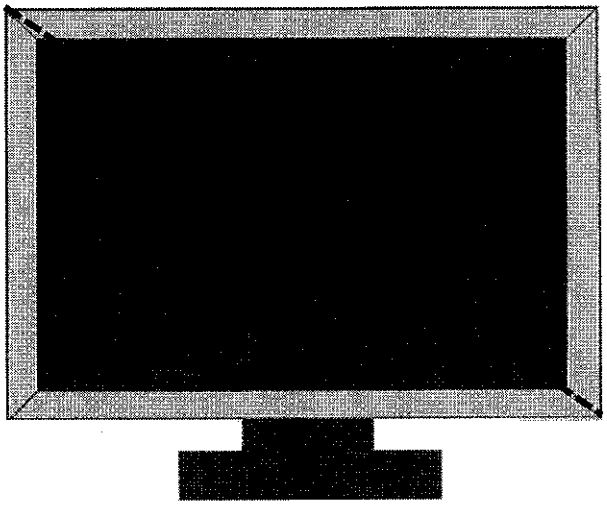


MAFS.8.G.2.7 FSA PRACTICE



A CALCULATOR IS ALLOWED

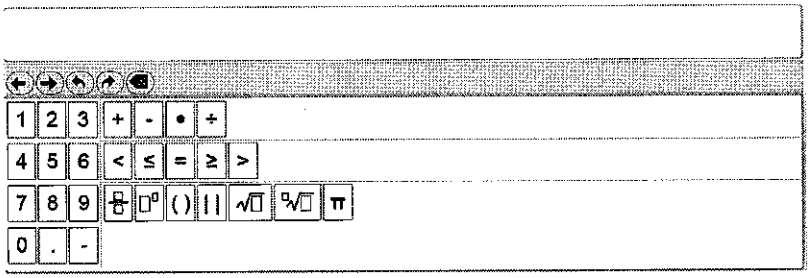
1.



28 in.

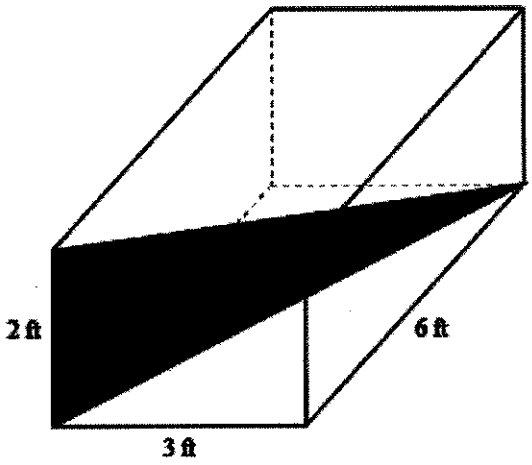
Television sizes are given by the length of the screen's diagonal. Tyrone wants a new 53 inch television for his bedroom. He plans to put the TV in a space that is 42 inches wide, but he is not sure it will fit. Tyrone knows the new television is rectangular and has a height of 28 inches. Determine whether the TV will fit in the available space. Show your work and explain how you determined your answer.

2. A right triangle has a hypotenuse of length 12 and a leg of length 8. What is the length of the other leg?



3.

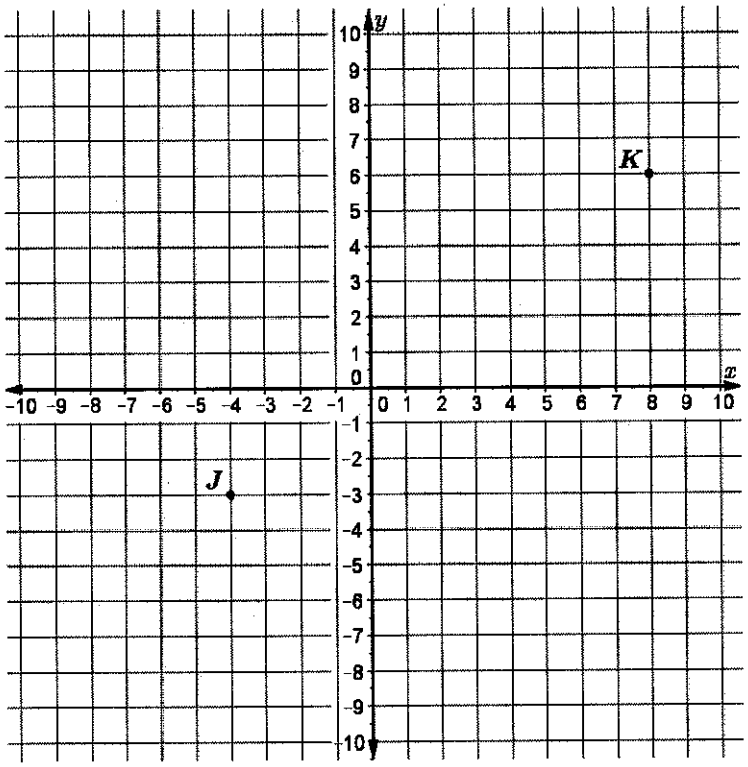
Twins James and Jamie, age 5, are getting bunk beds. Their parents picked up the box from Ruth and found that it has dimensions of 6 feet by 2 feet by 3 feet. Their minivan can only hold a box with a diagonal of 6.8 feet at most. Will the bunk bed fit in their trunk? Justify your answer.



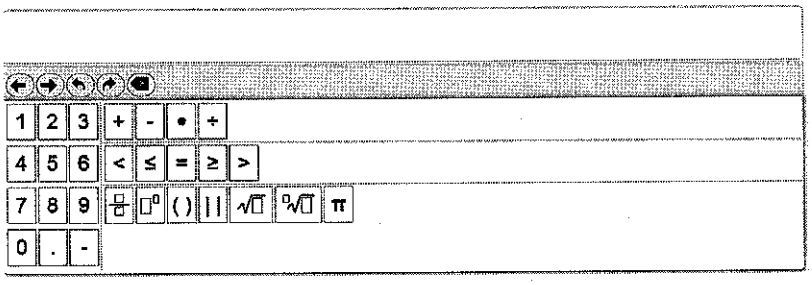
MAFS.8.G.2.8

A CALCULATOR IS ALLOWED

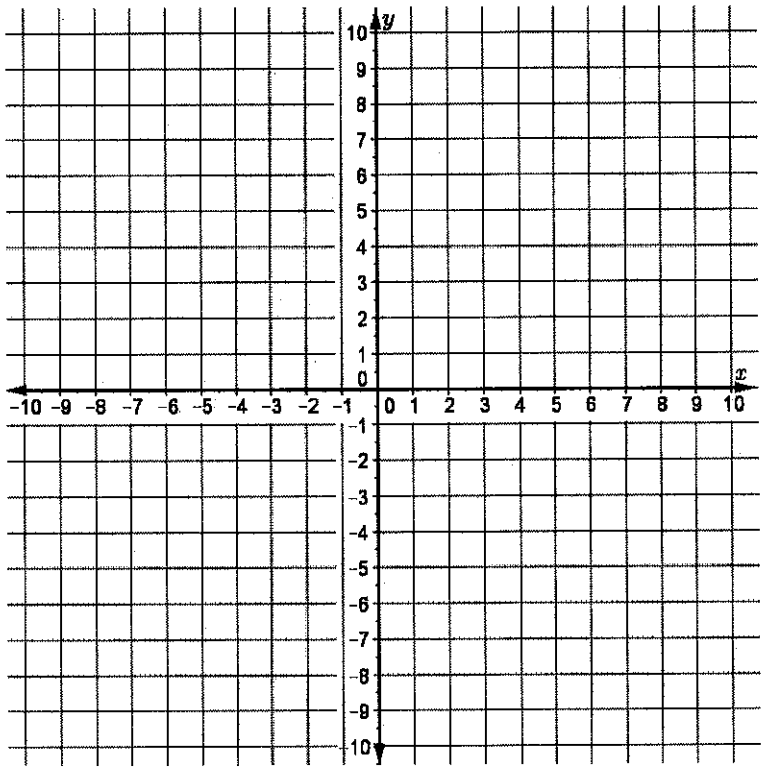
1. Find the distance between the points *J* and *K* shown on the coordinate plane. Show work to justify your answer.



2. What is the distance between (-1, 1) and (5,9)?



3. Graph and label triangle PQR whose vertices are located at $P(-5, 2)$, $Q(7, -3)$, $R(7, 2)$. Determine the length of each side and show work to justify your answers.



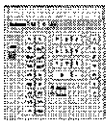
List the length of each side of the triangle:

$\overline{PQ}$ _____

$\overline{QR}$ _____

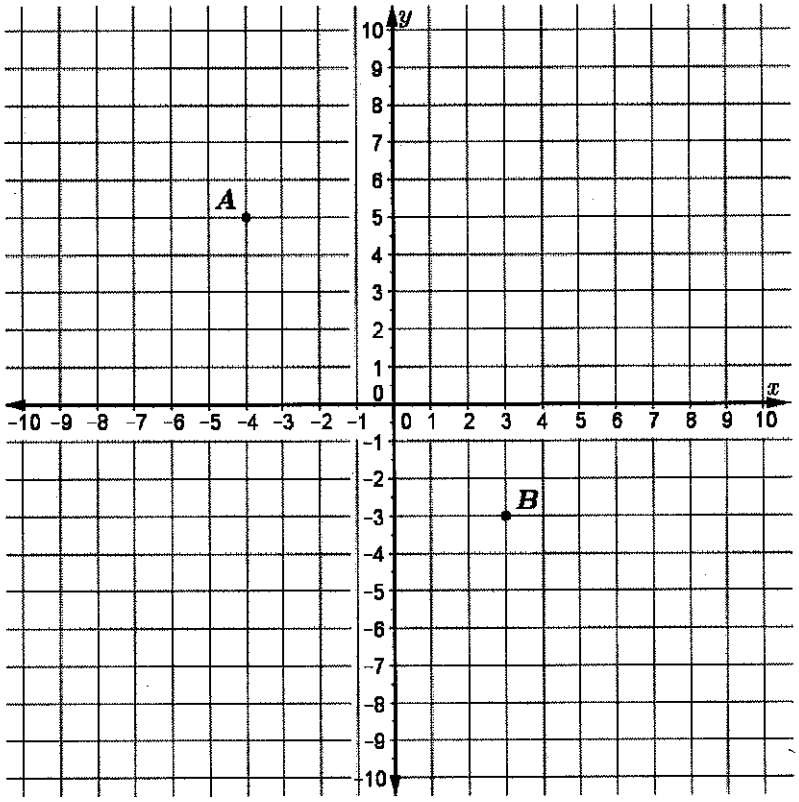
$\overline{RP}$ _____

MAFS.8.G.2.8 FSA PRACTICE

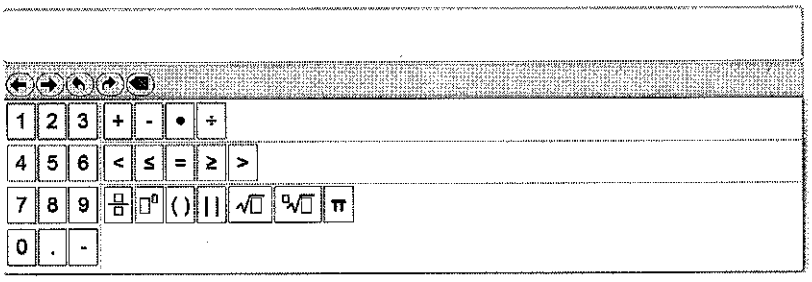


A CALCULATOR IS ALLOWED

1. Find the distance between points A and B in the coordinate plane. Show work to justify your answer.



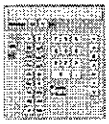
2. What is the distance between (1,4) and (4,8)?



3. Which two points are separated by a distance of 17 units?

Ⓐ (1, -2) and (13, 14)
Ⓑ (-2, -4) and (6, 9)
Ⓒ (-3, 11) and (5, -4)
Ⓓ (2, 5) and (13, -3)

MAFS.8.G.3.9

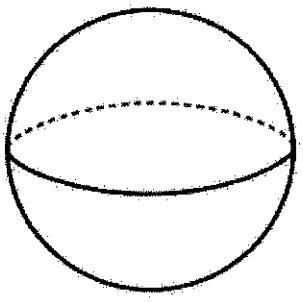


A CALCULATOR IS ALLOWED

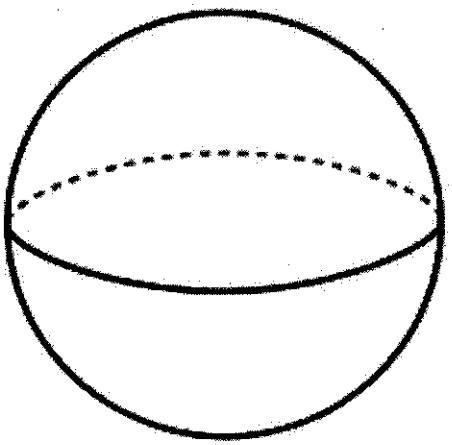
1. State the formula for finding the volume of a sphere.

Explain what each variable in the formula represents.

On the diagram, draw and label the dimensions represented by the variables in the formula.



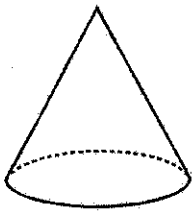
A science teacher fills a spherical bubble with hydrogen gas. The bubble has a diameter of 8 centimeters. Find the volume of hydrogen gas in terms of π, and explain or show how you found your answer.



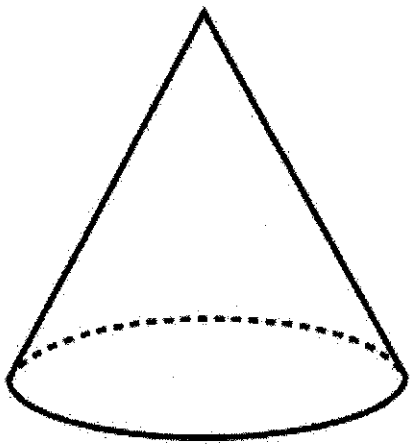
2. State the formula for finding the volume of a cone.

Explain what each variable in the formula represents.

On the diagram, draw and label the dimensions represented by the variables in the formula.



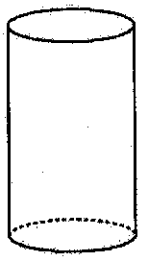
Sugar was traditionally produced and sold as sugarloaves, which are cones of sugar wrapped in paper. Find the volume of a cone-shaped sugarloaf with a base diameter of 8 centimeters and a height of 22 centimeters. Explain or carefully show how you calculated the volume.



3. State the formula for finding the volume of a cylinder.

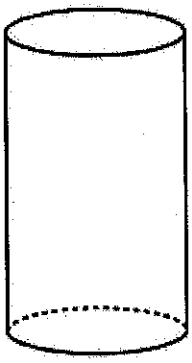
Explain what each variable in the formula represents.

On the diagram, draw and label the dimensions represented by the variables in the formula.

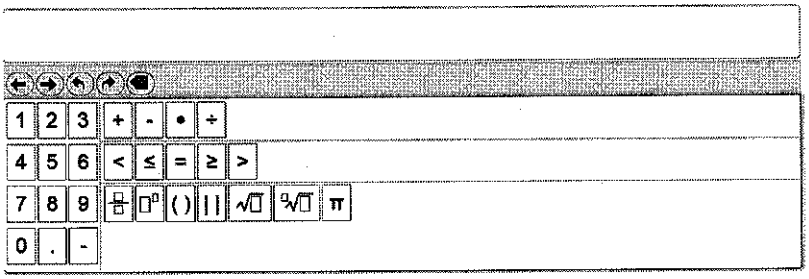


Until 2014, the mass of a kilogram was defined as exactly equal to the mass of a special platinum-iridium cylinder kept in Sèvres, France. The cylinder's diameter and height are both 39.2 millimeters.

What is the volume of this cylinder? Explain how you found your answer.



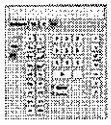
4. A basketball has a circumference of 29.5 inches. Using 3.14 as an approximation for π, what is the basketball's volume to the nearest cubic inch?



5. What is the volume of a cylinder with a radius of 4m and a height of 5m?

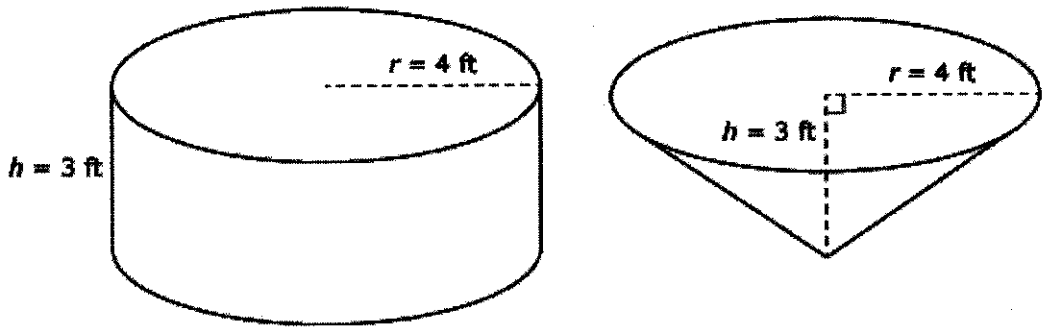
- $40\pi\ m^3$
- $80\pi\ m^3$
- $100\pi\ m^3$
- $400\pi\ m^3$

MAFS.8.G.3.9 FSA PRACTICE



A CALCULATOR IS ALLOWED

1. The figure shows a right-circular cylinder and a right-circular cone. The cylinder and the cone have the same base and the same height.



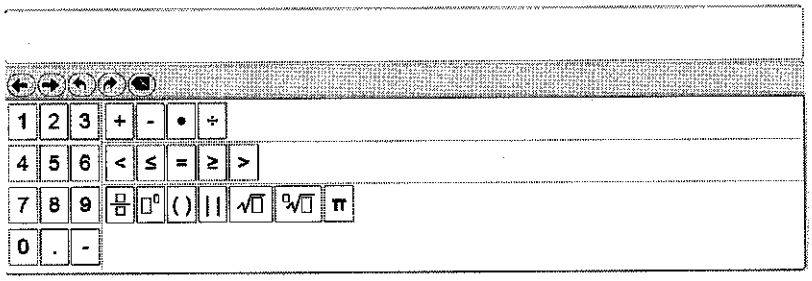
Part A

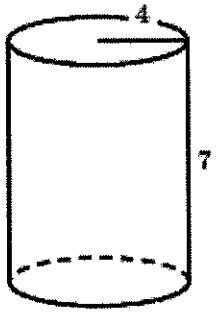
What is the volume of the cone, in cubic feet?

A. 12π B. 16π C. 36π D. 48π

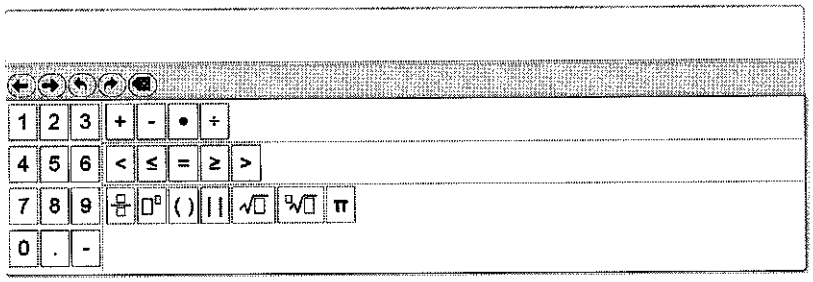
Part B

What is the ratio of the cone's volume to the cylinder's volume?
Enter your answer in the space provided. Enter **only** your fraction.



2. 

What is the volume of a cylinder with base radius 4 and height 7?



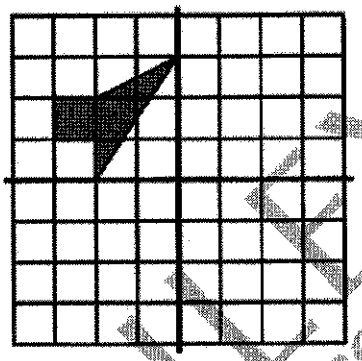
8th Grade

MAAP Tested Domains Performance Tasks

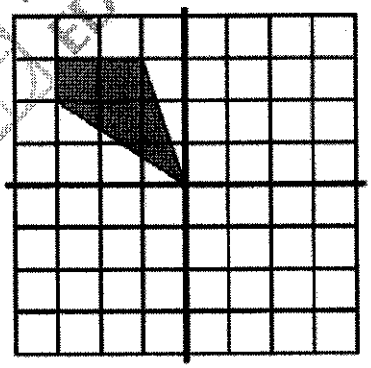
Task #1: Aaron's Designs

Aaron is drawing some designs for greeting cards. He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant. He then reflects, rotates or translates the shape into the other the quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line. Then reflect both of the shapes over the horizontal line. This will make a design in all four quadrants.

