Webster County Schools

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HS Math

Packet 3

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ACT MATH QUICK PREP 001

1. The price of a can of soda in a vending machine increased from 50 cents to 75 cents. What is the percent of increase?
   A. 25%
   B. 33%
   C. 50%
   D. 75%
   E. 125%

4. Which of the following is the slope of any line perpendicular to the line with equation $2x + y - 3 = 0$?

   A. -2

   B. 2

   C. $-\dfrac{1}{2}$

   D. $\dfrac{1}{2}$

   E. -1

2. $(2x-3)(x+1)$ is equivalent to:
   A. $2x^2 - x - 3$
   B. $2x^2 + x - 3$
   C. $2x^2 - 5x + 3$
   D. $2x^2 + 5x + 3$
   E. $2x^2 - 5x - 3$

5. What is the volume of a cube with a side of length 4 inches?
   A. $\sqrt[3]{4}$ in^3
   B. 2 in^3
   C. 4 in^3
   D. 16 in^3
   E. 64 in^3

3. For all $x^2 \neq 4$, $\dfrac{(x-2)^2}{x^2-4} = ?$

   A. $\dfrac{1}{x+2}$

   B. $\dfrac{1}{x-2}$

   C. $\dfrac{x+2}{x-2}$

   D. $\dfrac{x-2}{x+2}$

   E. 1

6. What is the value of $\cos \angle A$ in the triangle below?

   A. 5/12
   B. 5/13
   C. 12/13
   D. 13/12
   E. 12/5

ACT MATH QUICK PREP 002

1. Alan has math test scores of 95, 80, 89, and 92. What score must Alan make on his fifth test to have an average of 91?

   A. 71.2
   B. 80.0
   C. 89.0
   D. 89.4
   E. 99.0

2. If $3x+4 < 3x-4$, then which of the following is true?

   A. $x < -8$
   B. $x < 0$
   C. $x < 8$
   D. x is a real number
   E. no solution

3. If $f(x) = x^2 - x + 1$, then $f(-1) = ?$

   A. -3
   B. -2
   C. -1
   D. 1
   E. 3

4. What is the slope of a line which passes through the points $(-3, 2)$ and $(4, -1)$?

   A. $-\dfrac{7}{3}$
   B. $-\dfrac{3}{7}$
   C. $-\dfrac{1}{3}$
   D. $\dfrac{3}{7}$
   E. $\dfrac{7}{3}$

5. In rhombus $ABCD$, $AC = 6$ and $BD = 8$. What is the length of any side of the rhombus?

   A. 3
   B. 4
   C. 5
   D. 14
   E. 24

6. Right triangle ABC has acute angles A and B. Which of the following is equivalent to the expression $(\cos A)(\tan A)$?

   A. $\sin A$
   B. $\sin B$
   C. $\tan A$
   D. $\tan B$
   E. 1

1. $6 - |-3| + 2 = ?$

   A. 3
   B. 4
   C. 5
   D. 11
   E. 20

2. Which of the following is equivalent to the expression $3(x+2) - 2(x+3)$?

   A. x
   B. $x + 12$
   C. $5x$
   D. $5x + 12$
   E. $-6x^2 - 30x - 36$

3. Which value of b is necessary so that the following system of equations has an infinite number of solutions?

   $$3x - 2y = 14$$
   $$9x - 6y = 2b$$

   A. 7
   B. 21
   C. 28
   D. 42
   E. 84

4. What is the y-coordinate of the point on the standard (x, y) coordinate plane where the lines $y = 2x + 3$ and $y = 3x + 2$ intersect?

   A. -5
   B. -1
   C. 1
   D. 5
   E. 6

5. The circumference of a circle is 12π inches. What is the area, in square inches, of the circle?

   A. 6π
   B. 12π
   C. 24π
   D. 36π
   E. 144π

6. For all real values x, which of the following is equivalent to the expression $\sin^2 2x + \cos^2 2x$?

   A. -1
   B. 0
   C. 1
   D. 2π
   E. 4π

ACT MATH QUICK PREP 004

1. What is the next term of the sequence $3, 6, 12, 24, \ldots$?
   A. 32
   B. 36
   C. 48
   D. 64
   E. 192

2. Which of the following expressions is equivalent to $(-3a)^2$?
   A. $-3a^2$
   B. $3a^2$
   C. $-6a^2$
   D. $-9a^2$
   E. $9a^2$

3. Factor $2y^2 - 5y - 3$.
   A. $(y+1)(2y-3)$
   B. $(y-1)(2y+3)$
   C. $(y-3)(2y-1)$
   D. $(y-3)(2y+1)$
   E. $(y+3)(2y+1)$

4. Which of the following is the center of the circle with equation $(x-2)^2 + (y+3)^2 = 9$ in the standard (x, y) coordinate plane?
   A. $(2, -3)$
   B. $(-2, -3)$
   C. $(2, 3)$
   D. $(-2, 3)$
   E. $(4, 9)$

5. A triangle and a square have the same area. If a side length of the square is 6 units, which of the following could be the length of the base of the triangle?
   A. 12
   B. 16
   C. 32
   D. 54
   E. 64

6. Evaluate $\sin(-30°)$.
   A. $-\dfrac{\sqrt{3}}{2}$
   B. $-\dfrac{1}{2}$
   C. $\dfrac{1}{2}$
   D. $\dfrac{\sqrt{3}}{2}$
   E. $\dfrac{\sqrt{3}}{3}$

ACT MATH QUICK PREP 005

1. 40 is 80 percent of what number?
   A. 20
   B. 50
   C. 100
   D. 120
   E. 150

4. What is the distance between the points $(-2,2)$ and $(5,-5)$ on the standard (x,y) coordinate plane?
   A. -1
   B. 0
   C. 98
   D. $2\sqrt{7}$
   E. $7\sqrt{2}$

2. Sandy has 4 yellow marbles, 5 blue marbles, and 6 red marbles in a bag. What is the probability that she will randomly pick two red marbles from the bag?
   A. $\dfrac{2}{15}$
   B. $\dfrac{11}{15}$
   C. $\dfrac{4}{25}$
   D. $\dfrac{1}{7}$
   E. $\dfrac{4}{5}$

5. Kevin is making a wooden frame in the shape of a triangle. He has pieces of wood of lengths 8 inches and 15 inches. Which of the following lengths of wood could Kevin use to complete the frame?
   A. 6 inches
   B. 7 inches
   C. 22 inches
   D. 23 inches
   E. 24 inches

3. Which of the following is a solution of the quadratic equation $x^2 + 4x = -4$?
   A. -4
   B. -2
   C. 2
   D. 4
   E. 8

6. What is the radian measure of an angle of $120°$?
   A. $\dfrac{2\pi}{3}$
   B. $\dfrac{3\pi}{2}$
   C. $\dfrac{2}{3\pi}$
   D. $\dfrac{3}{2\pi}$
   E. $\dfrac{2}{3}$

1. What number is 40% of 150?

   A. 3.75
   B. 30
   C. 60
   D. 110
   E. 210

4. Which of the following is the slope of the linear equation $2x + 3y - 6 = 0$?

   A. $\dfrac{2}{3}$

   B. $\dfrac{3}{2}$

   C. $-\dfrac{2}{3}$

   D. $-\dfrac{3}{2}$

   E. 2

2. Laura bought a pair of shoes for $20. The shoes were on sale for 15% off, and she also used a coupon for an extra 20% off. Before sales tax was applied, how much did Laura pay for the shoes?

   A. $ 3.40
   B. $ 6.00
   C. $13.00
   D. $13.60
   E. $19.65

5. A company produces cylindrical soup cans of various heights and diameters. Which of the following is *closest* to the diameter that would be necessary for a can to hold 20 in^3 of soup if the can's height must be 5 inches?

   A. 1.1
   B. 1.3
   C. 2.3
   D. 157.1
   E. 314.2

3. $16^{\frac{3}{4}} + 16^{\frac{1}{4}} = ?$

   A. 8
   B. 10
   C. 16
   D. 32
   E. 64

6. What is the cosine of angle θ in the triangle shown below?

   A. $\dfrac{8}{15}$

   B. $\dfrac{8}{17}$

   C. $\dfrac{15}{17}$

   D. $\dfrac{15}{8}$

   E. $\dfrac{17}{8}$
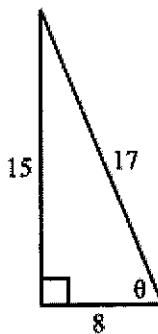
ACT MATH QUICK PREP 007

1. Diane bought a pair of shoes for 15% off. Before taxes were applied, she paid $29.75 for the shoes. What was the original price of the shoes?
   A. $25.29
   B. $30.60
   C. $31.25
   D. $34.21
   E. $35.00

4. What are the coordinates of the vertex of the parabola defined by the function $y = x^2 + 6x - 7$ in the standard (x, y) coordinate plane?
   A. $(-3, -34)$
   B. $(-3, -16)$
   C. $(-3, 2)$
   D. $(-3, -31)$
   E. $(3, 20)$

2. If $2 + 3(x - 1) = 8$, then $x = ?$
   A. $-2\dfrac{1}{3}$
   B. 1
   C. $2\dfrac{3}{5}$
   D. 3
   E. 4

5. What is the area, in inches squared, of the trapezoid shown below?
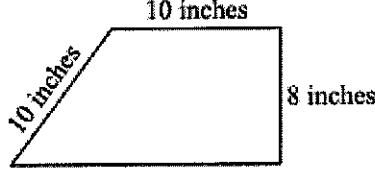
   A. 64 in.^{2}
   B. 104 in.^{2}
   C. 130 in.^{2}
   D. 208 in.^{2}
   E. 400 in.^{2}

3. If x is a real number such that $x^4 = 256$, then $x^3 + \sqrt{x} = ?$
   A. 66
   B. 68
   C. 516
   D. 4,100
   E. 262,152

6. If $0 \le \alpha < \dfrac{\pi}{2}$, then $\dfrac{\tan \alpha}{\sin \alpha} = ?$
   A. $\sin \alpha$
   B. $\cos \alpha$
   C. $\cot \alpha$
   D. $\csc \alpha$
   E. $\sec \alpha$

ACT MATH QUICK PREP 008

1. For all real numbers x and y, the operation "@" is defined as $x @ y = x^2 - y^2$. What is the value of $-4 @ 3$?

   A. -25
   B. -14
   C. -1
   D. 2
   E. 7

2. For all pairs of real numbers M and N where $N = 3M - 2$, $M = ?$

   A. $\dfrac{N-2}{3}$

   B. $\dfrac{2-N}{3}$

   C. $\dfrac{N+2}{3}$

   D. $3N + 2$

   E. $3N - 2$

3. Which of the following quadratic equations has the solutions $\dfrac{1}{2}$ and $-\dfrac{2}{3}$?

   A. $6x^2 + 7x + 2 = 0$
   B. $6x^2 - 7x + 2 = 0$
   C. $6x^2 - x - 2 = 0$
   D. $6x^2 + x - 2 = 0$
   E. $2x^2 - x - 6 = 0$

4. A rectangle has coordinates $(3,2)$, $(-2,-1)$, and $(-2,2)$ on the standard (x,y) coordinate plane. Which of the following could be the fourth set of coordinates?

   A. $(1,-3)$
   B. $(3,-1)$
   C. $(-1,-3)$
   D. $(2,-2)$
   E. $(2,-1)$

5. One of the faces of a cube has an area of 16 square inches. What is the volume of the cube in cubic inches?

   A. 4
   B. 8
   C. 16
   D. 64
   E. 256

6. For acute angle θ, $\sin\theta = \dfrac{3}{5}$ and $\cos\theta = \dfrac{4}{5}$. What is the value of $\cot\theta$?

   A. $\dfrac{4}{3}$

   B. $\dfrac{3}{4}$

   C. $\dfrac{5}{3}$

   D. $\dfrac{5}{4}$

   E. 1

ACT MATH QUICK PREP 009

1. Kelly bought a pair of shoes on sale and paid $28.00. The shoes were marked 30% off. What was the original price of the shoes?