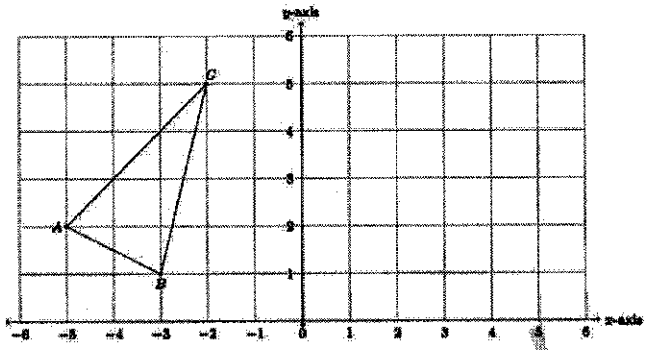


2. To finish drawing Aaron's second design, rotate the gray shape ¼ of a turn in a clockwise direction about the origin. Then draw the second shape. Rotate the second shape ¼ of a turn in a clockwise direction about the origin; then draw the third shape. Finally, rotate the third shape ¼ of a turn in a clockwise direction about the origin; then draw the fourth shape. This will make a design in all four quadrants.



Task #2: Reflecting Reflections

Below is a picture of a triangle on a coordinate grid.

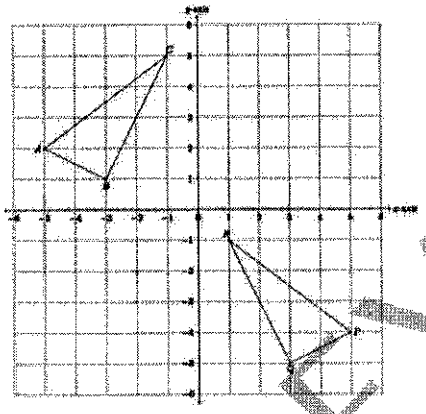


1. Draw the reflection of $\triangle ABC$ over the line $x = -2$. Label the image of A as A', the image of B as B' and the image of C as C'.

2. Draw the reflection of $\triangle A'B'C'$ over the line $x = 2$. Label the image of A' as A'', the image of B' as B'' and the image of C' as C''.

Task #3: Triangle congruence with Coordinates

Triangles *ABC* and *PQR* are shown below in the coordinate plane:

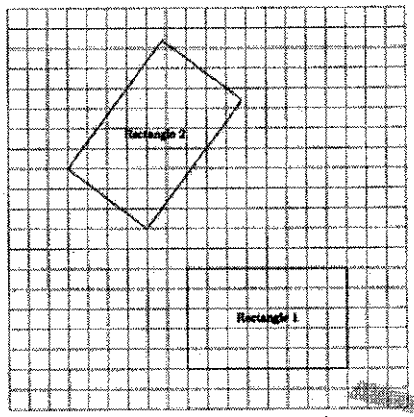


1. Show that $\triangle ABC$ is congruent to $\triangle PQR$ with a reflection followed by a translation.

2. If you reverse the order of your reflection and translation in part (a) does it still map $\triangle ABC$ to $\triangle PQR$?

Task #4: Congruent Rectangles

Below is a picture of two rectangles with the same length and width:



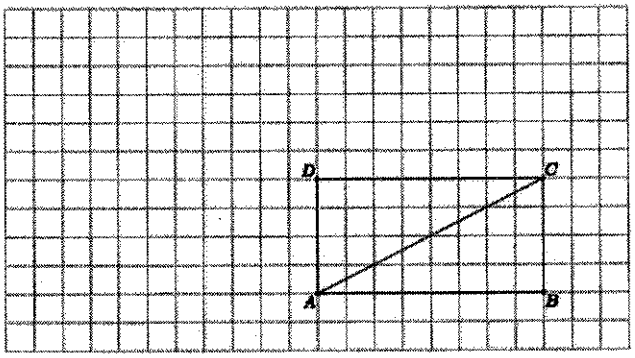
1. Show that the rectangles are congruent by finding a translation followed by a rotation which maps one of the rectangles to the other.

2. Explain why the congruence of the two rectangles cannot be shown by translating Rectangle 1 to Rectangle 2.

3. Can the congruence of the two rectangles be shown with a single reflection? Explain.

Task #5: Cutting a rectangle into two congruent Triangles

Below is a picture of a rectangle *ABCD* with diagonal *AC*.



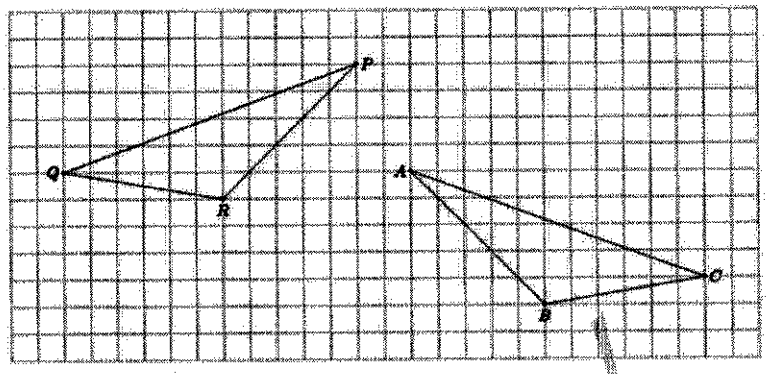
1. Draw the image of triangle *ACD* when it is rotated 180° about vertex *D*. Call *A'* the image of point *A* under the rotation and *C'* the image of point *C*.

2. Show that $\triangle A'C'D$ can be translated to $\triangle CAB$. Conclude that $\triangle ACD$ is congruent to $\triangle CAB$.

3. Explain why $DA' \cong DA$ and why DC' is parallel to AB.

Task #6: Congruent Triangles

The two triangles in the picture below are congruent:



1. Give a sequence of rotations, translations, and/or reflections which take $\triangle PRQ$ to $\triangle ABC$.

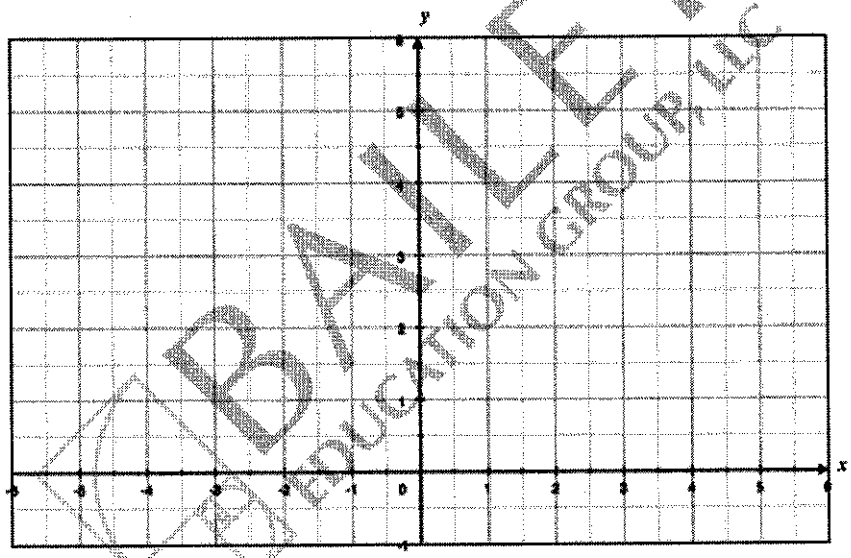
2. Is it possible to show the congruence in part (a) using only translations and rotations? Explain.

Task #7: Coordinating Reflections

Antonio and his friend Brittany were at a summer math camp that had a large *coordinate plane* drawn on the gym floor. Antonio challenged Brittany to try and mirror him as he traveled around the first quadrant.

Map Antonio's and Brittany's movements on this coordinate plane:

"Antonio began at $(2,1)$ *and walked to* $(3,5)$*; Brittany decided to begin at* $(-2,1)$*, then tried to mirror Antonio by walking to* $(-3,5)$*. Antonio jumped to* $(5,5)$ *and side-stepped to* $(4,3)$*; Brittany jumped to* $(-5,5)$ *then side-stepped to* $(-4,3)$*. Antonio returned to* $(2,1)$ *and Brittany returned to* $(-2,1)$*."*



1. Did Brittany mirror Antonio?

2. If Brittany had instead begun at $(-2,1)$, walked to $(-4,3)$, side-stepped to $(-5,5)$, jumped to $(-3,5)$ and then returned to (-2,1), could she claim that she created a mirror image of Antonio's path? Justify your answer.

Task #8: Coordinating Translations

Your task is to plot any creative polygon you want on the coordinate plane, and then create polygons congruent to the one you designed using the three translations described below.

1. Translate the original polygon right 5 units. For each vertex of your original polygon in the form (*x*, y), what is its image's coordinates? What is the general form for the image's vertices?

2. Translate the original polygon down 4 units. For each vertex of your original polygon in the form (*x*, y), what is its image's coordinates? What is the general form for the image's vertices?

3. Translate the original polygon left 4 units and up 2 units. For each vertex of your original polygon in the form (*x*, y), what is its image's coordinates? What is the general form for the image's vertices?

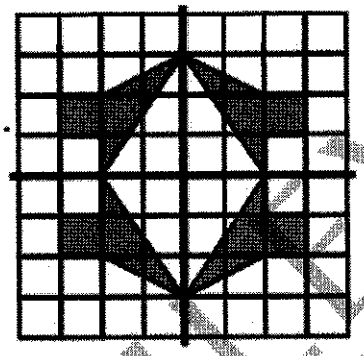
8th Grade Performance Tasks – Tested
G.1, G.2 and G.3

Illustrative Mathematics
Georgia Standards
Inside Mathematics
NCDPI
HCPSS
Engage NY
Math is Love
Robert Kaplinsky
Dan Meyer
Illuminations

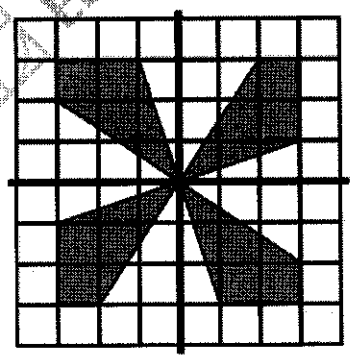
Task #1: Aaron's Designs—KEY

Aaron is drawing some designs for greeting cards. He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant. He then reflects, rotates or translates the shape into the other the quadrants.

1. *Finish Aaron's first design by reflecting the gray shape over the vertical line. Then reflect both of the shapes over the horizontal line. This will make a design in all four quadrants.*



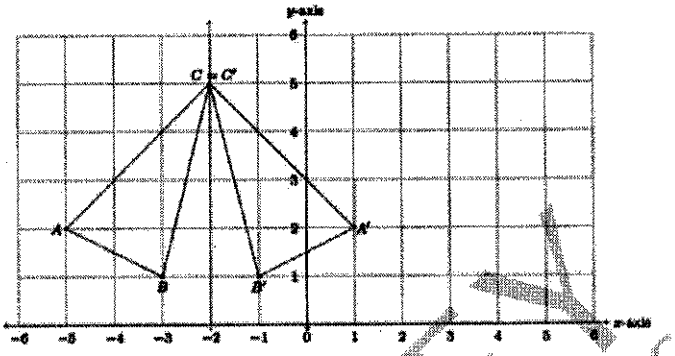
2. *To finish drawing Aaron's second design, rotate the gray shape ¼ of a turn in a clockwise direction about the origin. Then draw the second shape. Rotate the second shape ¼ of a turn in a clockwise direction about the origin; then draw the third shape. Finally, rotate the third shape ¼ of a turn in a clockwise direction about the origin; then draw the fourth shape. This will make a design in all four quadrants.*



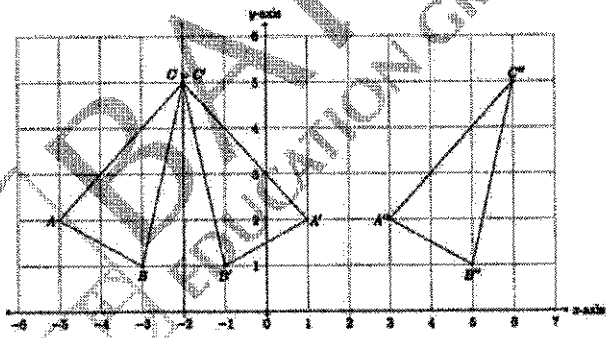
Task #2: Reflecting Reflections—KEY

Below is a picture of a triangle on a coordinate grid.

1. *Below is a picture of triangle ABC and its reflection about x = −2, triangle A′ B′ C′.*

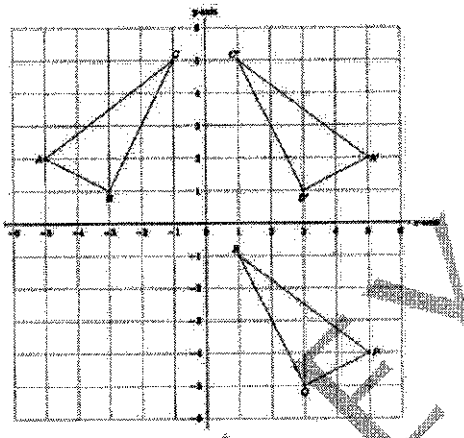


2. *Below is the picture of triangle ABC and its reflection A′ B′ C′ together with the reflection of A′ B′ C′ over the line x = 2.*



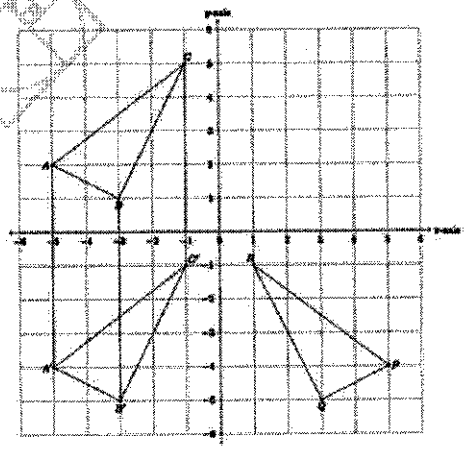
Task #3: Triangle congruence with Coordinates—KEY

1. Below the y-axis is shaded red and triangle ABC is reflected over the y-axis. The image of this reflection is triangle A'B'C'. Reflecting about the y-axis leaves the y- coordinate of each point the same and switches the sign of the x-coordinate.



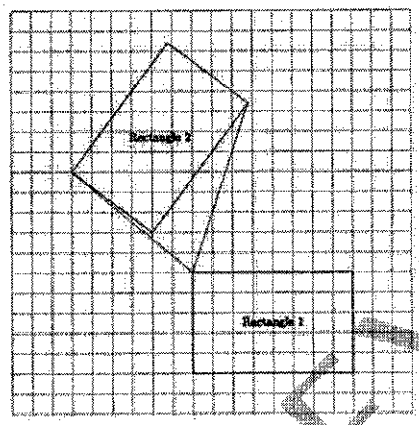
To find the coordinates after applying this translation, the x-coordinate stays the same and we subtract 6 from the y-coordinate of each point.

2. The answer here will depend on which reflection and translation have been chosen in Question 1. For the reflection and translation chosen above, we reverse the order by first translating $\triangle ABC$ by 6 units downward and then reflecting over the y-axis. Below, the translated triangle is triangle A'B'C' and its reflection over the y-axis is $\triangle PQR$:

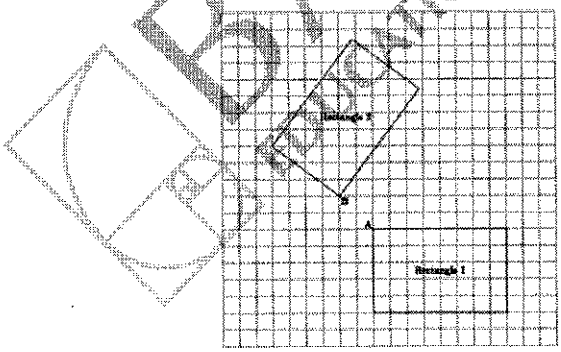


Task #4: Congruent Rectangles—KEY

1. We can do this by choosing a vertex of Rectangle 1 and then translate this to a carefully selected vertex of Rectangle 2 and then follow this with a rotation about the chosen vertex of Rectangle 2.



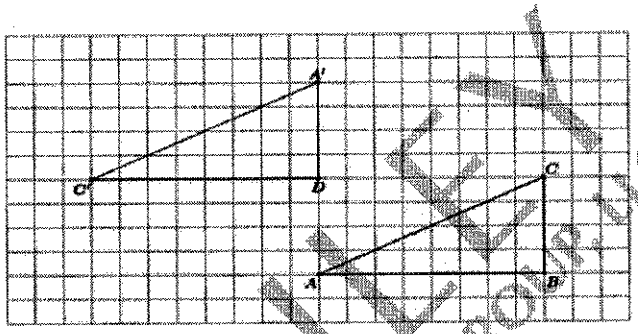
2. A translation can move Rectangle 1 to any other position on the coordinate grid but will not influence the angles its sides make with the grid lines. Since none of the lines containing sides of Rectangle 2 are parallel to the grid lines, Rectangle 1 cannot be moved to Rectangle 2 with a translation.



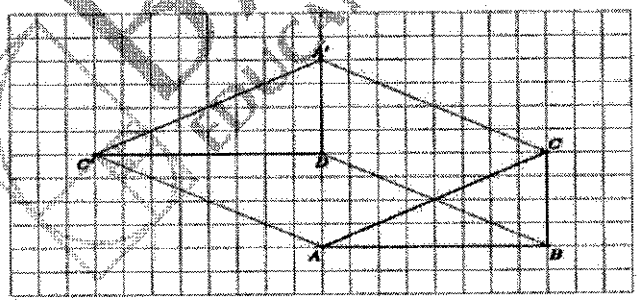
3. The congruence cannot be exhibited with a single reflection. To see this, we can choose a vertex of Rectangle 1.

Task #5: Cutting a rectangle into two congruent Triangles—KEY

1. Rotation by 180° about D takes any line through D to itself but switches the orientation of the line. So, for example, line DA is taken to DA but the notions of up and down on this vertical line are reversed. So, point A, which is four units below D will be mapped to the point A′ which is four units above D. The points D and C, on the other hand, lie on a horizontal line through D. So, rotation by 180° about D has the effect of switching left and right on this line. Since C lies 8 units to the right of D, its image, C′, after rotating 180° about D will be the 8 units to the left of D. This is pictured below:



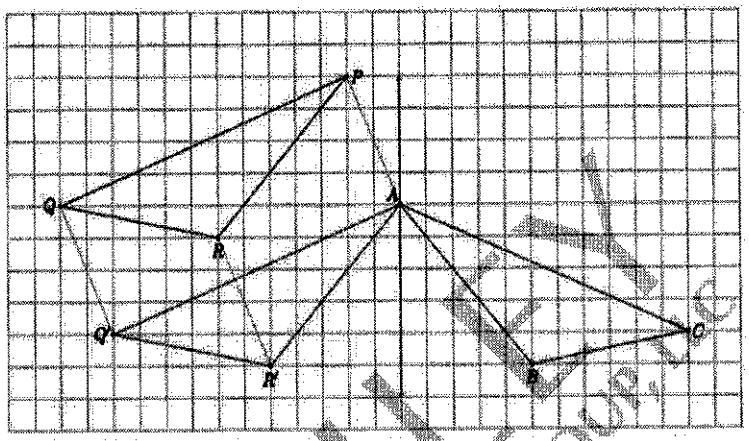
2. To send D to B we need to translate by 8 units to the right and 4 units down. Translating by 8 units to the right and 4 units down also takes C′ to A and A′ to C as is seen in the picture below:



3. Rotation by 180° about D maps any line through D to itself, exchanging the two rays through D which make up the line. This means that DA′ = DA since DA′ is the rotation of line DA by 180° about D. Similarly, DC′ = DC. So, DC′ is a horizontal line of the grid, as is AB, and so these two lines are parallel, remaining four units apart from one another.

Task #6: Congruent Triangles—KEY

1. There are multiple possible approaches. One possible approach is as follows: begin by translating the vertex P of △PRQ to the corresponding vertex A of △ABC. The image of this translation is pictured below with the image of R denoted R′ and the image of Q denoted Q′ (note that the image of P is A). This translation △PRQ moves each point of △PRQ two boxes to the right and four boxes down.



2. If we move from vertex P to vertex R to vertex Q on △PRQ then we are moving around △PRQ in a clockwise direction. If we move from vertex A to vertex B to vertex C on △ABC, on the other hand, then we are moving in a counterclockwise direction. Both translations and rotations preserve the notions of clockwise and counterclockwise in the plane. Reflections, on the other hand, reverse these two directions. Since triangles PRQ and ABC have different orientations at least one reflection is needed to show this congruence.

Task #7: Coordinating Reflections—KEY

1. Yes, Brittany mirrored Antonio. The line of symmetry (line of reflection) is the y-axis. Students should recognize through a class discussion that the y-axis is a "mirror" or reflection line. Some may argue that Brittany should have moved initially to (-1, 5), which is moving the same distance and direction as Antonio and results in a translation.

2. Yes, the completed path is a mirror image. Students should provide a justification for their answer that can help them develop the definition of reflections. During whole group discussions, teachers should use student justifications and debates about the questions to help students come to a consensus about a definition that is not dependent upon the particular movement of Brittany. Instead it is dependent upon creating a set of corresponding points that are reflected across the line of reflection.