   A. $ 8.40
   B. $19.60
   C. $21.54
   D. $36.40
   E. $40.00

2. If $\dfrac{3x}{2}+\dfrac{1}{4}=2$, then $x=?$

   A. $-\dfrac{3}{2}$

   B. $\dfrac{6}{7}$

   C. $\dfrac{7}{6}$

   D. $\dfrac{3}{2}$

   E. $\dfrac{7}{3}$

3. $\log_2 32 = ?$

   A. 4
   B. 5
   C. 8
   D. 16
   E. 64

4. What is the slope of the line $3x-4y=12$?

   A. 3

   B. $\dfrac{3}{4}$

   C. $\dfrac{4}{3}$

   D. $-\dfrac{4}{3}$

   E. $-\dfrac{3}{4}$

5. If D is in the interior of right angle $\angle ABC$, then which of the following could be the measure of $\angle DBC$?

   A. 89°
   B. 90°
   C. 100°
   D. 110°
   E. 150°

6. What is 225° expressed in radian measure?

   A. $-\dfrac{\pi}{4}$

   B. $\dfrac{\pi}{4}$

   C. $\dfrac{5\pi}{2}$

   D. $\dfrac{5\pi}{4}$

   E. $\dfrac{5\pi}{8}$

1. What fraction is exactly halfway between $\dfrac{1}{2}$

   and $\dfrac{2}{3}$?

   A. $\dfrac{7}{6}$

   B. $\dfrac{3}{10}$

   C. $\dfrac{7}{12}$

   D. $\dfrac{1}{6}$

   E. $\dfrac{7}{3}$

2. $(2x-3)^2 = ?$

   A. $4x^2 - 6$
   B. $4x^2 + 9$
   C. $4x^2 - 9$
   D. $4x^2 - 12x + 9$
   E. $4x^2 + 12x + 9$

3. If $f(x) = -2x^2 - 3x$, then $f(-3) = ?$

   A. -27
   B. -9
   C. 9
   D. 21
   E. 27

4. Quadrilateral *ABCD* is a parallelogram with vertices $(1,1)$, $(5,2)$, and $(7,5)$. Which of the following could be the fourth vertex?

   A. $(3,4)$
   B. $(5,7)$
   C. $(6,6)$
   D. $(4,3)$
   E. $(9,9)$

5. Points *A*, *B*, *C*, and *D* lie on a circle of circumference 15 units. *B* is 8 units clockwise from *A*. *D* is 6 units counterclockwise from *C*. *B* is two units counterclockwise from *C*. What is the order of the points, starting with *A* and going clockwise around the circle?

   A. A,B,C,D
   B. A,C,B,D
   C. A,D,B,C
   D. A,D,C,B
   E. A,C,B,D

6. If $0 \le x < \dfrac{\pi}{2}$, then which of the following is a solution of $2\sin x = 1$?

   A. $\dfrac{\pi}{4}$

   B. $\dfrac{\pi}{3}$

   C. $\dfrac{5\pi}{6}$

   D. $\dfrac{2\pi}{3}$

   E. $\dfrac{\pi}{6}$

Name _____ Date _____

One Variable Statistics
Dot Plots

1. Below are the recorded high temperatures, in Fahrenheit, for each day of October in St. Augustine, Florida.

85, 78, 80, 78, 76, 81, 89, 88, 87, 80, 81, 86, 89, 87, 85, 80, 77, 80, 84, 78, 81, 81, 85, 85, 84, 78, 84, 84, 81, 84

Part A: Construct a dot plot to represent the data.

Part B: What observations can you make about the shape of the distribution?


Name _____ Date _____

One Variable Statistics
Histograms

1. The scores of the Eastside High School varsity ladies' basketball team for the 2015 season were as follows:

57, 62, 48, 56, 45, 68, 54, 70, 55, 59, 52, 65, 75, 80, 47, 60, 67, 78, 82, 25

Part A: Construct a histogram of the data using intervals of 10 points.

Part B: What observations can you make about the shape of the distribution?

Name _____   Date _____

One Variable Statistics
Box Plots – Part 1

1. The average number of Instagram likes per day for Ms. Rozycki's class was recorded and constructed into the following box plot.
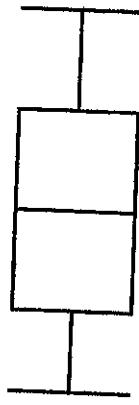
The minimum is approximately _____

The maximum is approximately _____

The first quartile is approximately _____

The third quartile is approximately _____

The median is approximately _____

75% of students like at most _____ photos per day.

The top 25% of students like between _____ and _____ photos per day.

Name _____   Date _____

One Variable Statistics
Box Plots – Part 2

1. Consider the following box plot.

Part A: Describe the maximum, minimum, first quartiles and third quartile.

Part B: Explain why this box plot is unique.

Name _____   Date _____

One Variable Statistics
Measures of Center and Shapes of Distribution

1. Below are dot plots of the number of chocolate chips in two different store brand cookies.

14 15 16 17 18 19 20 21 22

14 15 16 17 18 19 20 21 22
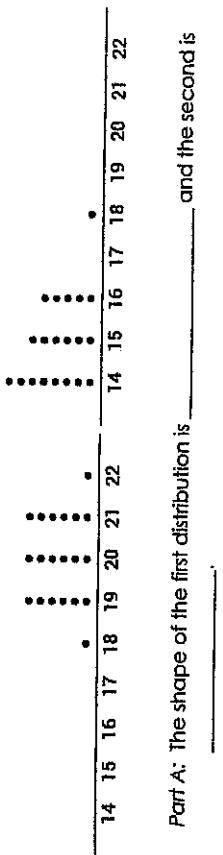
Part A: The shape of the first distribution is _____ and the second is _____

Part B: The value of the larger median for the two groups is _____

Part C: The value of the larger mean for the two groups is _____

Part D: Describe the difference between the modes of the two groups by comparing their center rand shapes for their groups.

2. Consider the two dot plots with different distributions shown below.

Describe the difference between the distributions, using key words such as mean and median.

One Variable Statistics
Measures of Spread – Part 2

1. Consider the following two box plots.

8 10 12 14 16 18 20 22 24 26 28 30 32

Part A: Calculate the IQR for each box plot.