Task #8: Coordinating Translations—KEY

Your task is to plot any creative polygon you want on the coordinate plane, and then create polygons congruent to the one you designed using the three translations described below.

1. Translate the original polygon right 5 units. For each vertex of your original polygon in the form (*x*, y), what is its image's coordinates? What is the general form for the image's vertices? $(x + 5, y)$

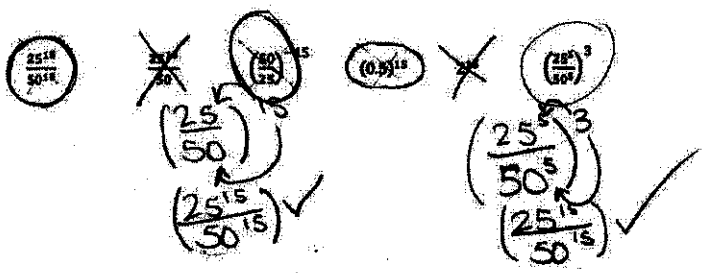
2. Translate the original polygon down 4 units. For each vertex of your original polygon in the form (*x*, y), what is its image's coordinates? What is the general form for the image's vertices? $(x, y - 4)$

3. Translate the original polygon left 4 units and up 2 units. For each vertex of your original polygon in the form (*x*, y), what is its image's coordinates? What is the general form for the image's vertices? $(x - 4, y + 2)$

MAFS.8.EE.1.1

1. $\frac{1}{49}$ and $\frac{1}{7^2}$ with work or an explanation to support the answer.

2. $\frac{25^{15}}{50^{15}} : \left[\frac{50}{25}\right]^{-15} : (0.5)^{15} : \left(\frac{25^5}{50^5}\right)^3$



3.

Expression	Matches	Solution
$b^x \cdot b^y$	⟷	[redacted]
$b^x \div b^y$	⟷	[redacted]
b^{-y}	⟷	[redacted]
$(b^x)^y$	⟷	[redacted]

4. 2^6

PLEASE NOTE: THE HANDWRITTEN PORTION OF THE ANSWER KEY ARE SCREENSHOTS OF EXAMPLES OF STUDENTS' WORK FROM CPALMS FORMATIVE ASSESSMENTS.

MAFS.8.EE.1.1 FSA PRACTICE

1. Which expressions are equivalent to $\frac{1}{2^6}$? Select all that apply.

■	$2^{-5} \cdot 2^{-1}$
□	$2^{-3} \cdot 2^{2}$
■	$2^{-2} \cdot 2^{-4}$
□	$2^{1} \cdot 2^{5}$
□	$2^{1} \cdot 2^{6}$
■	$2^{2} \cdot 2^{-8}$
□	$2^{2} \cdot 2^{3}$

2. Choose the expressions that are **NOT** equivalent to $\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}$?

■	$\frac{1}{4^5}$
■	$\left(\frac{1}{4}\right)^{-5}$
□	$4^{-3} \cdot 4^{-2}$
■	4^5
□	$\frac{1}{256}$
■	$\frac{1}{20}$

3. C. 9

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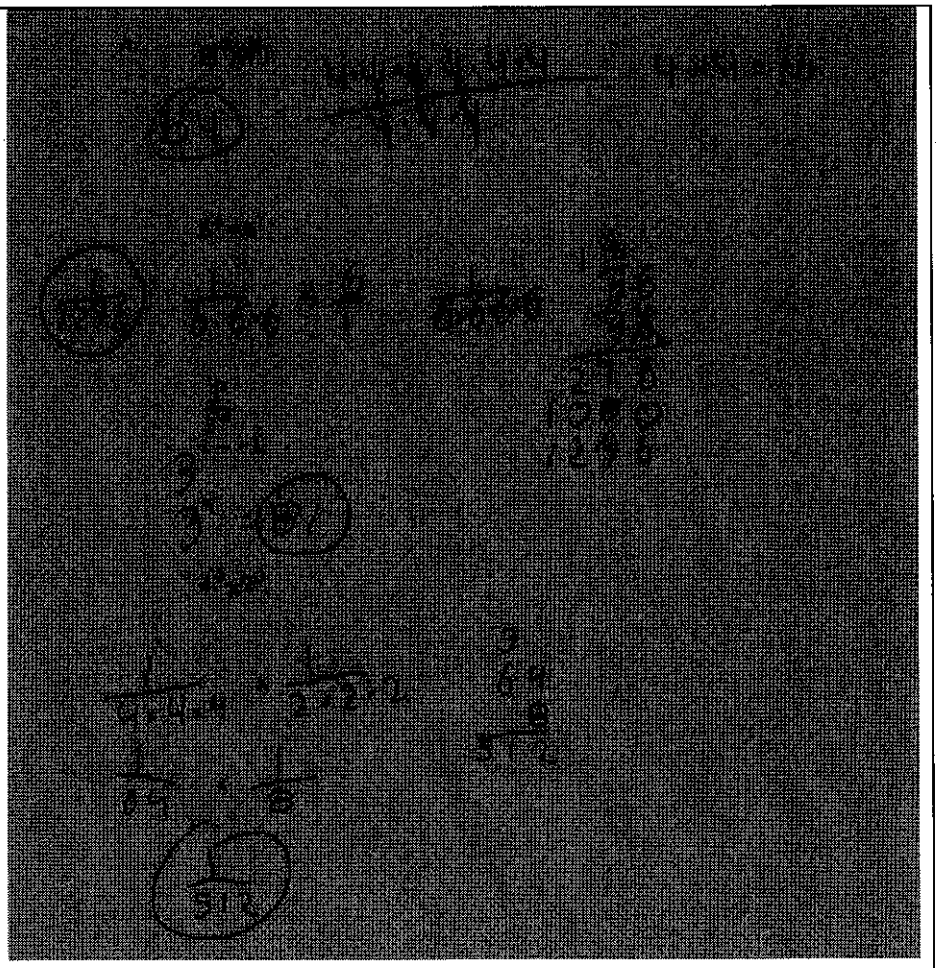
4.	

MAFS.8.EE.1.2

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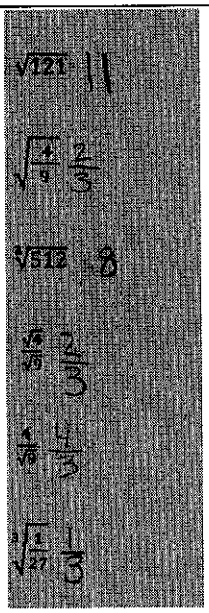
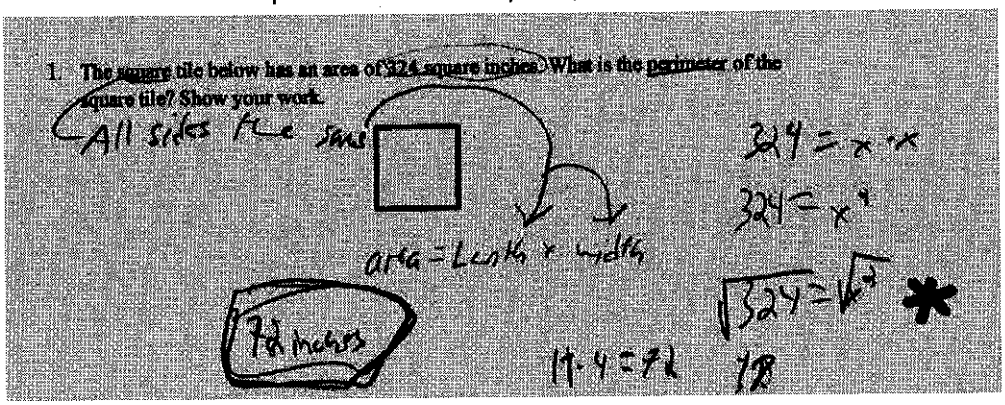
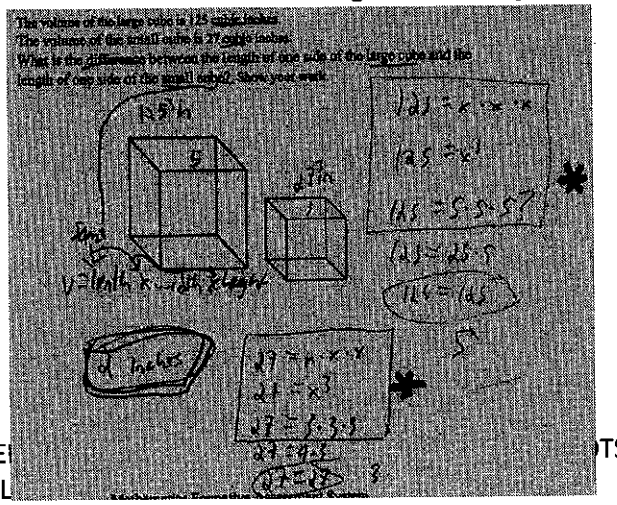
1.	
2.	The student takes the square root of the area of the square to determine the length of its sides getting a length of 18 in. The student multiplies 18 by four to find the perimeter of the square, 72 in. 
	The student takes the cube roots of the volumes of the cubes to determine the length of their sides, 5 in. and 3 in. Then, the student subtracts the length of the small cube from the length of the large cube getting 2 in. 

PLEASE NOTE: THE HANDWRITTE TS OF EXAMPLES OF STUDENTS' WORK FROM CPAL

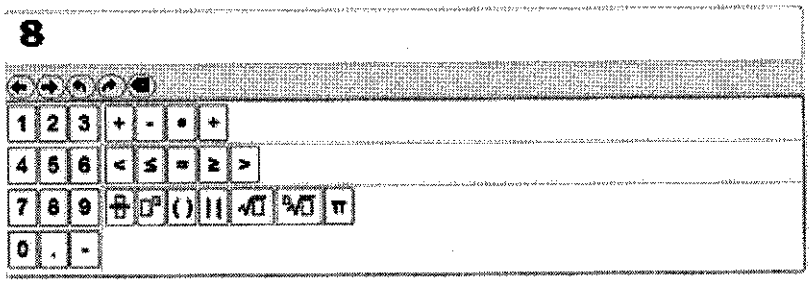
MAFS.8.EE.1.2 FSA PRACTICE

1. C

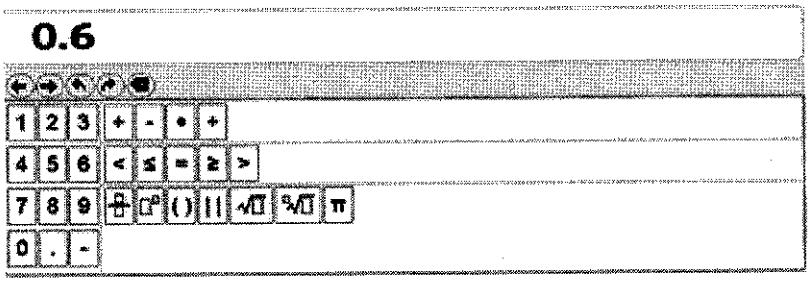
2. Which of the following statements best describe the positive solution of the equation? Select all that apply.

☐	The positive solution is 1
☐	The positive solution is a rational number
■	The positive solution is an irrational number
☐	The positive solution is greater than 0 but less than 1
☐	The positive solution is a repeating decimal
■	The positive solution is greater than 1 but less than 2

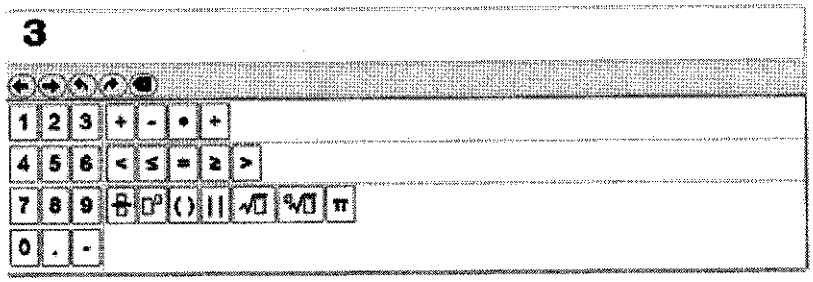
3.



4.



5.



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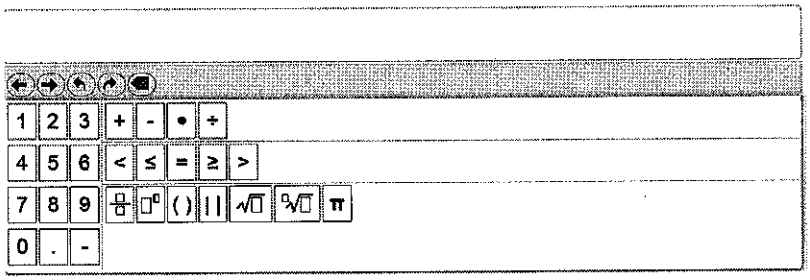
MAFS.8.EE.1.3

1. The student writes 4 x 10^{13} for the first estimate.



2. The student writes 5 x 10^{-11} for the second estimate.

3. Correct answers and possible explanations:
(A) < ; the larger the exponent, the larger the number.
(B) < ; the first is less than zero, the second is greater than zero; a negative number is always less than a positive number.
(C) > ; the one with the negative exponent is smaller since it is a number between zero and one.
(D) < ; the more negative the exponent, the smaller the number.
(E) < ; the more negative the number, the smaller it is; when they are both negative numbers, the one closer

A. 6×10^{16} [<] 4×10^{17}

The exponent of 4×10^{17} is greater than 6×10^{16}. Which means that 4×10^{17} is one place value greater.

B. -5×10^{12} [<] 3×10^{-12}

-5×10^{12} in standard form is negative and 3×10^{12} in standard form is positive.

C. 1×10^{16} [>] 9×10^{-19}

1×10^{16} in standard form is greater than 9×10^{-19} because 9×10^{-19} is a decimal.

D. 7×10^{-14} [<] 7×10^{-11}

7×10^{-11} is 3 place values greater than 7×10^{-14}

E. -2×10^{15} [<] -2×10^{13}

Even though both expressions are negative, -2×10^{13} is greater than -2×10^{15} because its exponent is smaller.

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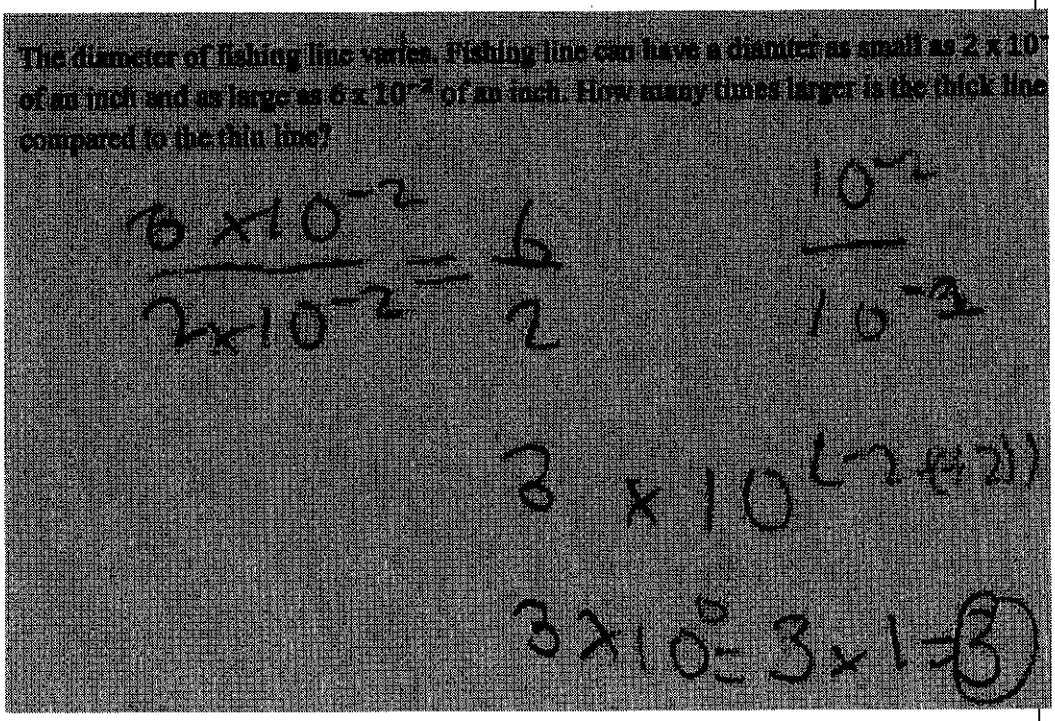
4.	

MAFS.8.EE.1.3 FSA PRACTICE

1.	$4 \cdot 10^{-6}$
2.	$5 \cdot 10^{9}$

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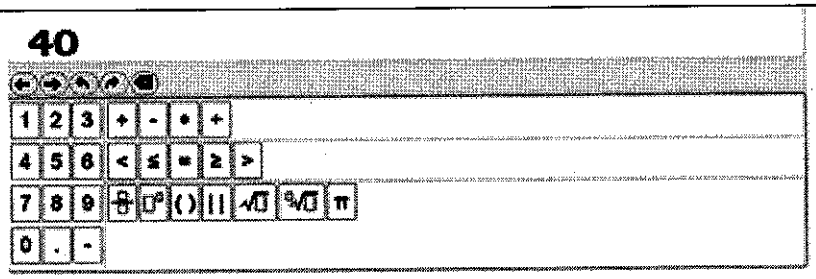
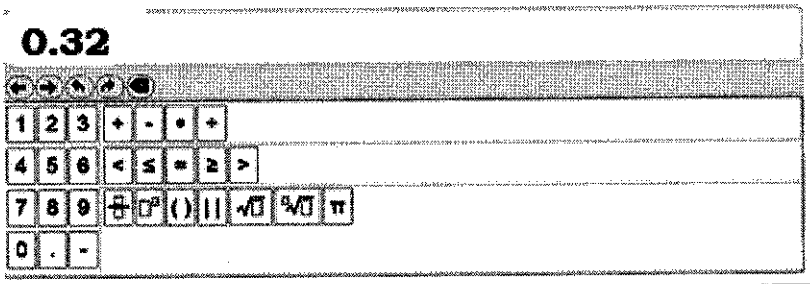
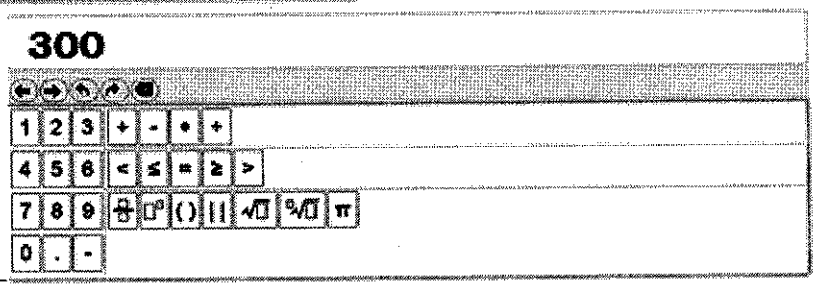
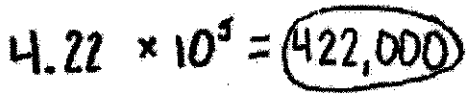
3.	
4.	A
5a.	C
5b.	
6.	 

MAFS.8.EE.1.4

1.	The student correctly interprets scientific notation generated by technology and converts the number to standard notation. For the first problem, the student writes: $4.22 \times 10^5 = 422,000$.  

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2.	The student correctly interprets scientific notation generated by technology and converts the number to standard notation. For the second problem, the student writes: $8.04 \times 10^{-6} = 0.00000804$ $8.04 \times 10^{-6} = .00000804$ .000008.04
3.	The student correctly completes operations with all numbers in scientific notation: $\frac{3.98 \times 10^6}{10^3} = 3.98 \times 10^3 \text{ mi}^2$ $\frac{3.98 \times 10^6}{10^3} = 3.98 \times 10^3 \text{ m}^2$
4.	The student correctly adds and subtracts in each problem getting answers of 109.916 grams A collection of meteorites includes three meteorites that weigh 1.1×10^2 grams, 6.8×10^1 grams, and 8.4×10^{-2} grams. What is the difference between the mass of the heaviest meteorite and the mass of the lightest meteorite? Show work and write your answer in standard notation. heaviest-1.1×10^2 lightest-8.4×10^{-2} 109 9 9 110.00 000.84 109.16 109.16 grams
5.	$1.6 \cdot 10^{-7}$

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MAFS.8.EE.1.4 FSA PRACTICE

1. A

2. 1.2×10^{5}

3. The student correctly multiplies and divides each pair of numbers in scientific notation getting answers of (1.76×10^{17}) gallons per year.

1. The Amazon River releases 5.5×10^7 gallons of water into the Atlantic Ocean every second. There are about 3.2×10^9 seconds in a year. How many gallons are released into the ocean in one year? Show all work, and give your answer in scientific notation.

$(5.5 \times 10^7) \times (3.2 \times 10^9)$
$= (5.5 \times 3.2) \times (10^7 \times 10^9)$ $\times 10^{9+7}$
$= 17.6 \times 10^{16}$
$= 1.76 \times 10^{17}$

4. $9 \cdot 10^{-8}$

5.