Part B: Explain what the IQR says about a set of data.

One Variable Statistics
Measures of Spread – Part 1

1. Below are the test scores from the last math test for two different classes.

Class B

Class A

65 70 75 80 85 90 95

Part A: Describe the shape of each distribution.

Class A:

Class B:

Part B: Which data set the largest median score?

Part C: Which data set has the largest IQR?

One Variable Statistics
The Empirical Rule

1. Jiffy Mix in Chelsea, Michigan has a machine that fills the Jiffy Corn Muffin Mix boxes with Mix. It dispenses cereal with a normal distribution and has mean of 10.0 and a standard deviation of .1 ounces.

Part A: The middle 95% of Jiffy Corn Muffin Mix boxes contain between _____ and _____ ounces of cereal.

Part B: Approximately 68% of Jiffy Corn Muffin Mix boxes have between _____ and _____ ounces of cereal.

Part C: What percentage of Jiffy Corn Muffin Mix boxes contain more than 10.2 ounces of cereal?

Part D: What is the probability that a randomly selected Jiffy Corn Muffin Mix box contains less than 10.1 ounces of cereal?

2. Mr. Bowen's test is normally distributed with a mean of 75 and a standard deviation of 3 points.

Part A: What is the probability that a randomly selected score is greater than 81 points?

Part B: What percentage of students scores are between 69 and 78?

Part C: A student who scores a 84 is in the _____ percentile.

Name _____ Date _____

One Variable Statistics
Outliers in Data Sets

1. The outlier of a data set causes the _____ (mean/median) to be greater than the _____ (mean/median) when the outlier is in the upper part of the data set.

2. An outlier has a greater effect on the _____ (standard deviation/interquartile range).

Answer Key for Algebra I packet!

Page 1
1. Part A. Record Highs for October

[line plot: 76 77 78 80 81 82 83 84 85 86 87 88 89]

Part B.
Answers will vary.
The majority of recorded highs are between 78 and 85 with a couple of lower values and six higher.
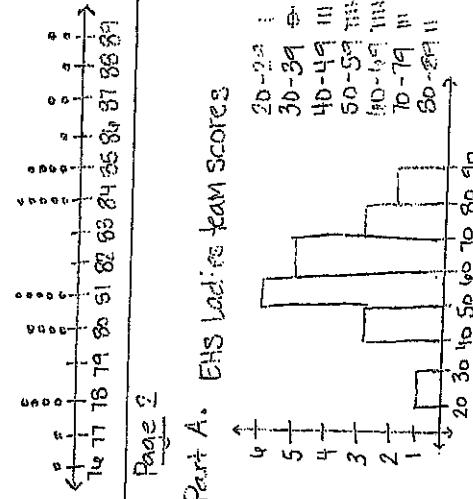
Page 2
1. Part A. EHS Ladies team scores

```
20-29  |
30-39  +
40-49  |||
50-59  ||||| ||||
60-69  ||||| |||
70-79  |||
80-89  ||
```

[histogram: 20 30 40 50 60 70 80 90]

Part B.
Answers will vary.
The majority of the scores are in the 50-59 point range.

Page 3
1. Minimum 30
Maximum 125
first quartile 50
third quartile 100
median 75
at most 100
between 100 and 125

Page 4
1. Part A.
Max: 10
Min: 3
1st Q: 3
3rd Q: 10
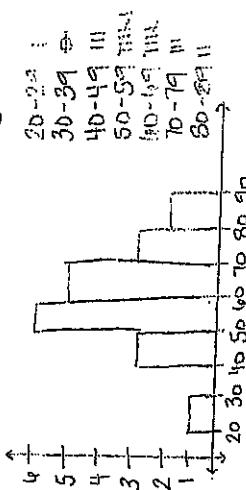
Part B.
Answers will vary.
The minimum and 1st quartile have the same value, and the maximum and 3rd quartile has the same value. Therefore, it has no whiskers.

Page 5
A. normal & skewed right
B. 20
C. 20
D. Answers will vary. →

The mode is a 4, 16 for 18, 20, 21 for the first group. It corresponds with the median and shows a normal distribution.
For the second group, 14 is the mode even though the median is 15. Median is 15. Median is skewed right because there are only a small number of values to the right of center.

Page 6
2. Answers will vary.
For the top plot the mean is lower than the median so the data is skewed left.
For the bottom plot the mean is higher than the median so the data is skewed right.
For both graphs, the median would be a better measure of center.

Page 7
1. Part A
Class A: Normal distribution.
Class B: Skewed right
Part B
Class B: 80
Part C
Class B: 14

Page 8
Part A
top: $22-16 = \boxed{6}$
bottom: $13-10 = \boxed{3}$
Part B
It says the spread of the data is smaller in the bottom box plot and larger in the top box plot in this particular set of data. In general, the IQR tells us about the spread of the data.

Page 9
1. Part A: 9.8 & 10.2
Part B: 9.9 & 10.1
Part C:
Below 9.8 and above 10.2 account for 5% so above 10.2 represents
$5 \div 2 = \boxed{2.5\%}$
Part D:
$6.8\% + (32\% \div 2) = \boxed{84\%}$

Page 10
2.

[bell curve graph: 69 72 75 78 81 84]

Part A: 2.5%
Part B: $48\% + (27\% \div 2) = \boxed{81.5\%}$
Part C: 79.85

Page 11
1. Mean → Median
2. standard deviation

Unit 11 Test Study Guide
(Probability & Statistics)

Name: _____

Date: _____ Block: _____

Topic 1: Fundamental Counting Principle, Permutations, & Combinations

1. There are ten questions on Jack's science quiz: six multiple choice questions with four choices each and four true/false questions. How many ways can he answer the questions?

2. The Sandwich Shop offers combo meals with a choice of one sandwich, one side, and one drink. In total, there are 560 combos available. If there are 16 sandwiches and 5 drinks available, how many sides are there?

Determine whether the situation represents a permutation or combination, then solve.

3. Marlena must answer three out of eight essay questions on her writing test. How many ways can she choose 3?

4. The Grandview High School Band plans to play six pieces of music in their upcoming concert. How many ways can they arrange the order of their performance?