Expression	Matches	Solution
$14000 - (6 \times 10^3)$	⟷	[redacted]
$\frac{28,000,000}{(4 \times 10^3)}$	⟷	[redacted]
$(3 \times 10^4) + (4 \times 10^4)$	⟷	[redacted]
$(4 \times 10^2)(2 \times 10^2)$	⟷	[redacted]

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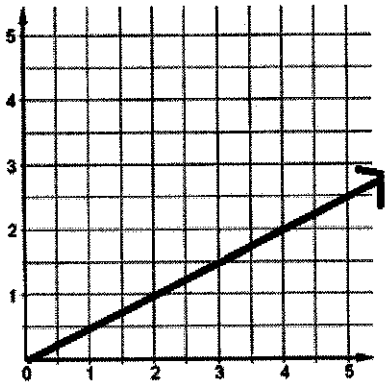
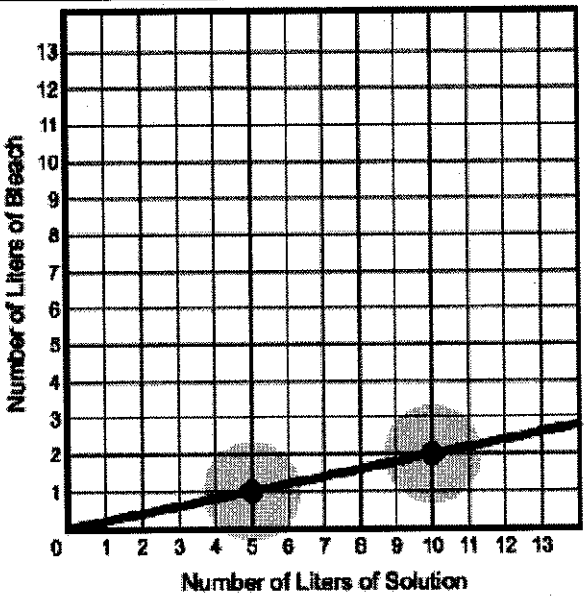
MAFS.8.EE.2.5

1.	The student correctly graphs the data in the table and identifies the slope of the line to be $\frac{1}{2}$. In addition, the student describes the slope of the line as a unit rate. For example, the student says, "It means that there is a half cup of sea salt for every gallon of distilled water. 
2.	
3.	Student response includes each of the following 3 elements: • Finds unit rates for both companies • Valid work or explanation of how unit rates are found for each company • Finds the cost of buying 2,375 kilowatt-hours of electricity from the least expensive company Sample Student Response: The unit rate for Company P is \$0.12 per kilowatt-hour of electricity. When I divide the cost by the number of kilowatt-hours of electricity I get the unit rate. $150.00 \div 1250 = 0.12$ $198.00 \div 1650 = 0.12$ The slope of a linear function can be considered the function's rate. The unit rate for Company M is \$0.15 per kilowatt-hour of electricity.

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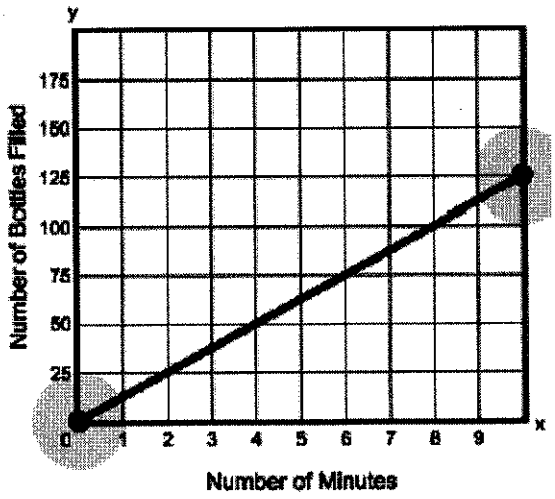
4.	The student identifies and interprets the slope in each representation. The student says that the slope of the graph of Jack's equation is $\frac{5}{4}$ which means that Jack charges \$5 for every 4 gallons of water the pail holds, or \$1.25 per gallon and the slope of Jill's graph is $\frac{4}{5}$ which means that Jill charges \$4 for every 5 gallons of water the pail holds or \$0.80 per gallon. When comparing the slopes, the student says: • If we graphed Jack's equation, the slope would be greater than the slope of Jill's graph (or Jill's slope is smaller than Jack's). • Jack charges more per gallon for his pails (or Jill charges less per gallon for her pails). • You will have to pay more for the same size pail if you buy it from Jack (or you'll have to pay less if you buy from Jill). • Jack has a bigger slope, so his is more expensive.

MAFS.8.EE.2.5 FSA PRACTICE

1.	The rate of change in Proportion A is 2.5 less than the rate in Proportion B.
2.	
3.	The student describes the unit rate as 400 square feet per gallon. Upon questioning, the student explains that a unit rate is a comparison of some quantity to one unit of another quantity, and the "one unit" must be in the denominator to be considered a unit rate. The student recognizes $\frac{800}{2}$ as an equivalent ratio, but confirms that it does not represent the unit rate. The student describes the slope as an increase of 400 square feet for every gallon of paint. Upon questioning, the student explains that the slope is the amount of change in *y* over the amount of change in *x* when

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comparing any two points on the line. The student recognizes $\frac{800}{2}$ is also the slope.

The student says that when the slope is written as the amount of rise compared to one unit of run, it is the same as a unit rate, and, in the given problem, each indicates that every gallon of paint covers 400 square feet. The student recognizes the slope of the line is determined by the unit rate of the proportional relationship.

4.

Student response includes each of the following 3 elements:

- Approximate miles per gallon for car M, from 25 to 27
- Approximate miles per gallon for car P, from 28 to 33
- Valid work shown or explanation given for each answer

Sample Student Response:

Car M gets approximately 26.5 miles per gallon.

I found this by finding an average unit rate for the table for Car M.

$50.4 + 80.5 + 181.3 + 137.5 = 449.7$ Total Miles

$2 + 3 + 7 + 5 = 17$ Total Gallons

$\frac{449.7}{17} \approx 26.5$ Miles Per Gallon

Car P gets approximately 31.7 miles per gallon.

I found this by approximating the points in the graph as

(1, 30), (2, 65), (3, 90), (4, 130), and (5, 160). Then I found the average unit rate for these points.

$30 + 65 + 90 + 130 + 160 = 475$ Total Miles

$1 + 2 + 3 + 4 + 5 = 15$ Total Gallons

$\frac{475}{15} \approx 31.7$ Miles Per Gallon

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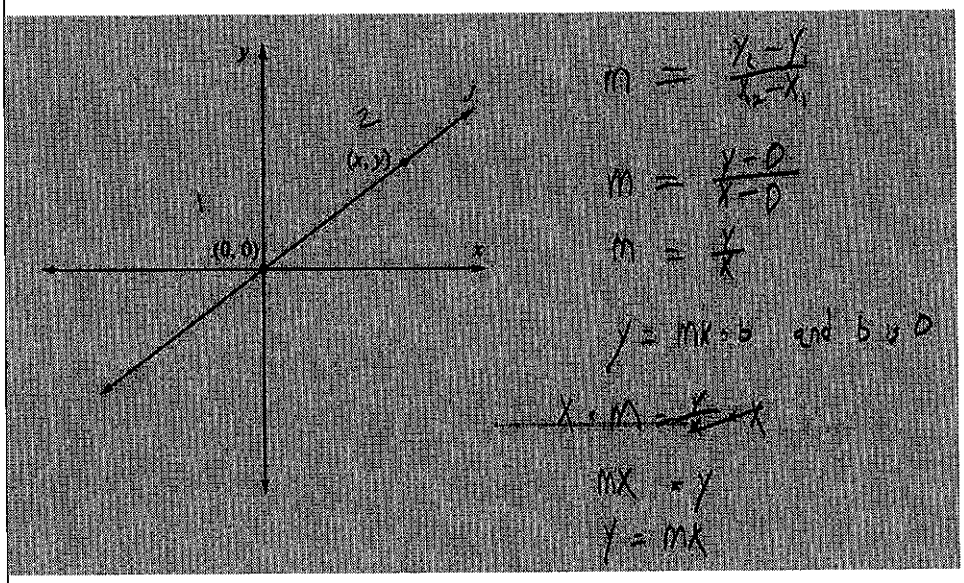
MAFS.8.EE.2.6

1.	The student explains that since $\angle E$ and $\angle F$ are both right angles, they are congruent. Since $\overleftrightarrow{EA}$ and $\overleftrightarrow{FB}$ are both vertical, they are parallel which means that $\angle EAB$ is congruent to $\angle FBD$ (by the Corresponding Angles Theorem). Since two angles of ΔCEA are congruent to two angles of ΔDFB, $\Delta CEA \sim \Delta DFB$ (by the AA Similarity Theorem). Since these triangles are similar, corresponding sides are proportional so that $\frac{EA}{EC} = \frac{FB}{FD}$. But both $\frac{EA}{EC} = \frac{FB}{FD}$ represent the slope of line *k*. Since these ratios are equal, the slope of line *k* can be calculated using either one.
2.	The student writes the equation $m = \frac{y_2 - y_1}{x_2 - x_1}$ and appropriately substitutes the coordinates of the two given points. The student clearly 

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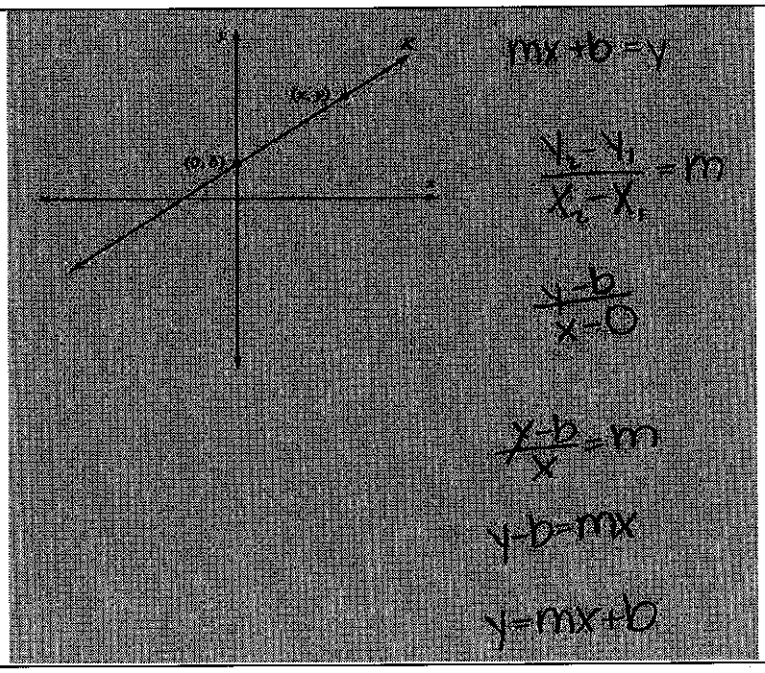
3.	

MAFS.8.EE.2.6 FSA PRACTICE

1.	■ The slope of $\overline{AC}$ is equal to the slope of $\overline{BC}$. ■ The slope of $\overline{AC}$ is equal to the slope of $\overline{BD}$. ■ The slope of $\overline{AC}$ is equal to the slope of line t. ☐ The slope of line t is equal to $\frac{EC}{AE}$. ■ The slope of line t is equal to $\frac{FB}{FD}$. ☐ The slope of line t is equal to $\frac{AE}{FD}$.
2.	A
3.	$y = 3x$

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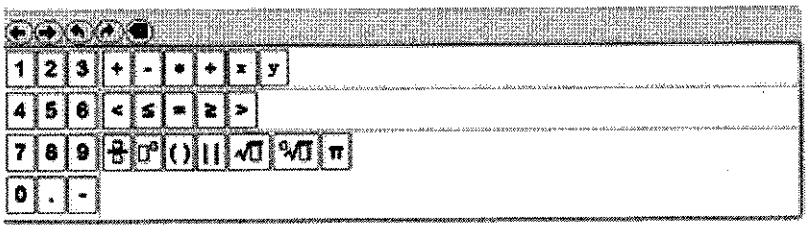
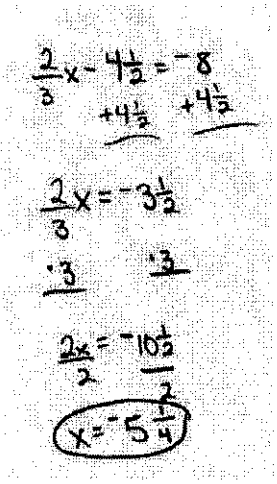
4.	$y = -\frac{4}{3}x - 15$ 

MAFS.8.EE.3.7

1.	The student correctly solves the equation clearly showing each step of work. The solution of the equation is given as $-5\frac{1}{4}$, -5.25, or $-\frac{21}{4}$. 

$\frac{2}{3}x - 4\frac{1}{2} = -8$

$+4\frac{1}{2} \quad +4\frac{1}{2}$

$\frac{2}{3}x = -3\frac{1}{2}$

$\cdot 3 \quad \cdot 3$

$\frac{2x}{2} = \frac{-10\frac{1}{2}}{2}$

$x = -5\frac{1}{4}$

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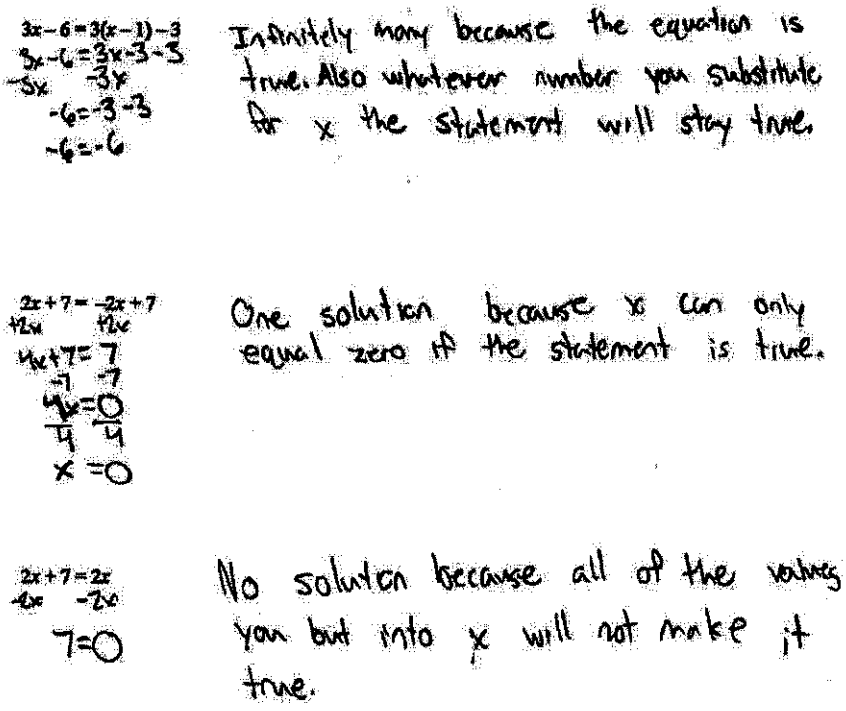
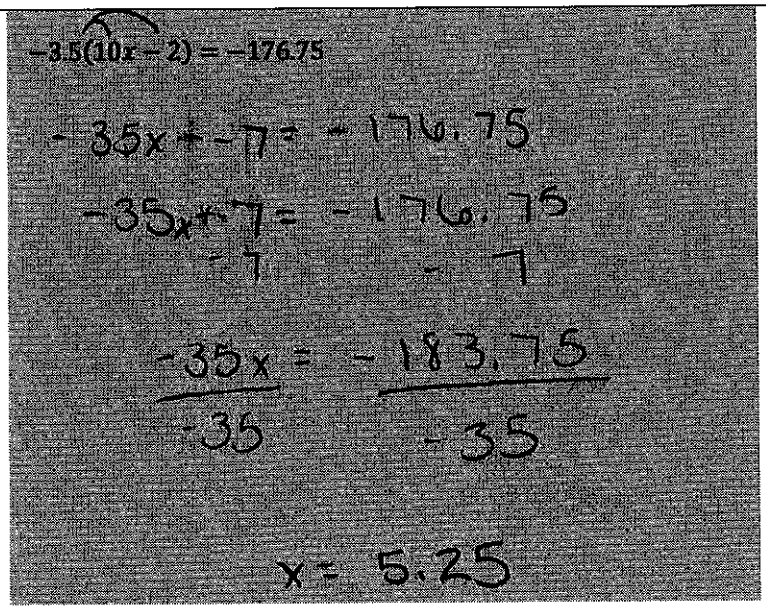
2.

The student:

- Correctly transforms the equation in #1 to an identity (e.g., $3x - 6 = 3x - 6$, $3x = 3x$, $-6 = -6$, $x = x$, $3 = 3$, or $0 = 0$) and interprets this to mean that the statement is true for all values of x and therefore has infinitely many solutions.
- Identifies that $x = 0$ in question #2 and states that this equation has one solution because the only value of x that makes the equation true is zero.
- Transforms the equation in question #3 to $7 = 0$ or reasons from its given form to conclude that the equation has no solutions because it produces a false statement or because there are no values of x for which the statement can be true.



3.



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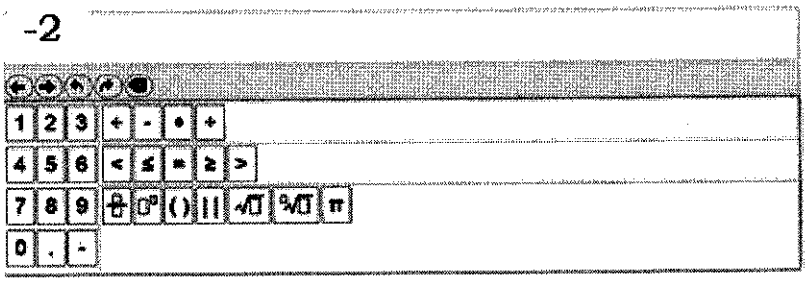
4.	

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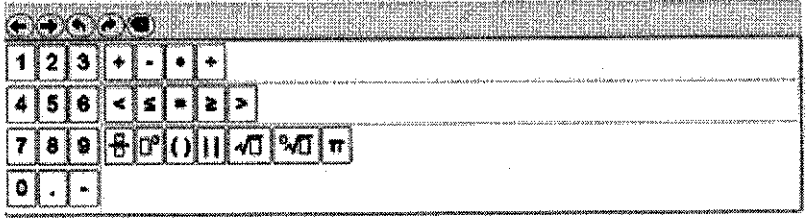
MAFS.8.EE.3.7 FSA PRACTICE

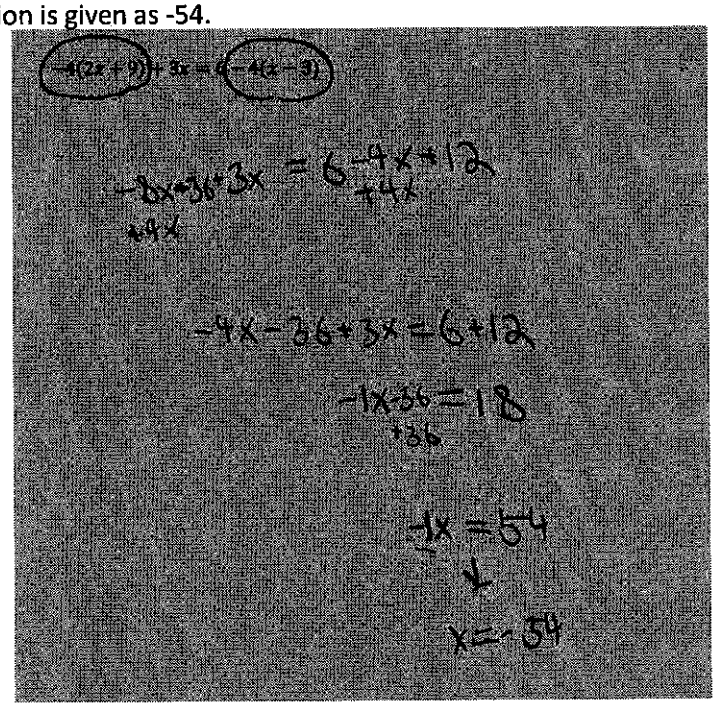
1.

$\frac{7}{2}$



2.

The student correctly solves the equation clearly showing each step of work. The solution of the equation is given as -54.



3.

Equations	No Solution	Exactly 1 Solution	Infinitely Many Solutions
$9 = 4x + 7$	☐	■	☐
$x + 5 = x + 8$	■	☐	☐
$y = \frac{x}{2}$	☐	☐	■
$3x + 6y - 9 = 0$	☐	☐	■
$y = 3y + 5$	☐	■	☐

4.

$2j + 7 = 2j + 7$

There are infinitely man solutions. Once I solved for j, I was left with an equivalent equation of j = j. Therefore, it doesn't matter what value I substitute for j, the equation will always be true.

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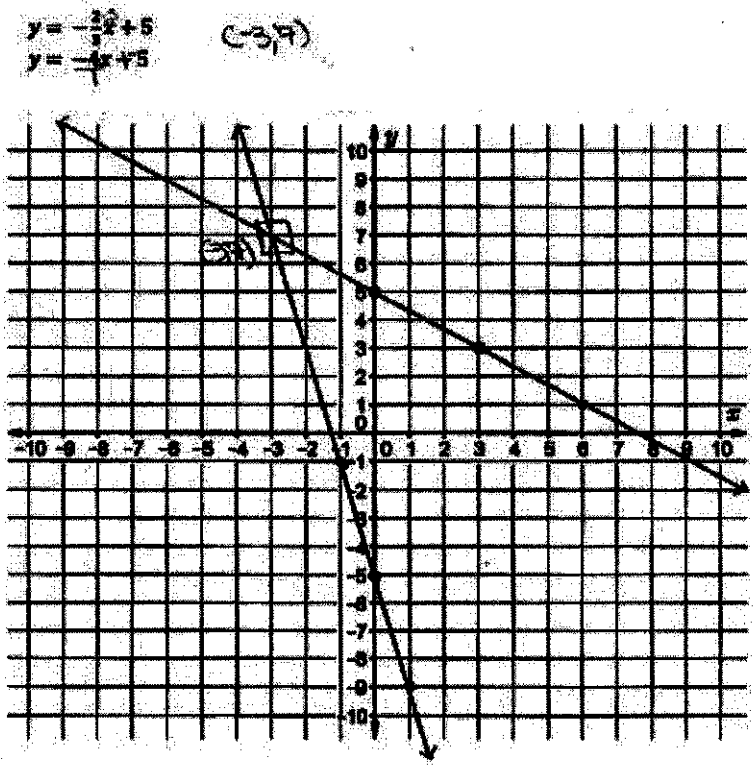
5.	B

FS.8.EE.3.8

1.	For the first system of equations, the student indicates that (-2, 4) is the solution because it is a point on each graph (or line) which means that it is a solution of each equation in the system. For the second system of equations, the student indicates there is no solution because the lines are parallel and share no points. This means that the equations they represent have no solutions in common, so there is no solution to the system. The student may initially respond only in terms of the graphs but upon questioning can relate the graphs and the solution outcome to the equations within the system.
2.	The student solves each system correctly getting (4, 9) for the first system, "no solution" for the second system, and (-8, 24) for the third system. For the first and third system, the student checks the solution to see that it satisfies both equations. The student can explain why the second system has no solution.
3.	The student correctly graphs both lines and identifies (-3, 7) as the solution of the system. The student explains that it is the solution of the system because it is the point of intersection of the two graphs and will satisfy each equation in the system.  2. Write the solution as an ordered pair and explain why it is a solution. The solution is (-3,7). This is a solution because it is correct for each equation. By multiplying $-\frac{2}{3}$ by -3 and adding 5 I got 7. By multiplying -4 by -3 and subtracting 5 I got 7. This made both equations equal therefore it is a solution.

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4.	**Part A:** 19 **Part B:** In the system of equations, x represents the cost, in dollars, of each t-shirt ⇕ and y represents the cost, in dollars, of each sweatshirt ⇕. **Part C:** (8, 11) **Part D:** 30

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MAFS.8.EE.3.8 FSA PRACTICE

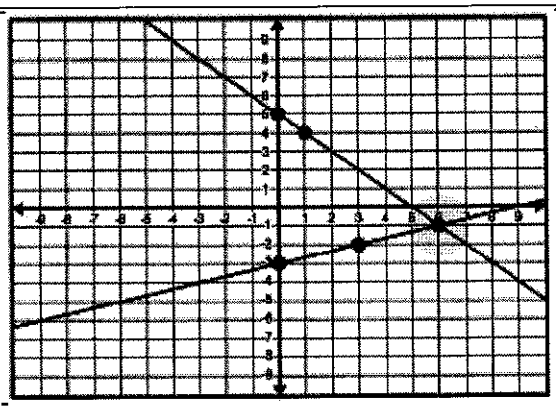
1.

Equations	No Solution	Exactly 1 Solution	Infinitely Many Solutions
$x = y$ $1.25x = 1.25y$	☐	☐	■
$9.9 = 6x + 8y$ $9x = 2.5y - 8.8$	☐	■	☐
$11x - 2y = 1.5$ $11x - 2y = 2.5$	■	☐	☐
$y = -x$ $8y = -8x$	☐	☐	■
$y = (3x + 1)$ $y = -4$	☐	■	☐

2.

■	$\begin{cases} x = 3 \\ y = 6 \end{cases}$
☐	$\begin{cases} x = 6 + y \\ y = 3 + x \end{cases}$
☐	$\begin{cases} y = 3x - 3 \\ y = x - 1 \end{cases}$
☐	$\begin{cases} x = 3 + y \\ y = 6 + x \end{cases}$
■	$\begin{cases} y = x + 3 \\ y = 2x \end{cases}$

3.



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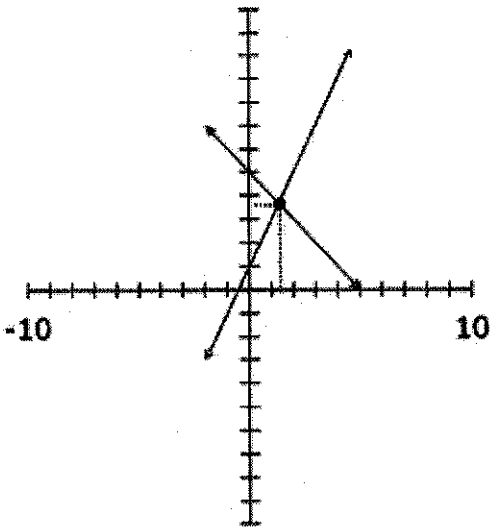
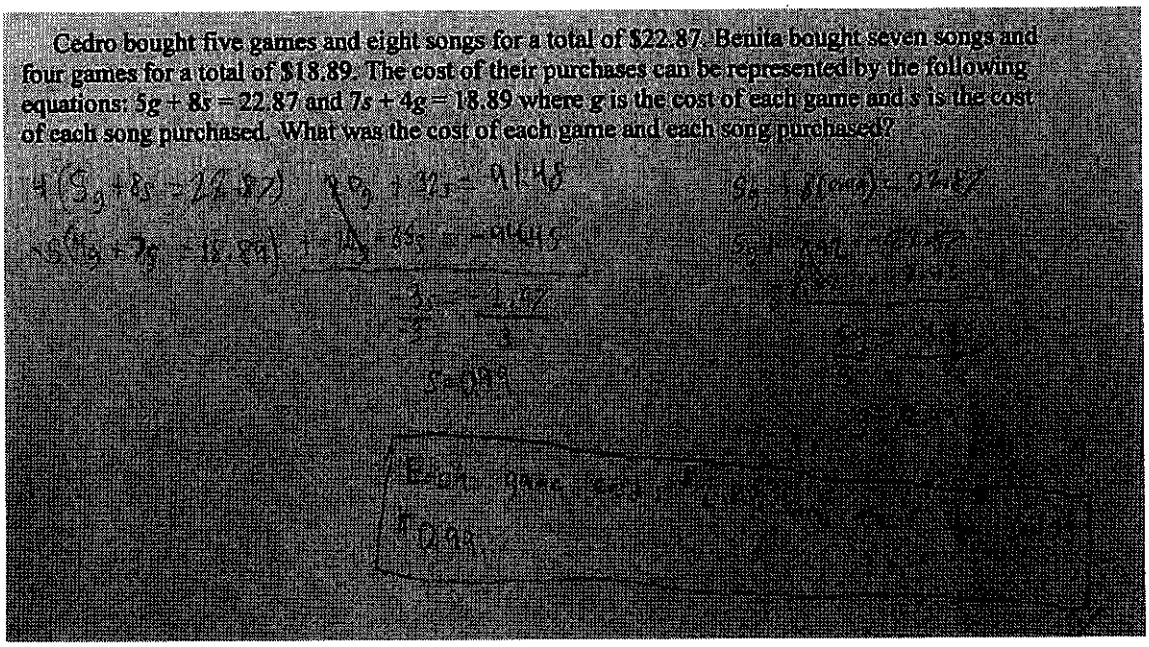
4.	 Answers may vary. Student's answer should be close to x = 1.5 and y = 3.5.
5.	x = 10 y = -2
6.	The student correctly solves the system of equations and states that songs cost $0.99 each and games cost $2.99 each. 

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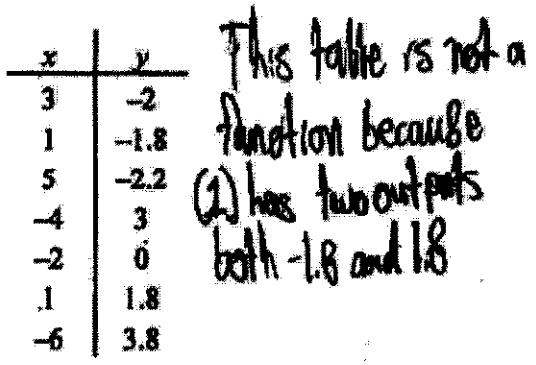
MAFS.8.F.1.1

1.	The student says that a function is: • A rule that assigns exactly one output to each input, • A relation in which each input has exactly one output, or • A mapping from one set (called the domain) to another set (called the range) that assigns each element of the domain exactly one element of the domain. The student may elaborate with examples and non-examples.
2.	The student identifies the first two relations as functions and explains that in each case, for each input there will always be only one output. The student says the third relation is not a function since an input can have two different outputs. When asked, the student can provide an example such as (4, 2) and (4, -2).
3.	The second example does not represent a function because the *x*-value of one is paired with two different *y*-values (1.8 and -1.8).  This table is not a function because (2) has two outputs both -1.8 and 1.8
4.	The student states that the graph does not represent a function because there are *x*-values that are paired with more than one *y*-value or inputs that have more than one output. The student may reference specific examples on the graph.

x	*y*
3	−2
1	−1.8
5	−2.2
−4	3
−2	0
1	1.8
−6	3.8

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MAFS.8.F.1.1 FSA PRACTICE

1.	B
2.	D
3.	**The response is correct as long as 8 and 10 are input values and 1 and 5 are output values. For example:** Input | Output 1 | 4 8 | 6 5 | 1 10 | 5
4.	The student states that the graph represents a function because every *x*-value is paired with exactly one *y*-value or every input has only one output.
5.	The student states that the graph represents a function because every x-value is paired with exactly one y-value. The student may explain that although the x-value of four is listed twice in the table, it is paired with the same y-value. x | y 4 | 12 −1 | −3 0 | −4 −5 | −21 1 | −3 4 | 12 −2 | 0 This table is a function because all inputs only have one output

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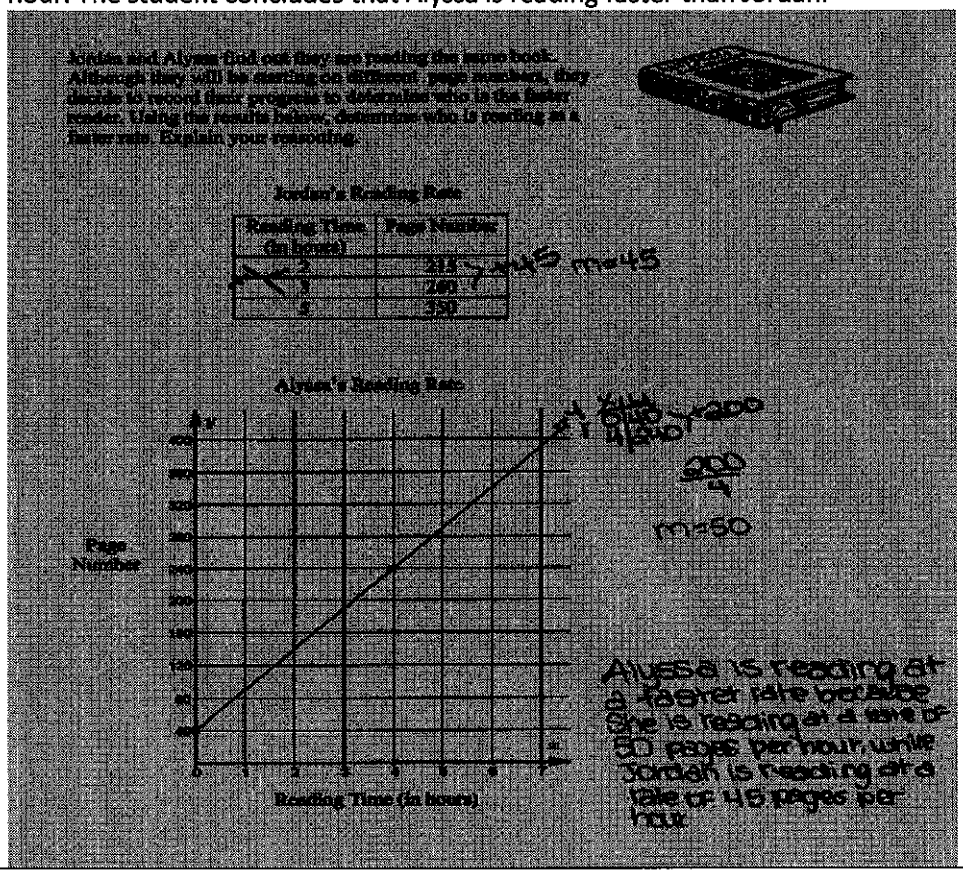
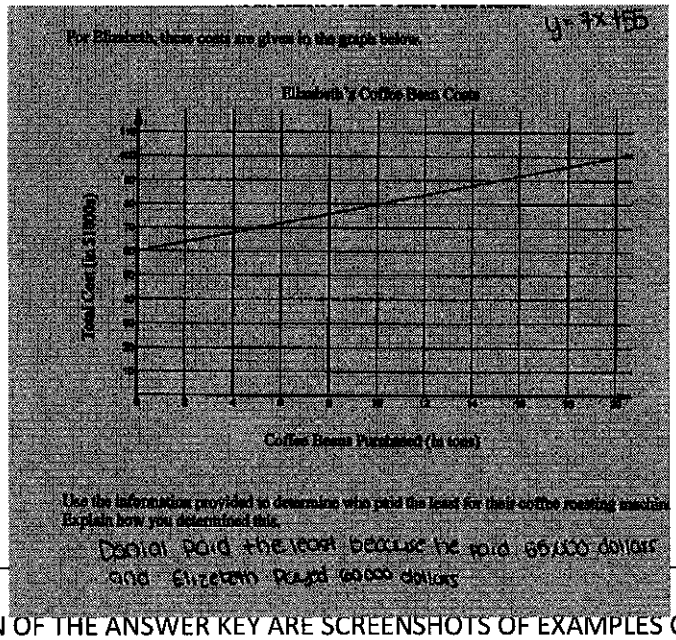
MAFS.8.F.1.2

1.	The student identifies Jordan's reading rate as 45 pages per hour and Alyssa's reading rate as 50 pages per hour. The student concludes that Alyssa is reading faster than Jordan. 
2.	The student states that Daniel's machine cost \$55,000 and determined this by identifying the initial value in Daniel's cost equation. The student states that Elizabeth's machine cost \$60,000 and determined this by reading the *y*-intercept from the graph of her costs. The student concludes that Daniel's machine cost the least. The student may not initially describe how these costs were determined, but upon questioning can immediately explain. 

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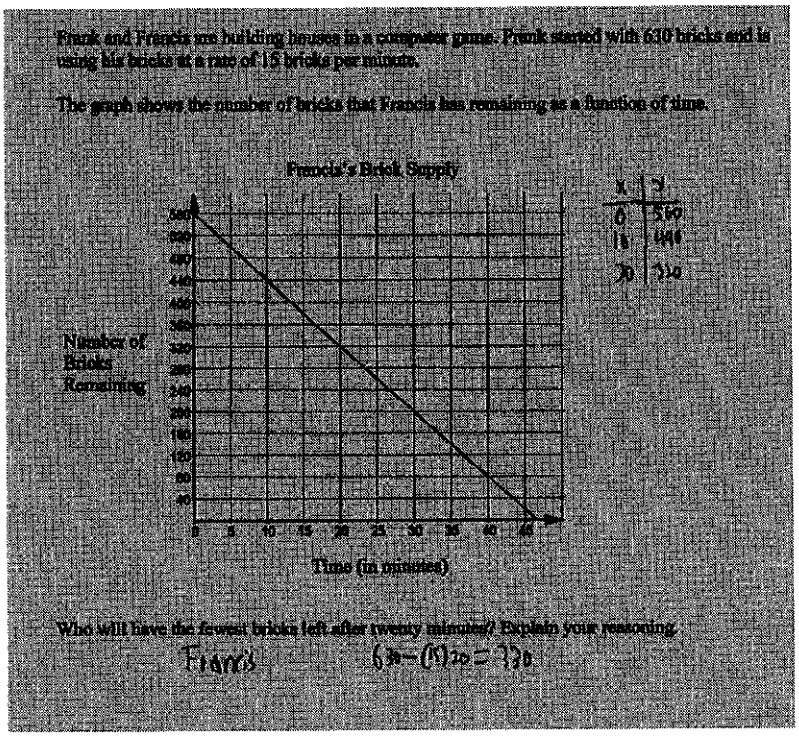
MAFS.8.F.1.2 FSA PRACTICE

1.	**Least Rate of Change** **Greatest Rate of Change** Function B | Function A | Function C
2.	☐ The slope of Function W is less than the slope of Function Z. ■ The slope of Function W is greater than the slope of Function Z. ☐ The y-intercept of Function W is equal to the y-intercept of Function Z. ☐ The y-intercept of Function W is less than the y-intercept of Function Z. ☐ The y-value when $x = -4$ for Function W is greater than the y-value when $x = -4$ for Function Z. ■ The y-value when $x = -4$ for Function W is greater than the y-value when $x = -4$ for Function Z.
3.	The student correctly determines the number of bricks that each will have left after 20 minutes. For example, the student determines that Francis will have 320 bricks left after 20 minutes by identifying and interpreting the appropriate point, (20, 320), on the graph. To determine the number of bricks that Frank will have left, the student subtracts the product of 15 and 20 from 630 getting 330. 

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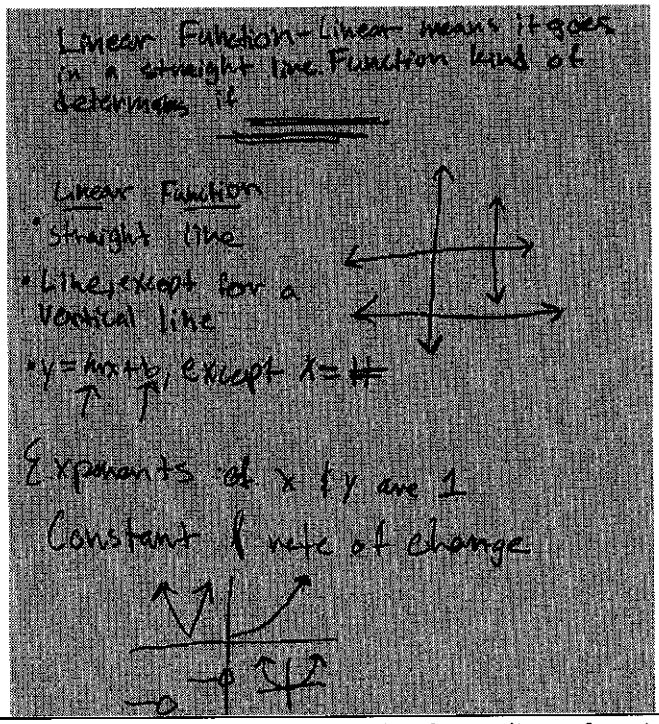
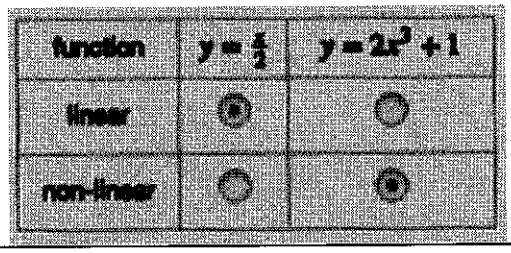
MAFS.8.F.1.3

1.	The student describes one or some of the following properties of a linear function: • Its graph is a nonvertical line. • Its equation is of the form $y = mx + b$ or $ax + by = c$. • The two variables are each raised to the first power. • The rate of change is constant. 
2.	The student provides an example of a nonlinear function using either an equation, graph, or table. The student: • Sketches a parabola or the graph of another nonlinear function and explains that it is nonlinear because it is not a line. • Creates a table of values that includes ordered pairs such as [(1, 1), (2, 4), (3, 9), (4, 16)] and explains that equal differences in x-values do not correspond to equal differences in y-values. • Provides an equation such as $y = x^2$ and explains that it is nonlinear because the variable is raised to the second power or its graph is not a line.
3.	The student explains the equation is nonlinear because: • The variable has an exponent (of two). • If you graph it, it will not be a straight line (or it will be a parabola).
4.	

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MAFS.8.F.1.3 FSA PRACTICE

1.

function	$y = 7 \times 4x$	$y = (2x+5)^2$	$y = 10x^2$	$y = 5x - 3$
linear	◉	○	○	◉
non-linear	○	◉	◉	○

2.