5. How many ways can a president, vice president, and treasurer be elected from a group of 40 students?

6. Josh must submit 4 paintings as part of his application to art school. If he has 25 to choose from, how many ways can he pick 4?

7. How many different 12-letter arrangements can be made using the letters in the word CARELESSNESS?

8. The field hockey coach chooses players to put away equipment after each practice. If there are 16 players on the team, how many ways can she choose five?

Topic 2: Theoretical Probability/Independent vs. Dependent Events

9. Kate is randomly choosing a date in the month of August. What is the probability that she chooses a two-digit number or a prime number?

10. Erik is randomly choosing a card from a standard deck. What is the probability that he chooses a card that is red and a multiple of three?

11. One of the 50 states is chosen at random What is the probability of not choosing a state that begins with the letter N?

12. Tony's wallet contains six $1 bills, four $5 bills, two $10 bills, and three $20 bills. If Tony randomly removes a bill, what is the probability that it is at least $5?

13. A number 1-30 is randomly selected, followed by a letter from the word TARGET. What is the probability of choosing a perfect square then the letter T?

14. Carter is handing out Valentine's Day cards to his friends. He has 8 Batman cards, 12 Superman cards, and 5 Captain American cards in a bag. What is the probability that the first two he chooses are Batman?

Use for questions 15-16: A bag contains 25 red chips, 18 blue chips, and 29 yellow chips. A chip is selected, replaced, then another chip is chosen. Find each probability.

15. P(blue then red)

16. P(yellow then blue)

Use for questions 17-18: A box of pizza contains three cheese slices, seven pepperoni slices, and five supreme slices. Mark randomly chooses a slice, eats it, then chooses another. Find each probability.

17. P(cheese then supreme)

18. P(two pepperonis)

Topic 3: Conditional Probability

19. Mason randomly chooses a card from a standard deck of playing cards. What is the probability that it is not an ace, given it is a red card?

20. One of the 50 United States is randomly selected. What is the probability that it has two syllables, given it starts with the letter M?

21. Of the 318 sophomores, 140 are taking Algebra 2 and 102 are taking Chemistry. Twenty-six of those taking Algebra 2 are also taking chemistry. If a sophomore is chosen at random, find the probability that they are taking Algebra 2, if it is known that they do not take Chemistry.

22. A group of cell phone owners were asked whether they had an Android or apple phone. Use the results in the table to find each probability.

	Male	Female
Android	34	19
Apple	30	42

a) P(a male that owns an android)

b) P(apple | male)

c) P(female | android)

Expand each binomial using the binomial theorem.

28. $(a-2)^9$

29. $(4k+1)^5$

Topic 5: Statistics: Measures of Variation, Normal Distribution, and z-Scores

Find the mean absolute deviation, variance, and standard deviation for each data set.

30. The following data represents the last ten field goal attempts, in yards, made by the kicker.
{54, 29, 33, 62, 45, 39, 41, 52, 59, 36}

MAD = _____

Variance: σ^2 = _____

Standard Deviation: σ = _____

31. The following data shows the grades of the Carl's last 8 quiz grades in Algebra 2.
{72, 93, 52, 86, 100, 81, 79, 61}

MAD = _____

Variance: σ^2 = _____

Standard Deviation: σ = _____

Label the normal distribution curve, then answer the questions that follow.

The ages of the 32 recruits in police academy are normally distributed with a mean of 27 with a standard deviation of 2.

32. What percent of the recruits are between ages 23 and 27?

33. What is the probability that a recruit is at least 31 years old?

34. Approximately how many recruits are at most 29 years old?

---

23. The table below shows the number of gold, silver, and bronze medals won by the United States and China during the 2012 summer Olympics. Find the joint relative and marginal relative frequencies

	U.S.	China
Gold	46	38
Silver	28	28
Bronze	29	22

	U.S.	China	Total
Gold			
Silver			
Bronze			
Total			

If a medal from those above is randomly selected, find each probability.

a) P(a U.S. bronze medal)

b) P(a gold or silver medal)

c) P(silver | China)

d) P(U.S. | gold)

e) P(China | not silver)

f) P(bronze | not China)

Topic 4: Binomial Probability & Binomial Theorem

Use for questions 24-27: The soda company is printing prizes on the inside of their bottle caps, with a 3 in 5 chance of winning. If Tom purchases a 12-pack of soda, find each probability.

24. P(exactly two prizes)

25. P(exactly five prizes)

26. P(at least ten prizes)

27. P(no more than three prizes)

35. The blood pressure of a group of adults is normally distributed with a mean of 122 and a standard deviation of 13. If Mina's blood pressure is 108, find her z-score.

36. The daily balance of a checking account over the course of a month is normally distributed with a standard deviation of $84.10. If the balance in the account on a particular day was $317.34 with a z-score of -2.4, find the mean balance.

37. The length of a certain fish species is normally distributed with a mean of 15 cm. If a fish in this species is 18.8 cm with a z-score of 1.9, what is the standard deviation?

38. The number of visits to the gym each year by the members at InFit is normally distributed with a mean of 97 and a standard deviation of 25. If Kurt's z-score is -1.8 and Mindy's z-score is 2.4, how many more times did Mindy visit the gym than Kurt?

Use for questions 39-42: The shoe sizes of the 36 students in Samantha's PE class are normally distributed with a mean of 8.5 and a standard deviation of 1.5.

39. What percent of the students have a shoe size between 7 and 11?

40. What is the probability that a student will have a maximum shoe size of 9.5?

41. Approximately how many students wear at least a size 6?

42. Approximately how many students wear a shoe size between 8 and 10?

Unit 11 Test Study Guide
(Probability & Statistics)

Name: _____

Date: _____   Block: _____

Topic 1: Fundamental Counting Principle, Permutations, & Combinations

1. There are ten questions on Jack's science quiz: six multiple choice questions with four choices each and four true/false questions. How many ways can he answer the questions?

$$4^6 \cdot 2^4 = \boxed{65,536}$$

2. The Sandwich Shop offers combo meals with a choice of one sandwich, one side, and one drink. In total, there are 560 combos available. If there are 16 sandwiches and 5 drinks available, how many sides are there?

$$16 \cdot 5 \cdot X = 560$$
$$80 X = 560 \qquad \boxed{X = 7}$$

Determine whether the situation represents a permutation or combination, then solve.

3. Mariana must answer three out of eight essay questions on her writing test. How many ways can she choose 3?

$$_8C_3 = \boxed{56}$$

4. The Grandview High School Band plans to play six pieces of music in their upcoming concert. How many ways can they arrange the order of their performance?

$$6! = \boxed{720}$$

5. How many ways can a president, vice president, and treasurer be elected from a group of 40 students?

$$_{40}P_3 = \boxed{59,280}$$

6. Josh must submit 4 paintings as part of his application to art school. If he has 25 to choose from, how many ways can he pick 4?

$$_{25}C_4 = \boxed{12,650}$$

7. How many different 12-letter arrangements can be made using the letters in the word CARELESSNESS?

$$\frac{12!}{3! \, 4!} = \boxed{3,326,400}$$

8. The field hockey coach chooses players to put away equipment after each practice. If there are 16 players on the team, how many ways can she choose five?

$$_{16}C_5 = \boxed{4368}$$

Topic 2: Theoretical Probability/Independent vs. Dependent Events

9. Kate is randomly choosing a date in the month of August. What is the probability that she chooses a two-digit number or a prime number?

$$\frac{26}{31}$$

10. Erik is randomly choosing a card from a standard deck. What is the probability that he chooses a card that is red and a multiple of three?

$$\frac{6}{52} = \frac{3}{26}$$

11. One of the 50 states is chosen at random. What is the probability of not choosing a state that begins with the letter N?

$$1 - \frac{8}{50} = \boxed{\frac{21}{25}}$$

12. Tony's wallet contains six $1 bills, four $5 bills, two $10 bills, and three $20 bills. If Tony randomly removes a bill, what is the probability that it is at least $5?

$$\frac{9}{15} = \boxed{\frac{3}{5}}$$

13. A number 1-30 is randomly selected, followed by a letter from the word TARGET. What is the probability of choosing a perfect square then the letter T?

$$\frac{5}{30} \cdot \frac{2}{6} = \boxed{\frac{1}{18}}$$

14. Carter is handing out Valentine's Day cards to his friends. He has 8 Batman cards, 12 Superman cards, and 5 Captain American cards in a bag. What is the probability that the first two he chooses are Batman?

$$\frac{8}{25} \cdot \frac{7}{24} = \boxed{\frac{7}{75}}$$

Use for questions 15-16: A bag contains 25 red chips, 18 blue chips, and 29 yellow chips. A chip is selected, replaced, then another chip is chosen. Find each probability.

15. P(blue then red)

$$\frac{18}{72} \cdot \frac{25}{72} = \boxed{\frac{25}{288}}$$

16. P(yellow then blue)

$$\frac{29}{72} \cdot \frac{18}{72} = \boxed{\frac{29}{288}}$$

Use for questions 17-18: A box of pizza contains three cheese slices, seven pepperoni slices, and five supreme slices. Mark randomly chooses a slice, eats it, then chooses another. Find each probability.

17. P(cheese then supreme)

$$\frac{3}{15} \cdot \frac{5}{14} = \boxed{\frac{1}{14}}$$

18. P(two pepperoni)

$$\frac{7}{15} \cdot \frac{6}{14} = \boxed{\frac{1}{5}}$$

Topic 3: Conditional Probability

19. Mason randomly chooses a card from a standard deck of playing cards. What is the probability that it is not an ace, given it is a red card?

$$\frac{24}{26} = \boxed{\frac{12}{13}}$$

20. One of the 50 United States is randomly selected. What is the probability that it has two syllables, given it starts with the letter M?

$$\frac{0}{8} = \boxed{0}$$

21. Of the 318 sophomores, 140 are taking Algebra 2 and 102 are taking Chemistry. Twenty-six of those taking Algebra 2 are also taking chemistry. If a sophomore is chosen at random, find the probability that they are taking Algebra 2, if it is known that they do not take Chemistry.

$$\frac{114}{216} = \boxed{\frac{19}{36}}$$

22. A group of cell phone owners were asked whether they had an Android or apple phone. Use the results in the table to find each probability.

	Male	Female
Android	34	19
Apple	30	42

(125)

a) P(a male that owns an android)

$$\boxed{\frac{34}{125}}$$

b) P(apple | male)

$$\frac{30}{64} = \boxed{\frac{15}{32}}$$

c) P(female | android)

$$\boxed{\frac{19}{53}}$$

Expand each binomial using the binomial theorem.

28. $(a-2)^9$

$$_9C_0\,(a)^9(-2)^0 + _9C_1\,(a)^8(-2)^1 + _9C_2\,(a)^7(-2)^2 + _9C_3\,(a)^6(-2)^3 +$$
$$_9C_4\,(a)^5(-2)^4 + _9C_5\,(a)^4(-2)^5 + _9C_6\,(a)^3(-2)^6 + _9C_7\,(a)^2(-2)^7$$
$$+ _9C_8\,(a)^1(-2)^8 + _9C_9\,(a)^0(-2)^9$$
$$= a^9 - 18a^8 + 144a^7 - 672a^6 + 2016a^5 - 4032a^4 + 5376a^3 - 4608a^2 + 2304a - 512$$

29. $(4k+1)^5$

$$_5C_0\,(4k)^5(1)^0 + _5C_1\,(4k)^4(1)^1 + _5C_2\,(4k)^3(1)^2 + _5C_3\,(4k)^2(1)^3$$
$$+ _5C_4\,(4k)^1(1)^4 + _5C_5\,(4k)^0(1)^5$$

$$1024k^5 + 1280k^4 + 640k^3 + 160k^2 + 20k + 1$$

Topic 5: Statistics: Measures of Variation, Normal Distribution, and z-Scores

Find the mean absolute deviation, variance, and standard deviation for each data set.