- ☐ The slope of Function W is less than the slope of Function Z.
- ■ The slope of Function W is greater than the slope of Function Z.
- ☐ The y-intercept of Function W is equal to the y-intercept of Function Z.
- ☐ The y-intercept of Function W is less than the y-intercept of Function Z.
- ☐ The y-value when $x = -4$ for Function W is greater than the y-value when $x = -4$ for Function Z.
- ■ The y-value when $x = -4$ for Function W is greater than the y-value when $x = -4$ for Function Z.

- ■ y is a function of x.
- ■ The graph of the relationship is a line.
- ☐ When the input is -3, the output is 4.
- ■ When the input is -2, the output is 3.
- ☐ The y-intercept of the relationship is (0,1)

3.

The student answers all questions completely and correctly. The student says:

- The function is linear.
- The graph is a line. The student may add that the line is rising from left to right or that it is a diagonal line that is increasing. The student may draw a picture of a straight line rather than describing it.

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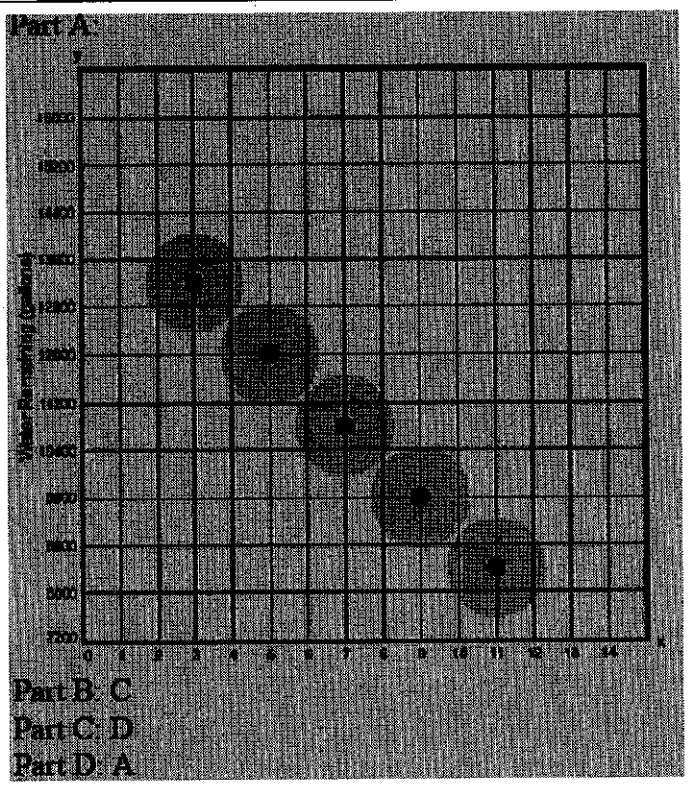
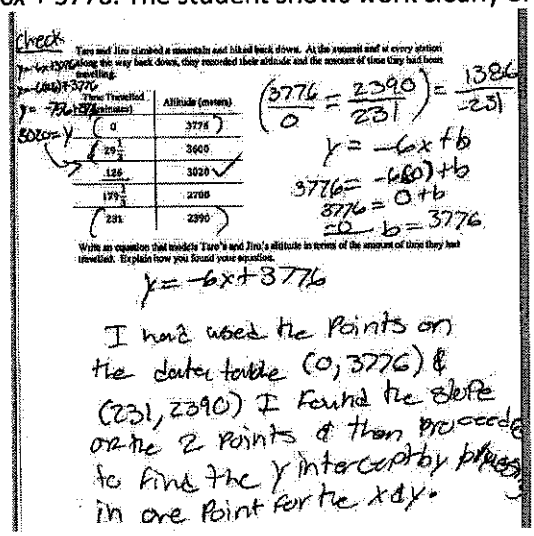
MAFS.8.F.2.4

1.	 Part A: Part B: C Part C: D Part D: A
2.	The student writes two ordered pairs from the given values, correctly calculates the rate of change as $\frac{9}{5}$ or 1.8, and correctly calculates the initial value as 50. The student writes the equation $y = \frac{9}{5}x + 50$. The student shows work clearly or writes an appropriate explanation.
3.	The student correctly calculates the rate of change as -6, recognizes the initial value as 3776, and writes the equation $y = -6x + 3776$. The student shows work clearly or writes an appropriate explanation.  Check Time Traveled (minutes) / Altitude (meters) 0 / 3776 126 / 3020 231 / 2390 $\left(\frac{3776}{0} = \frac{2390}{231}\right) = \frac{1386}{-231}$ $y = -6x + b$ $3776 = -6(0) + b$ $3776 = 0 + b$ $-0 \quad b = 3776$ $y = -6x + 3776$ I had used the Points on the data table (0, 3776) & (231, 2390) I found the slope of the 2 Points & then proceeded to find the y intercept by plugging in one Point for the x & y.

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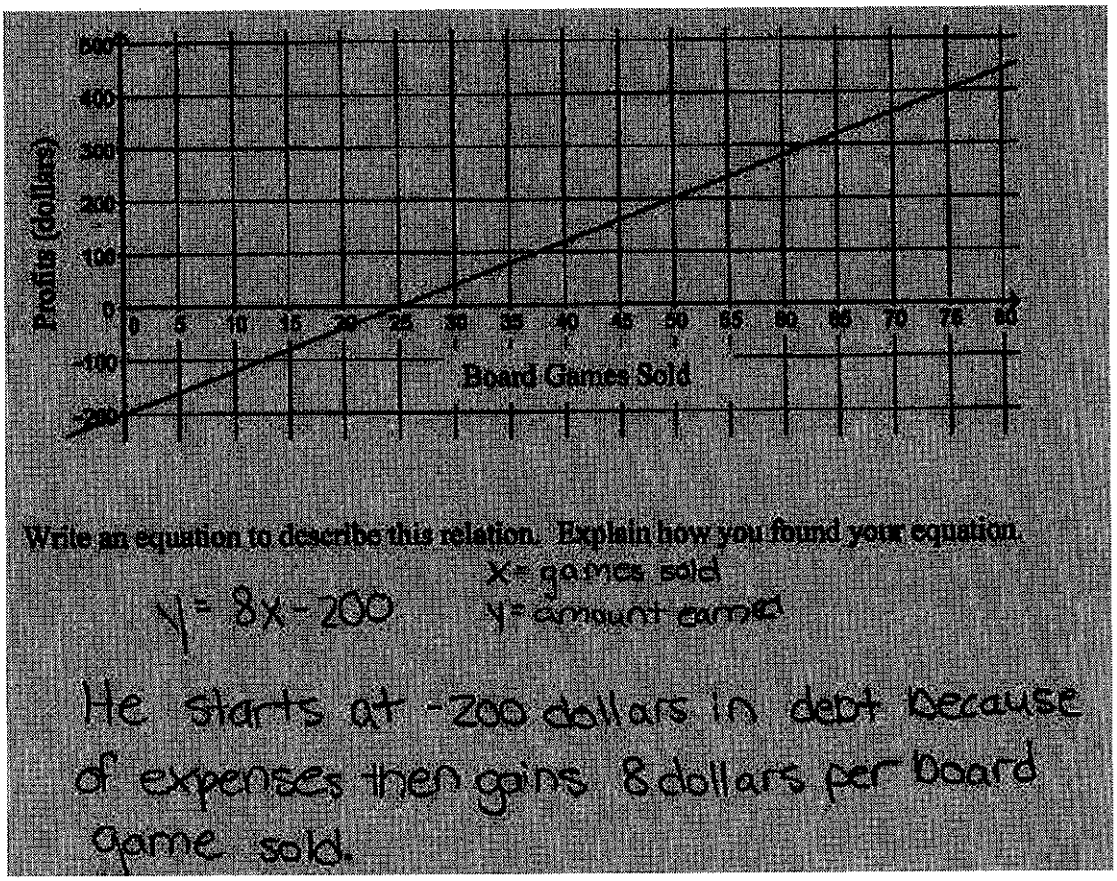
MAFS.8.F.2.4 FSA PRACTICE

1.	The student is able to correctly determine both the slope and *y*-intercept of the line and writes its equation as $y = 8x - 200$. The student demonstrates understanding through shown work or a thorough explanation.



2.	The student determines: • The rate of change is \$85/month, which means that Brent's account balance increases by \$85 every month. • The initial value is \$75, which means that there was \$75 in Brent's account when he started saving.
3.	The student determines: • The rate of change is -720 gallons/hour which means the water in the pool decreases by 720 gallons each hour. • The initial value is 10080 which is the amount of water in gallons in the pool before it started draining.

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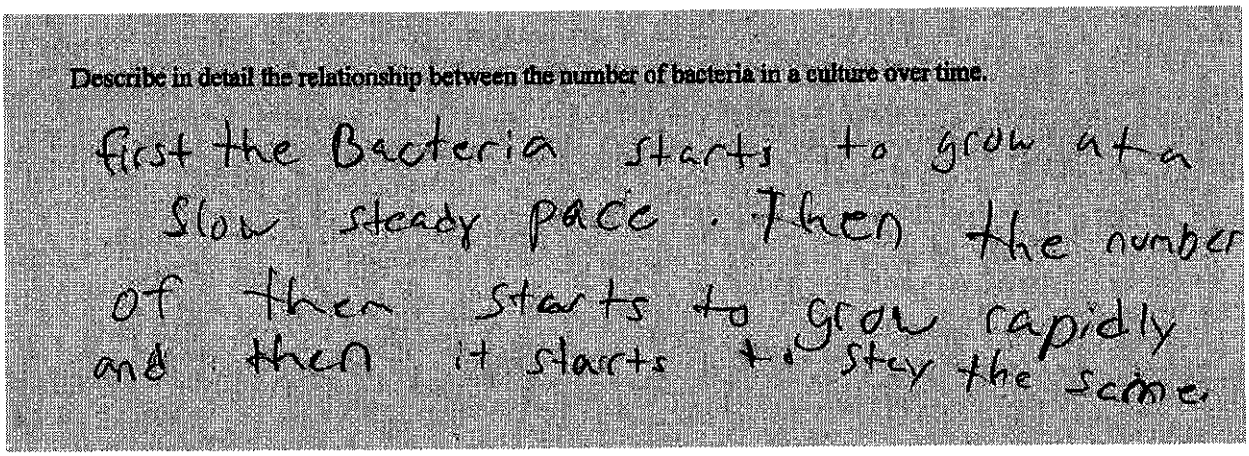
MAFS.8.F.2.5

1.	The student explains: • The volume of fuel decreases at a steady or constant rate over time. • The point where the graph intersected the *x*-axis would indicate the amount of time it takes for the jet to run out of fuel.
2.	The student identifies the two related quantities and labels the axes appropriately (e.g., *time* on the *x*-axis and *rate* or *speed* on the *y*-axis). The graph shows a gradual increase from a rate of zero for an unspecified time, then a 10 minute interval where the rate is constant, followed by a decrease in rate which is maintained for five minutes, after which the rate drops to zero. Note: Exact number labels may be missing on the *x*-axis due to non-specific times given for the acceleration and deceleration phases, but the graph should show a correct proportional relationship between lengths of segments relative to the description.
3.	The student describes the relationship between the number of bacteria and time as nonlinear because the rate of change varies. The description includes the three phases evident in the graph: at first, the number of bacteria is steady or very slowly increasing; the next phase shows a very fast increase in the number of bacteria; finally, the increase slows and the number of bacteria remains steady.  Describe in detail the relationship between the number of bacteria in a culture over time. first the Bacteria starts to grow at a slow steady pace. Then the number of then starts to grow rapidly and then it starts to stay the same.

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MAFS.8.F.2.5 FSA PRACTICE

1. The student identifies the two related quantities and labels the axes appropriately (e.g., *Time* or *Hours* on the *x*-axis and *Number of Bacteria* on the *y*-axis). The graph shows 50 bacteria at time zero remaining constant until hour one. The graph shows an exponential increase over hours two and three followed by a period of no growth from hour three to four. The graph decreases gradually from hour four until reaching zero at hour eight.

2.

Interval	Increasing	Decreasing	Neither Increasing nor Decreasing
$-7 < x < -3$	☑	☐	☐
$-3 < x < 1$	☑	☐	☐
$-1 < x < 1$	☐	☑	☐
$1 < x < 3$	☑	☐	☐
$3 < x < 5$	☐	☑	☐
$5 < x < 7$	☐	☐	☑

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MAFS.8.G.1.1

1.	The student understands that segments remain segments with the same length after undergoing a translation, reflection, or rotation by performing transformations of $\overline{AB}$. In addition, the student determines that the image of $\overleftrightarrow{AB}$ will also be a line.
2.	The student understands that parallel lines remain parallel lines by performing the indicated transformations of lines *a* and *b*. The student is able to fully justify his or her work.
3.	A
4.	The student understands that angles remain angles with the same measure after undergoing a translation, reflection, or rotation by performing transformations of $\angle A$.

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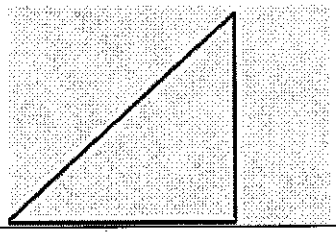
MAFS.8.G.1.1 FSA PRACTICE

1.	**C**
2.	**A**
3.	**A**
4.	**B**

MAFS.8.G.1.2

1	Reflection of pentagon produced Pentagon *FGHIJ*. Pentagon *ABCDE* was reflected vertically, so that it coincides with Pentagon *FGHIJ*. Each vertex *A*, *B*, *C*, *D*, and *E* was reflected to coincide with *F, G, H, I, and J* and explains that if the vertices coincide, the pentagons will coincide.
2.	The student describes: • How triangle *ABC* can be rotated 90° counterclockwise about point *N* so that it coincides with triangle *DEF*, or • How each vertex (*D*, *E*, and *F*) can be rotated 90° counterclockwise around point *N* to coincide with *D, E, and F* and explains that if the vertices coincide, the triangles will coincide.
3.	The student describes how triangle *ABC* can be rotated 90 degrees counterclockwise about point C and then translate the image of triangle *ABC* under the rotation.

MAFS.8.G.1.2 – FSA PRACTICE

1	**B** 
2.	**Rotation. The difference between Figure 1 and Figure 2 is it is turned on its side. This is done by a 90 degree rotation.**
3.	**None of these transformations. Reflection, rotatation and dilation does not change the shape.**

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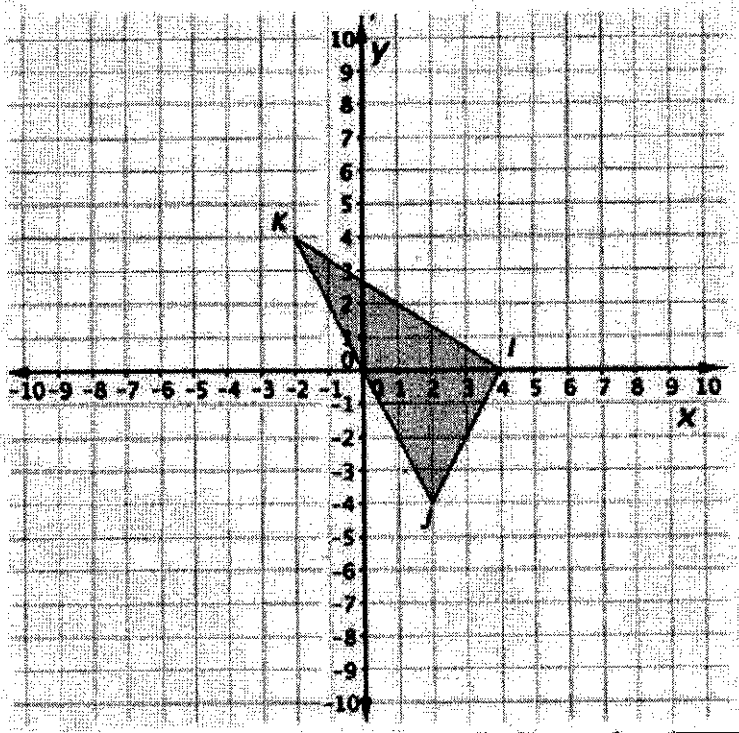
MAFS.8.G.1.3 -

1

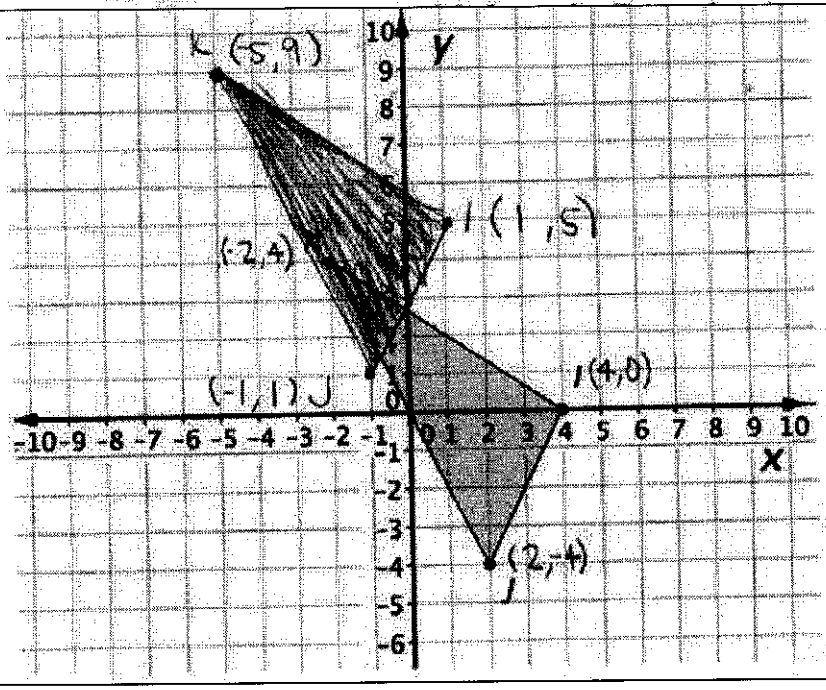


I' (1,0)

J' (t,-1)

K' (-5,1)

2.



1. List the coordinates of triangle $I'J'K'$ after triangle IJK is translated $P(x,y) \rightarrow P(x-3, y+5)$.

I' (1,5)

J' (-1,1)

K' (-5,9)