30. The following data represents the last ten field goal attempts, in yards, made by the kicker.
{54, 29, 33, 62, 45, 39, 41, 52, 59, 36} $\mu = 45$

$$\frac{9 + 16 + 12 + 17 + 0 + 6 + 4 + 7 + 14 + 9}{10}$$

MAD = 0.4

Variance: $\sigma^2 = 114.70$ Standard Deviation: $\sigma = 10.71$

31. The following data shows the grades of the Carl's last 8 quiz grades in Algebra 2.
{72, 93, 52, 86, 100, 81, 79, 61} $\mu = 78$

$$\frac{6 + 15 + 23 + 8 + 22 + 3 + 1 + 17}{8}$$

MAD = 11.88

Variance: $\sigma^2 = 222.90$ Standard Deviation: $\sigma = 14.93$

Label the normal distribution curve, then answer the questions that follow.

The ages of the 32 recruits in police academy are normally distributed with a mean of 27 with a standard deviation of 2.
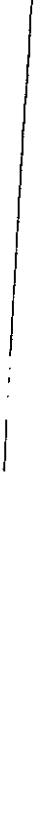
32. What percent of the recruits are between ages 23 and 27?

47.7%

33. What is the probability that a recruit is at least 31 years old?

2.3%

34. Approximately how many recruits are at most 29 years old?

26 recruits

---

23. The table below shows the number of gold, silver, and bronze medals won by the United States and China during the 2012 summer Olympics. Find the joint relative and marginal relative frequencies

	U.S.	China	Total
Gold	46	38	
Silver	28	28	
Bronze	29	22	

(191)

	U.S.	China	Total
Gold	.2408	.1990	.4398
Silver	.1466	.1466	.2932
Bronze	.1518	.1152	.2670
Total	.5392	.4608	1

If a medal from those above is randomly selected, find each probability.

a) P(a U.S. bronze medal)

15.18%

b) P(a gold or silver medal)

73.3%

c) P(silver | China)

$$\frac{.1466}{.4608}$$

31.81%

d) P(U.S. | gold)

$$\frac{.2408}{.4398}$$

54.75%

e) P(China | not silver)

$$\frac{.3142}{.7068}$$

44.45%

f) P(bronze | not China)

$$\frac{.1518}{.5392}$$

28.15%

Topic 4: Binomial Probability & Binomial Theorem

Use for questions 24-27: The soda company is printing prizes on the inside of their bottle caps, with a 3 in 5 chance of winning. If Tom purchases a 12-pack of soda, find each probability.

24. P(exactly two prizes)

$$_{12}C_2\,(3/5)^2\,(2/5)^{10} = .0025$$

.25%

25. P(exactly five prizes)

$$_{12}C_5\,(3/5)^5\,(2/5)^7 = .1009$$

10.09%

26. P(at least ten prizes)

$$_{12}C_{10}\,(3/5)^{10}\,(2/5)^2$$
$$_{12}C_{11}\,(3/5)^{11}\,(2/5)^1$$
$$_{12}C_{12}\,(3/5)^{12}\,(2/5)^0$$
$$= .0835$$

8.35%

27. P(no more than three prizes)

$$_{12}C_3\,(3/5)^3\,(2/5)^9$$
$$_{12}C_2\,(3/5)^2\,(2/5)^{10}$$
$$_{12}C_1\,(3/5)^1\,(2/5)^{11}$$
$$_{12}C_0\,(3/5)^0\,(2/5)^{12}$$
$$= .0153$$

1.53%

35. The blood pressure of a group of adults is normally distributed with a mean of 122 and a standard deviation of 13. If Mina's blood pressure is 108, find her z-score.

$$z = \frac{108-122}{13} = \boxed{-1.08}$$

36. The daily balance of a checking account over the course of a month is normally distributed with a standard deviation of $84.10. If the balance in the account on a particular day was $317.34 with a z-score of -2.4, find the mean balance.

$$-2.4 = \frac{317.34 - \mu}{84.10}$$

$$\boxed{519.18 = \mu}$$

37. The length of a certain fish species is normally distributed with a mean of 15 cm. If a fish in this species is 18.8 cm with a z-score of 1.9, what is the standard deviation?

$$1.9 = \frac{18.8-15}{\sigma}$$

$$\boxed{\sigma = 2}$$

38. The number of visits to the gym each year by the members at InFit is normally distributed with a mean of 97 and a standard deviation of 25. If Kurt's z-score is -1.8 and Mindy's z-score is 2.4, how many more times did Mindy visit the gym than Kurt?

$$-1.8 = \frac{X-97}{25} \quad X=52$$

$$2.4 = \frac{X-97}{25} \quad X=157$$

$$\boxed{102}$$

Use for questions 39-42: The shoe sizes of the 36 students in Samantha's PE class are normally distributed with a mean of 8.5 and a standard deviation of 1.5.

39. What percent of the students have a shoe size between 7 and 11?

$$\frac{7-8.5}{1.5} = -1$$

$$\frac{11-8.5}{1.5} = 1.67$$

$$\boxed{79.39\%}$$

40. What is the probability that a student will have a maximum shoe size of 9.5?

$$\frac{9.5-8.5}{1.5} = 0.67$$

$$\boxed{74.86\%}$$

41. Approximately how many students wear at least a size 6?

$$\frac{6-8.5}{1.5} = -1.67$$

$$\boxed{95.25\%}$$

42. Approximately how many students wear a shoe size between 8 and 10?

$$\frac{8-8.5}{1.5} = 0.33 \qquad 21.2\%$$

$$\frac{10-8.5}{1.5} = 1$$

$$\boxed{7\ \text{Students}}$$

Name: _____

Date: _____ **Bell:** _____

Unit 7 Test

Polygons & Quadrilaterals

---

1. What is the sum of the measures of the interior angles of a 27-gon?

   A. 4860°
   B. 4500°
   C. 5220°
   D. 166.7°

2. If the sum of the interior angles of a polygon is 2340°, how many sides does the polygon have?

   A. 11 sides
   B. 13 sides
   C. 15 sides
   D. 16 sides

---

3. Find $m\angle S$.

Q $(5x + 2)°$
P $(10x - 3)°$
$(7x - 11)°$ R
$(8x - 19)°$
T S $(13x - 31)°$
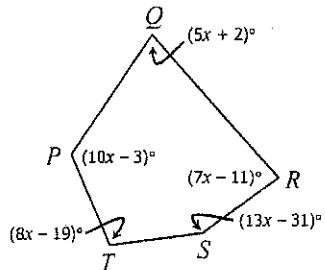
$m\angle S =$