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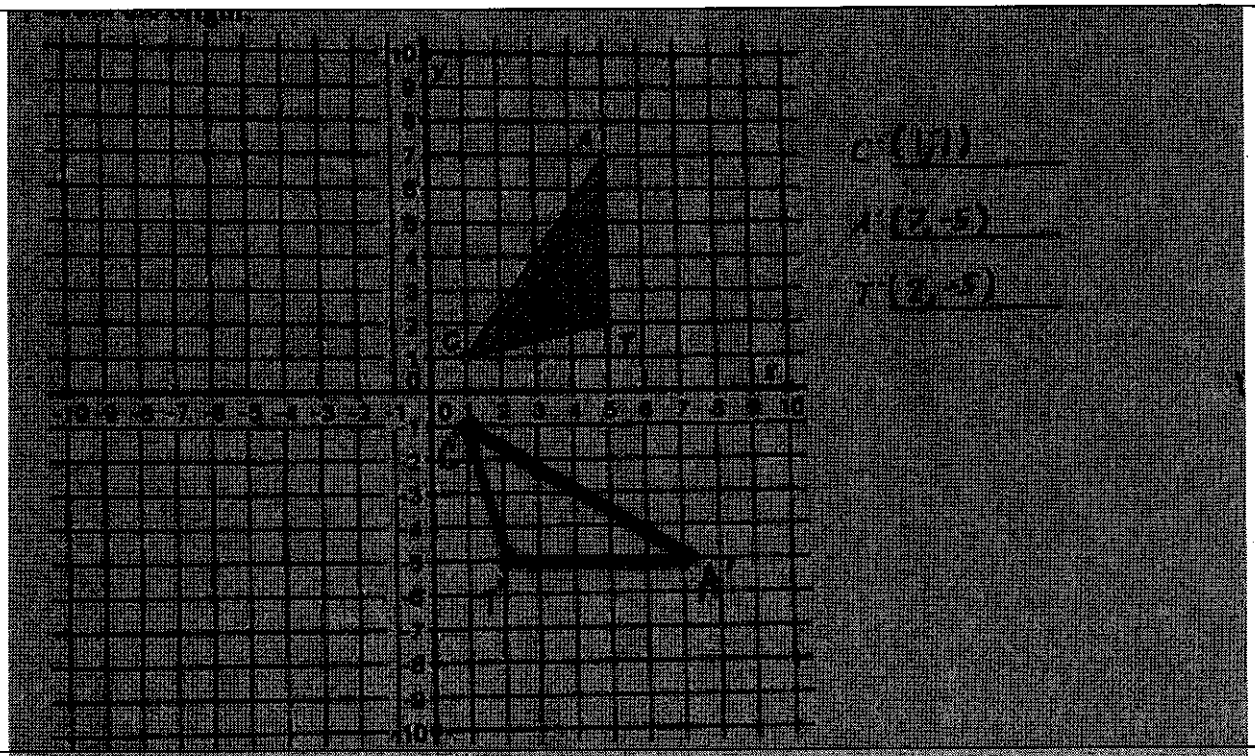
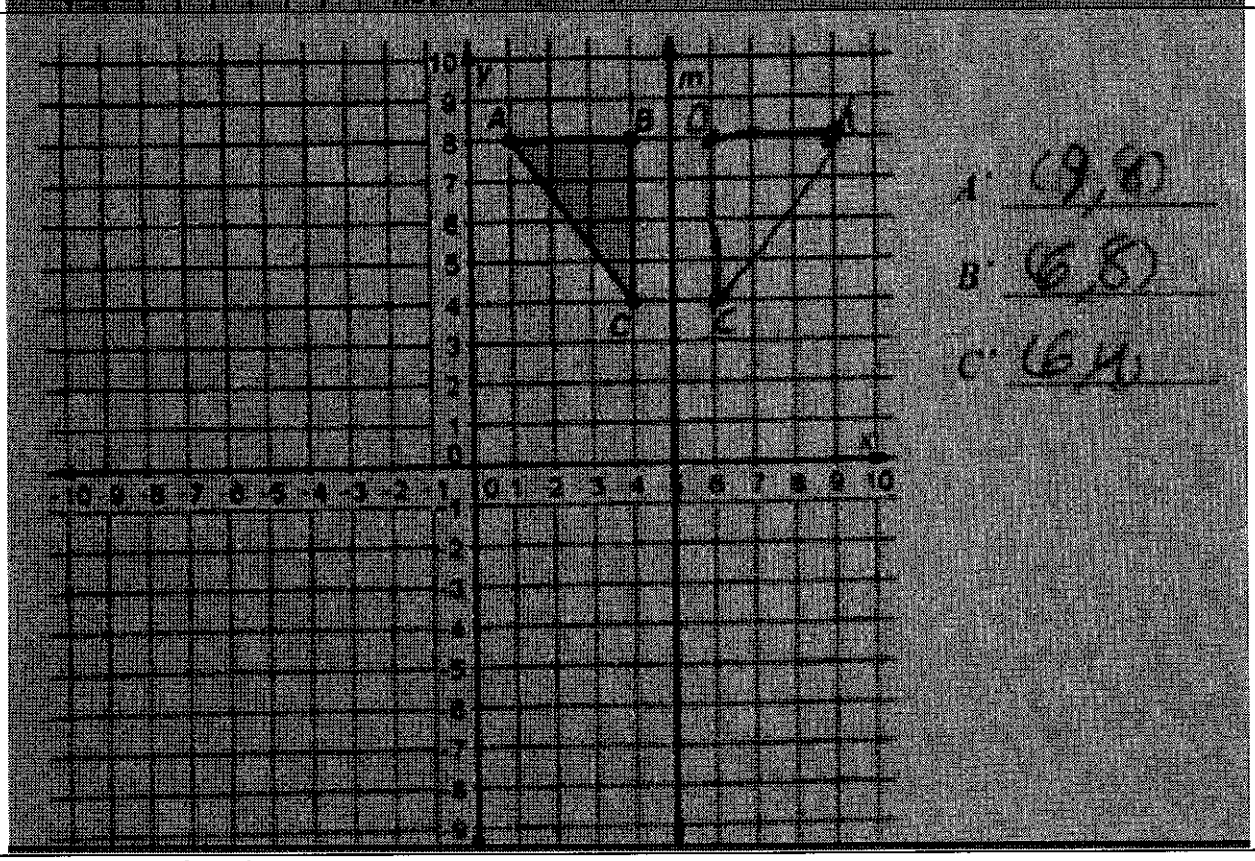
3.	
4.	
5.	© (-7, 4)

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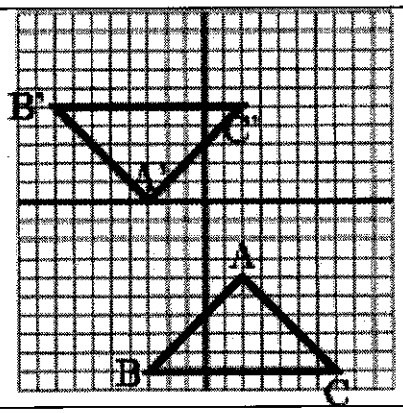
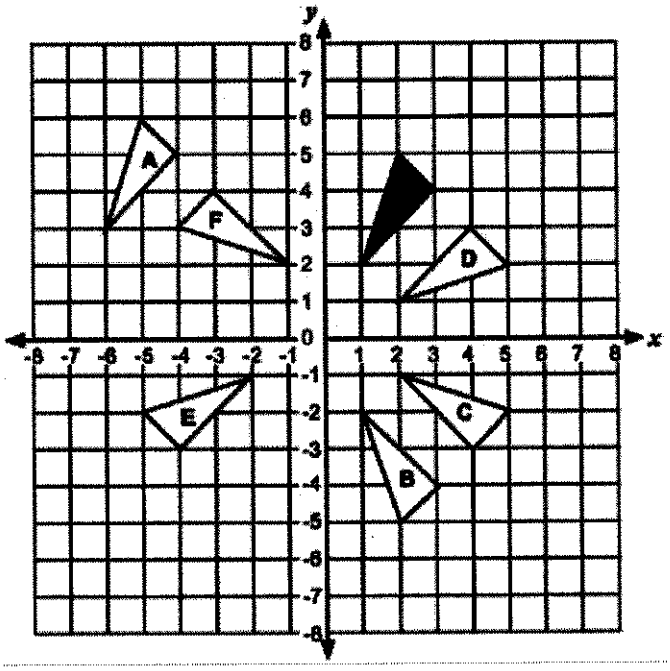
MAFS.8.G.1.3 – FSA PRACTICE

1	Translate the figure 2 left and 5 up.
2.	
3.	**Part A**  **Part B** • Reflection over the line y = -x • Rotation 90° counter clockwise around (0,1). • Reflection over the line y = x

MAFS.8.G.1.4

1.	The student describes a 90° counterclockwise rotation of quadrilateral *ABCD* about point *C*, and then

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	describes a dilation of the image of quadrilateral *ABCD* and a center at point *C*. The student explains that since the figures now coincide, they are similar.
2.	**B**

MAFS.8.G.1.4- FSA PRACTICE

1.	The student describes a reflection of trapezoid *ABCD* across the *x*-axis, and a dilation with a scale factor of two and a center at point *D*. The student explains that since the figures now coincide, they are similar.
2.	The student describes a sequence of transformations that carries triangle *ABC* onto triangle $A'B'C'$. For example, the student: • Reflects triangle *ABC* across a vertical line through point *B*, • Translates this image six units up and two units to the left, and • Dilates this image using point *C* as the center. The student explains that since the figures coincide, triangle *ABC* is similar to triangle $A'B'C'$.
3.	B

MAFS.8.G.1.5

1.	The student indicates that the measures of $\angle 1$ and $\angle 2$ sum to 180° and provides an appropriate justification. For example, the student: • Traces both angles and then redraws them so that they share a vertex and a side, and explains that the angles form a linear pair so must be supplementary. • Reasons logically from previously established angle relationships [e.g., (1) vertical angles are congruent and (2) when two parallel lines are intersected by a transversal, corresponding angles are congruent]. For example, the student names the angle that corresponds to $\angle 2$ as $\angle 3$ and explains that $\angle 3$ and $\angle 1$ form a linear pair and are supplementary. Since $\angle 2$ corresponds to $\angle 3$, they are congruent. So $\angle 2$ and $\angle 1$ must also be supplementary.

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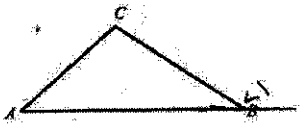
2.	The student extends $\overline{AB}$ and identifies the exterior angle formed as $\angle 1$. The student writes the equation $m\angle 1 = m\angle A + m\angle C$ and provides an informal justification. For example, the student: • Traces $\angle A$ and $\angle C$, then redraws them so they share a vertex and a side. Then the student uses tracing paper to compare the combined angles to $\angle 1$, demonstrating that they are congruent. • Explains that $\angle 1$ and $\angle B$ are supplementary (or $m\angle 1 + m\angle B = 180°$) since they form a linear pair. The student also observes that $m\angle A + m\angle B + m\angle C = 180°$ (because the three measures of the interior angles of any triangle sum to 180°). The student then reasons that $m\angle 1 + m\angle B = m\angle A + m\angle B + m\angle C$ so that $m\angle 1 = m\angle A + m\angle C$.
3.	The student provides an adequate yet informal justification of the theorem. For example, the student: • Traces the three interior angles and redraws them so that all three angles share a vertex and each pair of angles shares a side. The student explains that since the three angles combine to form a straight angle, their measures sum to 180°. • Draws a line through point *C* parallel to $\overline{AB}$ forming three angles that combine to form a straight angle and, therefore, have measures that sum to 180°. The student names the two outer angles (from left to right) $\angle 1$ and (the middle angle is the same as interior angle *C* of the triangle). The student uses the Alternate Interior Angle Theorem to deduce that $\angle 1$ is congruent to $\angle B$ and is congruent to $\angle A$. The student explains that this means that $m\angle A + m\angle B + m\angle C = 180°$.

The Exterior Angle of a Triangle Theorem states that the measure of an exterior angle of a triangle is equal to the sum of the measures of the non-adjacent interior angles.



Using the triangle shown below:

1. Extend $\overline{AB}$ to show an exterior angle at vertex *B*. Label this angle in the diagram as $\angle 1$.
2. Apply the Exterior Angle Theorem and write an equation that describes the measure of $\angle 1$.

   $\angle 1 = m\angle A + m\angle C$

3. Provide an informal justification of this theorem.

   since $\angle B$ and $\angle 1$ are a linear pair (adjacent) it makes them supplementary. All the interior ∠s of a triangle = 180. If you add $\angle A + \angle C$ then it will equal the other ~~half~~ part of the 180, which equals $\angle 1$.

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MAFS.8.G.1.5- FSA PRACTICE

1.	A. $m\angle 1 + m\angle 6 + m\angle 2 = 180$
2.	$m\angle 1 + m\angle 2 = m\angle 4$ We can use simple algebra to prove that (C) is the right answer. After rearranging the equations into $180 - m\angle 3 = m\angle 1 + m\angle 2$ and $180 - m\angle 3 = m\angle 4$, we can set the two equal to each other (because both equal $180 - m\angle 3$). This proves that the exterior angle of a triangle is equal to the sum of its two remote interior angles.
3.	An obtuse triangle has 3 obtuse angles **Answer Explanation:** It's important to know that right angles are 90° in measure, acute angles are less than 90°, and obtuse angles are greater than 90°. In that case, (A) and (B) make sense, and splitting up a pentagon shows that (C) makes sense too. But...how could one triangle have 3 obtuse angles? This would be greater than 270° at the very least. We know that's not true, so (D) is the illogical statement.
4.	**Student response includes each of the following 2 elements:** • Determines $m\angle SRT + m\angle TUV = 108°$ • Correct work shown or explanation given **Sample Student Response:** Angles TUV and RST are alternate interior angles so $m\angle TUV = m\angle RST$. Since $m\angle RTS + m\angle STV = 180$ and $m\angle STV = 108°$ $m\angle RTS = 180° - 108° = 72°$. The measures of the angles of a triangle sum to 180° so, $m\angle SRT + m\angle RST = 180° - m\angle RTS$ $= 180° - 72°$ $= 108°$ So $m\angle SRT + m\angle TUV = m\angle SRT + m\angle RST = 108°$.

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MAFS.8.G.2.6

1.	The student explains that the sum of the areas of squares with sides of length 3 units and 4 units (the legs of the right triangle) is equal to the area of a square with sides of length 5 units (the hypotenuse of the right triangle) demonstrating that $3^2+4^2=5^2$ as the Pythagorean Theorem would predict.
2.	© $1, 1\sqrt{2}$
3.	Ⓐ It allows us to identify right triangles
4.	The student justifies each step of the proof with a complete explanation and specific evidence. For example, the student writes: 1. Mr. Lopez can use the Pythagorean Theorem because it is given that ΔRST is a right triangle. 2. It is given that $a = r$ and $b = s$, so the Substitution Property can be applied. 3. Because $a^2+b^2=c^2$ and $a^2+b^2=t^2$, the Substitution Property can be used to justify that c^2 is equal to t^2. 4. Because ΔRST is congruent to ΔABC, the sides and angles of the triangles are congruent. Therefore, you can conclude $\angle C$ is congruent to $\angle T$ which measures 90°. Since $\angle C$ measures 90°, triangle *ABC* is a right triangle.
5.	This only shows that the theorem works for a 3, 4, 5 triangle. What about another right triangle with side measures 5, 12, 13.

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MAFS.8.G.2.6- FSA PRACTICE

1.	The student calculates the areas of the three squares and notes that the sum of the areas of the two smaller squares is not equal to the area of the larger square or determines that $4^2 + 7^2 = 65 \neq 64 = 8^2$. Consequently, the second triangle is not a right triangle.
2.	Ⓐ If the sides of a right triangle are of length 8 and 15, its hypotenuse is 17
3.	6, 8, 10 Any side lengths that are possible for a right triangle must fit into the formula $a^2 + b^2 = c^2$. That's what the Pythagorean Theorem tells us, anyway. In the formula, a and b should be the smaller sides and c is always the hypotenuse (the longest side). If we plug in these side lengths, we'll see that the only possibility is (C) because 36 + 64 = 100.

MAFS.8.G.2.7- FSA PRACTICE

1.	**The student applies the Pythagorean Theorem and provides work to show the TV is 45 inches wide, and therefore, will not fit in a 42 inch space.**
2.	Ⓐ If the sides of a right triangle are of length 8 and 15, its hypotenuse is 17
3.	6, 8, 10 Any side lengths that are possible for a right triangle must fit into the formula $a^2 + b^2 = c^2$. That's what the Pythagorean Theorem tells us, anyway. In the formula, a and b should be the smaller sides and c is always the hypotenuse (the longest side). If we plug in these side lengths, we'll see that the only possibility is (C) because 36 + 64 = 100.

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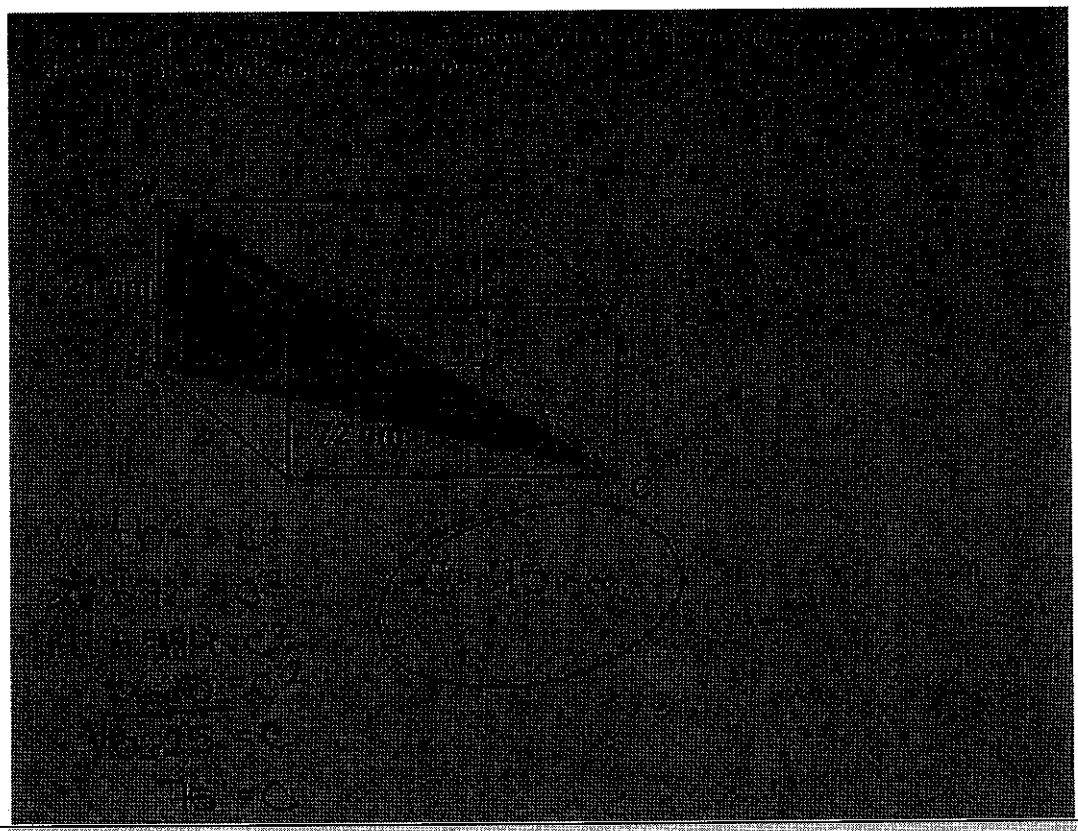
MAFS.8.G.2.7

1.	The student applies the Pythagorean Theorem and provides work to show Lily walks $\sqrt{\frac{13}{16}}$ miles or $\sqrt{0.8125}$ miles or 0.9 miles.
2.	The student applies the Pythagorean Theorem and provides work to show the diagonal measures 75 cm. 
3.	9 feet **Answer Explanation:** We can picture Mr. Feeney's handrail as the hypotenuse of a right triangle, where the height of the staircase is one leg and its length is the other. Since we already know the length of the hypotenuse (15 feet) and the vertical leg (12 feet), we can use the Pythagorean Theorem to solve for the horizontal leg (the length of the staircase). Substituting in 12 feet for *b* and 15 feet for *c*, we can find *a* = 9 feet.

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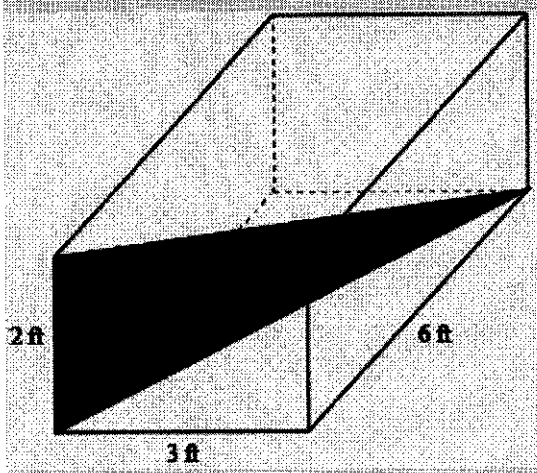
MAFS.8.G.2.7 FSA PRACTICE

1.	**The student applies the Pythagorean Theorem and provides work to show the TV is 45 inches wide, and therefore, will not fit in a 42 inch space.**
2.	$4\sqrt{5}$ **Answer Explanation:** In the formula $a^2 + b^2 = c^2$ (because that's what this all comes down to), the hypotenuse is c and the other two legs are a and b. As long as we substitute 12 for c, it doesn't matter whether 8 is a or b. Either way, we'd get $64 + b^2 = 144$, or $b^2 = 80$, which isn't a perfect square. Taking the square root and simplifying gives us our answer.
3.	No, it won't fit in their trunk **Answer Explanation:**  First, we can see that finding the hypotenuse of a right triangle with legs 6 and 3 will give us the distance across the bottom of the box. To add the height in, we'll then use that "hypotenuse" (now the leg) to find the distance across the entire box. First, $6^2 + 3^2 = 45 = c^2$, so our diagonal across the bottom is $\sqrt{45}$. Now, we can use that length and the height (2 feet) as the two legs of another right triangle: $(\sqrt{45})^2 + 2^2 = 49 = d^2$, so the diagonal is 7 feet exactly. Since it's just barely too large compared to the 6.8 feet of cargo space available it won't fit.

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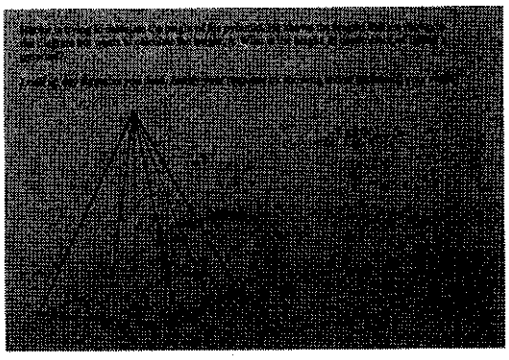
4.	The student applies the Pythagorean Theorem and shows work to justify the height of the pyramid as approximately 22.9 cm (or an appropriately rounded value). 

MAFS.8.G.2.8

1.	The student applies the Pythagorean Theorem and determines the distance between the two points is 15 units.
2.	3 **Answer Explanation:** When we draw our lines, we get legs of 5 – (-1) = 6 and 9 – 1 = 8. After substituting these numbers into the Pythagorean Theorem ($6^2 + 8^2 = 36 + 64 = 100 = c^2$), we get a hypotenuse of $c = 10$. That's the distance between the two points as well.
3	The student applies the Pythagorean Theorem, showing work to justify answers of PQ = 13, QR = 5, and RP = 12.

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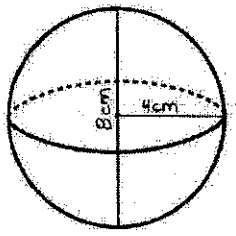
MAFS.8.G.2.8 FSA PRACTICE

1.	The student applies the Pythagorean Theorem and determines the distance between the two points is 15 units.
2.	5 **Answer Explanation:** From one point to the other, we move 4 – 1 = 3 units horizontally and 8 – 4 = 4 units vertically. In other words, the legs of our right triangle are 3 and 4. Using $a^2 + b^2 = c^2$, we end up with $3^2 + 4^2 = 9 + 16 = 25 = c^2$, or $c = 5$. Since we use the hypotenuse to represent the distance between the two endpoints, we know that our two points are 5 units apart.
3.	(-3, 11) and (5, -4)

MAFS.8.G.3.9

1	The student writes: • $V=\frac{4}{3}\pi r^3$ • V is volume and r is the radius of the sphere. • The student correctly labels the radius on the diagram. The student uses the formula $V=\frac{4}{3}\pi r^3$ to correctly calculate the volume of the sphere as $\frac{256\pi}{3}$. A physical science teacher fills a bubble with hydrogen gas. The bubble has a diameter of 8 centimeters. Find the volume of the sphere in terms of π. Add the given measurements to the diagram, and explain how you found your answer.  $V = \frac{4}{3}\pi r^3$ $V = \frac{4}{3}\pi \cdot 64$ $V = 267.9\ cm^3$ I found the radius by dividing the diameter by 2 and plugged it into the formula.

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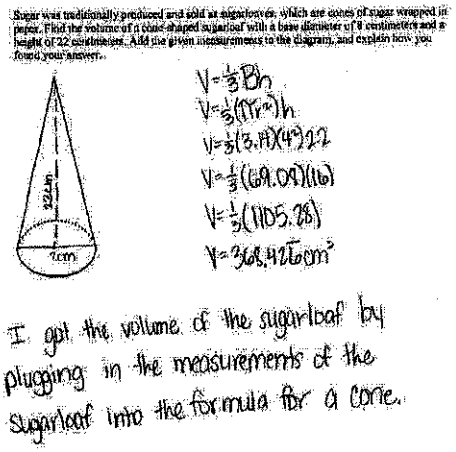
2. The student writes:

- $V=\frac{1}{3}Bh$ or $V=\frac{1}{3}\pi r^2 h$.
- V is volume, B is the area of the base, r is the radius of the base, and h is the height of the cone.
- The student correctly labels the dimensions on the diagram.

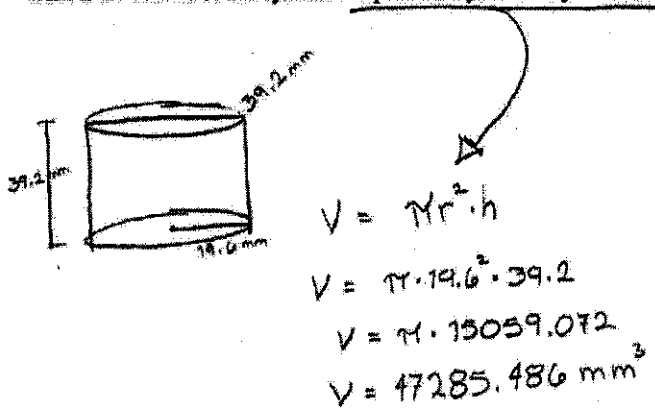
The student identifies an appropriate formula, $V=\frac{1}{3}\pi r^2 h$ or $V=\frac{1}{3}Bh$ (where B is the area of the base). The student substitutes correct values into the formula and determines a final answer of 368.43 cm^3 (or appropriately rounded to a different place) if using 3.14 for .



3. The student writes:

- $V=Bh$ or $V=\pi r^2 h$.
- V is volume, B is the area of the base, r is the radius of the base, and h is the height of the cylinder.
- The student correctly labels the dimensions on the diagram.

The student correctly identifies the formula $V=\pi r^2 h$ or $V=Bh$ (where B is the area of the base). The student substitutes correct values into the formula and determines a final answer of 47,285.48 mm^3 (or appropriately rounded to a different place) if using 3.14 for pi.



4. 434

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5.	◉ $80\pi\ m^3$

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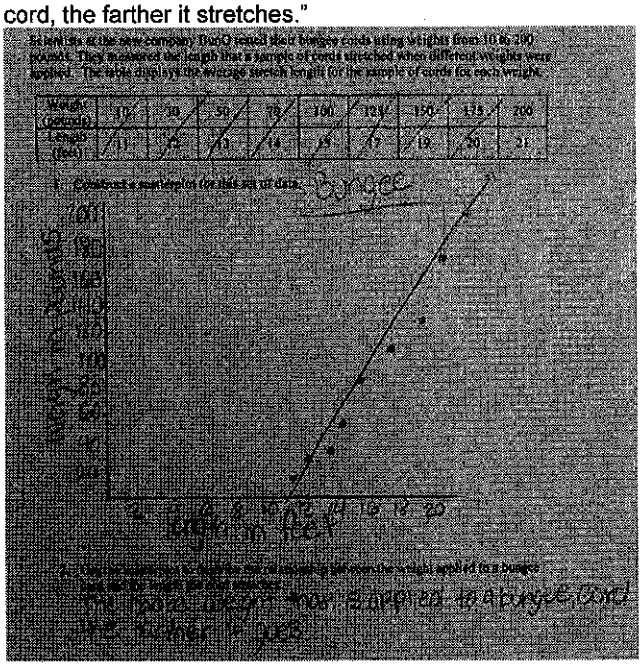
MAFS.8.G.3.9 – FSA PRACTICE

1	Part A: B Part B: $\frac{1}{3}$
2.	The volume of a cylinder is the area of the base × height. The area of a circle is πr^2. So the area the base is $\pi \cdot 4^2 = 16\pi$. The height of the cylinder is 7, so the volume is $16\pi \cdot 7 = 112\pi$ cubic units.

MAFS.8.SP.1.1

1.	The student produces a scatterplot with uniformly scaled axes that are appropriate for the range of data: axis labels and units, a title, and precisely located data points for each ordered pair. The student interprets the relationship between the variables in a reasonable way. For example, the student says, "The more weight applied to the bungee cord, the farther it stretches." 

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2.	The student: • States that the association is both linear and negative (or explains that as ESS scores increase, math test scores decline at a fairly constant rate). • Describes the association as strong (or does so upon asking). **Describe the association between score on the Epworth Sleepiness Scale to score on the math test.** This is a Strong (Linear!) Negative Slope. As the test scores decrease the ESS score increases.
3.	Most of the countries are clustered together between 0 and 1,000,000 sq km. This cluster includes Austria and Germany. Greenland is outside of the cluster with more than twice the area of the largest country within the cluster. Russia is even further away, with area and population much larger than any other European country. Therefore, these two countries are outliers. Note that without Russia, the range of the plot would change so much that we might discover other clusters or outliers. **Russia and Greenland are outliers.**

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MAFS.8.SP.1.1 –FSA PRACTICE

1.	The student: • States that the association is positive and linear (or explains that as time spent watching advertisements increases, willingness to purchase crackers increases). • Describes the association as weak (or does so upon questioning). Describe the association between time spent watching advertisements and the percent of each group willing to buy the company's cheese crackers. It's very and scattered even though it's postive. This is a weak linear association. No clusers at all.
2.	The student: • Describes the association as nonlinear and positive. • States that the association is strong (or does so upon questioning). Describe the association between the passage of time and the number of bacteria. -Its positive because its increasing as time goes by. -Its non-linear because it doesn't go in a straight line -Strong
3.	The student describes a pattern of clustering of most data points at less than 15 million in population with a land area of less than 150,000 square miles. The student may say that there is a roughly constant relationship between population and land area, indicating that as the populations of states increase, their land areas stay about the same or vary within the 0 – 150,000 square mile range. Further, the student describes the potential outliers: (approximately 2 million and 580,000 mi^2). (approximately 37 million and 170,000 mi^2). (25 million, 280,000 mi^2). (19 million, 500,000 mi^2) and (18 million, 600,000 mi^2).

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4.	There doesn't seem to be any association between shoe size and test scores, because the scores are about as high for students with big feet as for students with small feet. There is a *positive linear relationship* between study time and score, and *no relationship* between shoe size and score.

MAFS.8.G.SP.1.2

1.	**The student draws a line of good fit and assesses the line in terms of how close the data points are to the line. The student says the distance between the line and the data points is minimized or the line is as close to as many of the data points as possible.**
2.	**The student says that the line in the first graph fits the data better because the data points are either on the line or very close to it. The student explains that although the data in the second graph is roughly linear, the line does not fit the data as well because the data points are more widely scattered about the line.**

MAFS.8.G.SP.1.2- FSA PRACTICE

1.	The student selects line a and explains that the distance between line a and the data points is minimized or the line is as close to as many of the data points as possible.
2.	**The data does not form a linear trend, so there is no single line that fits the data well.**

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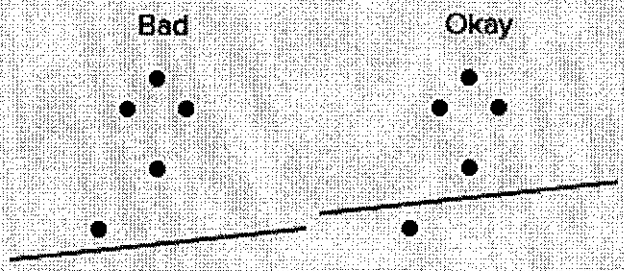
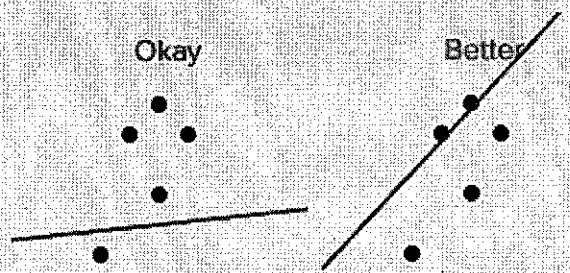
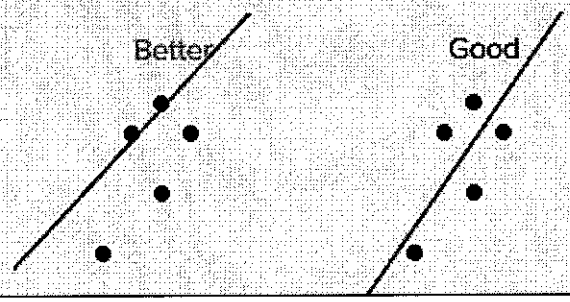
3.	● A line fits the data well ● No line fits the data well A line of fit is a line that approximates the data points. There are three main criteria to use when finding a line of fit. First, make sure that your line passes through the points, and does not lie completely above or below the points.  Next, make sure that your line alternates between passing above and then below points, and doesn't simply go above some points and then below the rest.  Finally, make sure that the line goes through the middle of all the points, so that it is close to all of the points. 
4.	A

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MAFS.8.S.P.1.3

1.	The student writes: • As height increases, foot length also increases. • The slope of 1.52 means that foot length increases 1.52 mm for every one cm increase in height. • The *y*-intercept of -4.35 indicates that a male student who is zero cm in height has a foot length of -4.35 mm. This does not make sense since foot length cannot be negative.
2.	The slope of the trend line represents the average change in the vertical variable that's associated with a one-unit change in the horizontal variable. In this case, the slope represents the average change in ear circumference associated with a 1 year increase in age. **On average, each 1 year increase in age was associated with a 0.48millimeter increase in ear circumference.**
3.	Part A: C Part B: 8

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MAFS.8.SP.1.3-FSA PRACTICE

1.	**The student explains that the slope indicates that the time an infant spends sleeping decreases by 7.5 minutes for each one month increase in age.**
2.	The student explains that: • A bungee cord holding 20 pounds is predicted to stretch to 11 feet long. • The *y*-intercept means the cord is 10 feet long when no weight is applied.

MAFS.8.SP.1.4

1.	The student correctly identifies the pattern of association and interprets the meaning of the data in context: • As grade level increases, the percentage of students wanting an earlier start time increases. • The 25% in the second row indicates that 25% of the seventh graders prefer a later start time.
2.	**The student correctly constructs a two-way frequency table with appropriate title, labels, cell values, and totals.**

Middle School Music and Sports Survey

	Plays Team Sport	Does Not Play Team Sport	Total
Plays Instrument	8	3	11
Does Not Play Instrument	2	7	9
Total	10	10	20

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3.

The student correctly converts the raw data to relative frequencies by using fraction, decimal, or percent values.

Westside Middle School Student Survey Results

	Prefer Math	Prefer Science	Total
Prefer Team Sports	80/105 ≈ .76 = 76%	25/105 ≈ .24 = 24%	100%
Prefer Individual Sports	40/85 ≈ .47 = 47%	45/85 ≈ .53 = 53%	100%

Westside Middle School Student Survey Results

	Prefer Math	Prefer Science
Prefer Team Sports	80/120 ≈ .67 = 67%	25/70 ≈ .36 = 36%
Prefer Individual Sports	40/120 ≈ .33 = 33%	45/70 ≈ .64 = 64%
Total	100%	100%

MAFS.8.SP.1.4-FSA PRACTICE

1.

The student correctly identifies the pattern of association and interprets the meaning of the data in context. The student explains:

- The students who do not have a sibling are more likely to have a pet (or the students who have a sibling are less likely to have a pet).
- The $\frac{5}{75}$ means that of the 75 students who do not have a sibling, five do not have a pet.

2.

☐	More grade 8 students were surveyed than grade 7 students.
■	A total of 221 students were surveyed.
■	Less than 50% of the grade 8 students surveyed exercised 5 or more hours last week.
☐	More than 50% of the students surveyed exercised less than 5 hours last week.
☐	A total of 107 grade 7 students were surveyed.

3.

	Have practiced for at least 10,000 hours	Have not practiced for at least 10,000 hours
Have won a major	37	8
Have not won a major	14	6

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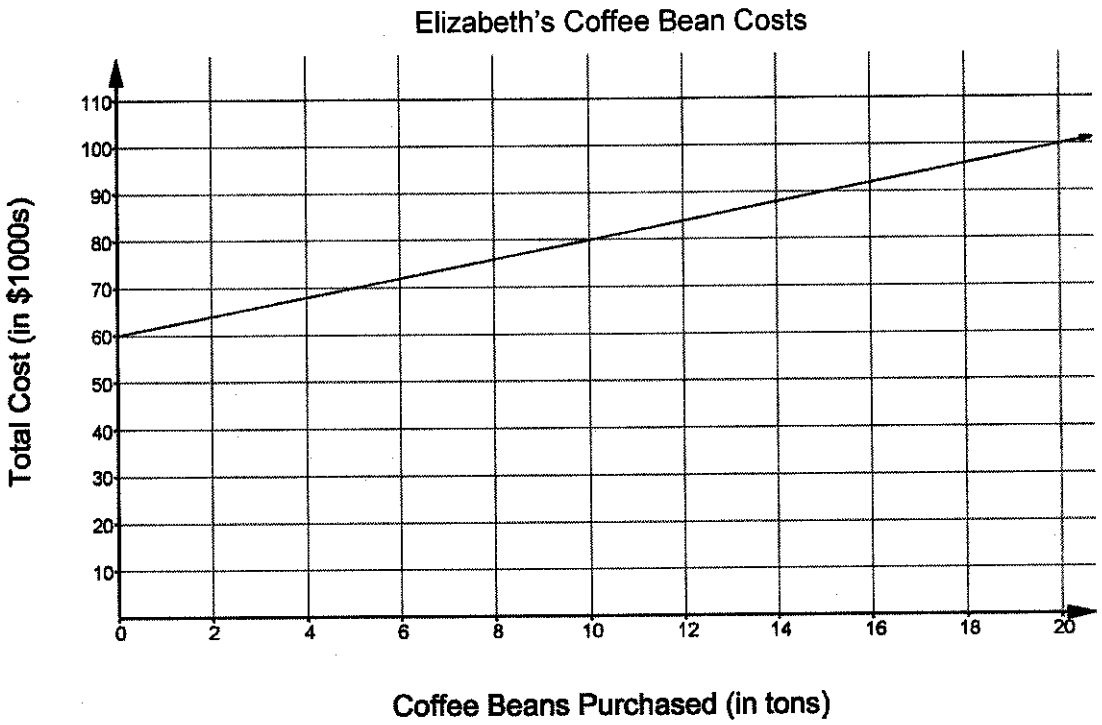
2. Elizabeth and Daniel are starting competing coffee roasting businesses. They each first buy a large coffee roasting machine and then spend money to buy coffee beans as they need them.

For Daniel, these costs can be described by the equation $y = 7x + 55$ where y is total cost in thousands of dollars and x is the number of tons of coffee beans roasted.

For Elizabeth, these costs are given in the graph below.



Use the information provided to determine who paid the least for their coffee roasting machine. Explain how you determined this.

MAFS.8.F.1.2 FSA PRACTICE

A CALCULATOR IS ALLOWED

1. Functions A, B, and C are linear functions.

Some values of Function A are shown in the table.

Function A

3	3
5	7
6	9

The graph of Function B has a y–intercept of (0, 3) and an x –intercept of (-5, 0).

Function C is defined by the equation $y = (3x + 1)$.

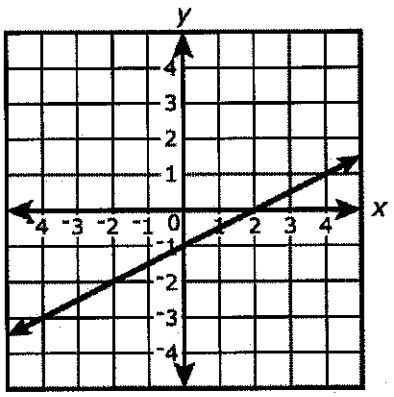
Order the linear functions based on rate of change, from least to greatest.

Least Rate of Change **Greatest Rate of Change**

Function A | Function B | Function C

2. Functions W and Z are both linear functions of x.

Function W



Function Z

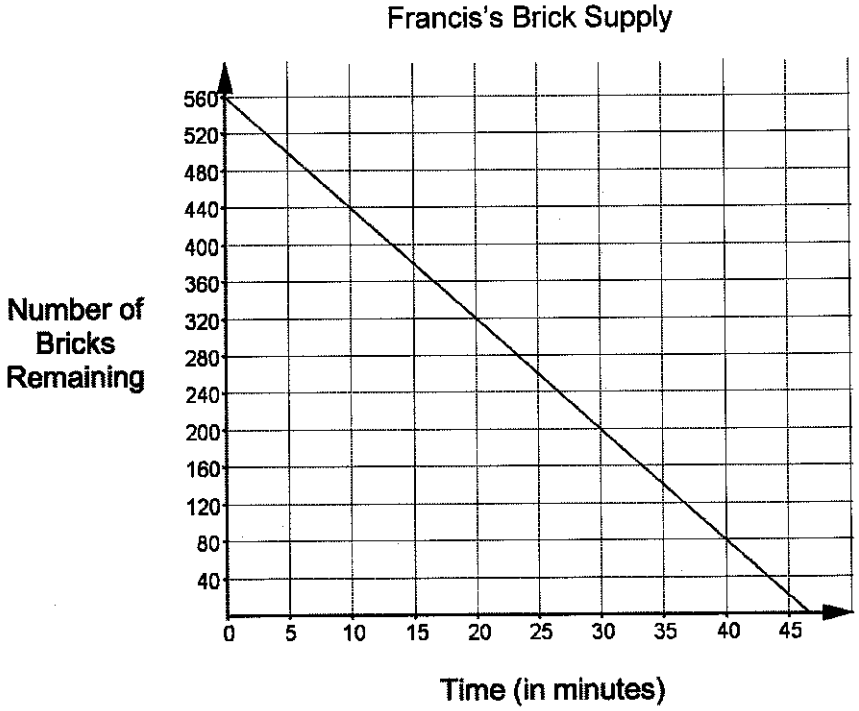
x	y
−2	−2.5
0	−2
2	−1.5
4	−1

Which statement comparing the functions are true? Select all that apply.

- ☐ The slope of Function W is less than the slope of Function Z.
- ☐ The slope of Function W is greater than the slope of Function Z.
- ☐ The y-intercept of Function W is equal to the y-intercept of Function Z.
- ☐ The y-intercept of Function W is less than the y-intercept of Function Z.
- ☐ The y-value when $x = -4$ for Function W is greater than the y-value when $x = -4$ for Function Z.
- ☐ The y-value when $x = -4$ for Function W is greater than the y-value when $x = -4$ for Function Z.

3. Frank and Francis are building houses in a computer game. Frank started with 630 bricks and is using his bricks at a rate of 15 bricks per minute.

The graph shows the number of bricks that Francis has remaining as a function of time.



Who will have the fewest bricks left after twenty minutes? Explain your reasoning.

MAFS.8.F.1.3

A CALCULATOR IS ALLOWED

1. Describe as many *defining* properties of linear functions as you can. List only properties that are unique to linear functions.

2. Give an example of a nonlinear function. You can describe this function in one or more of the following ways: with a table, graph, or equation. Be sure to specify what are the inputs (the independent variable) and what are the outputs (the dependent variable). Then explain how you know your example is nonlinear.

3. The area, *A*, of an isosceles right triangle is a function of the length of its legs, *s*, and is represented by the equation: $A = \frac{1}{2}s^2$. Is this function linear or nonlinear? Explain and justify your answer.

Select whether each function is linear or nonlinear.

4.

Function	Linear	Nonlinear
$y = \frac{x}{2}$	☐	☐
$y = 2x^3 + 1$	☐	☐