---

4. A regular hexagon is shown below. Find the value of x.

$(11x + 21)°$
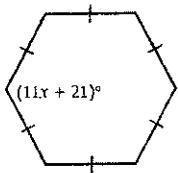
$x =$

5. If the polygon shown below is a regular nonagon, what is the value of x?

$x°$

$x =$

---

6. Find $m\angle DCE$.

D
$(9x - 31)°$
$(7x - 2)°$
C E
$(4x + 33)°$
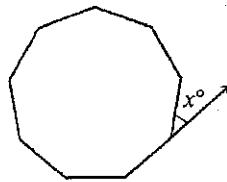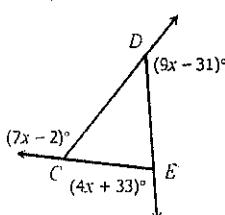
$m\angle DCE =$

7. If each interior angle of a regular polygon measures 168°, how many sides does the polygon have?

   A. 12 sides
   B. 30 sides
   C. 25 sides
   D. 15 sides

---

8. Which of the following properties is always true for a parallelogram?

   A. Diagonals bisect each other.
   B. Diagonals are perpendicular.
   C. Diagonals are congruent.
   D. Diagonals bisect opposite angles.

9. Which of the following quadrilaterals always have diagonals that are congruent? Check all that apply.

   ☐ Parallelograms
   ☐ Rectangles
   ☐ Rhombi
   ☐ Squares
   ☐ Isosceles Trapezoids

10. If $ABCD$ is a parallelogram, find $m\angle D$.

$(9x - 1)°$

$(13x - 25)°$
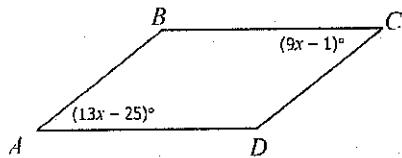
$m\angle D =$

Use parallelogram $WXYZ$ for questions 11 and 12.
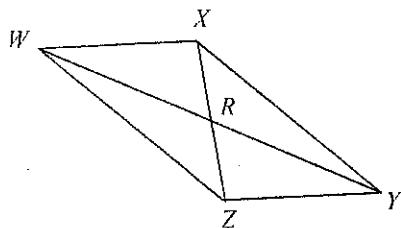
11. If $m\angle XYZ = 68°$ and $m\angle WXZ = 71°$, find $m\angle WZX$.

$m\angle WZX =$

12. If $XZ = 8x - 18$ and $RZ = 2x + 5$, find XR.

$XR =$

---

13. The vertices of quadrilateral $PQRS$ are given below. Use the distance and/or slope formuals to determine is $PQRS$ is a parallelogram. Use the diagram a a guide.

$P(-6, 4)$, $Q(-2, 7)$, $R(-1, 0)$, $S(-5, -3)$
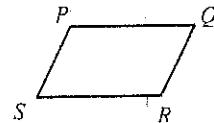
☐ $PQRS$ is a parallelogram

☐ $PQRS$ is not a parallelogram

Use rectangle $ABCD$ for questions 14-16.

$31°$
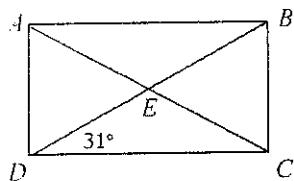
14. If $EC = 13$, find BD.

$BD =$

15. Find $m\angle ADB$.

$m\angle ADB =$

16. Find $m\angle DEC$.

$m\angle DEC =$

17. If $JKLM$ is a rectangle, find $m\angle NML$.

$(3x + 38)°$

$(7x - 2)°$

J K N M L
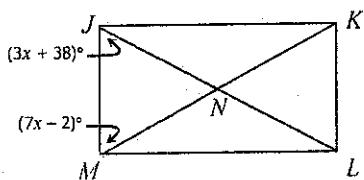
$m\angle NML =$

Use rhombus $DEFG$ for questions 18 and 19.

D E H G F
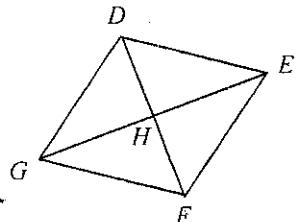
18. If $GE = 42$ and $DH = 16$, find GF.

$GF =$

19. If $EF = 13$ and $DF = 18$, find EH.

$EH =$

---

20. If $RSTU$ is a rhombus, find $m\angle UTS$.

R S V $(10x - 23)°$ U $(3x + 19)°$ T
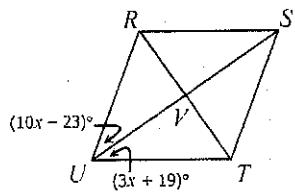
$m\angle UTS =$

Use square $ABCD$ for questions 21 and 22.

A B E D C
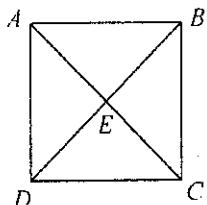
21. If $AC = 26$, find BC.

$BC =$

22. If $m\angle ACB = (11x - 32)°$, find the value of x.

$x =$

23. The vertices of quadrilateral $LMNP$ are $L(-1, 7)$, $M(4, 9)$, $N(8, -1)$, and $P(3, -3)$. Using the distance formula, determine the most precise classification of $LMNP$: parallelogram, rectangle, rhombus, or square. Use the diagram as a guide.
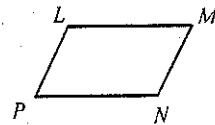
$LMNP$ is a

---

24. $WXZY$ is a quadrilateral with W located at $(-5, 2)$ and X located at $(3, 0)$. What must be the slope of $\overline{ZY}$ in order for $WXYZ$ to be a parallelogram?

A. 4

B. -4

C. $\dfrac{1}{4}$

D. $-\dfrac{1}{4}$

---
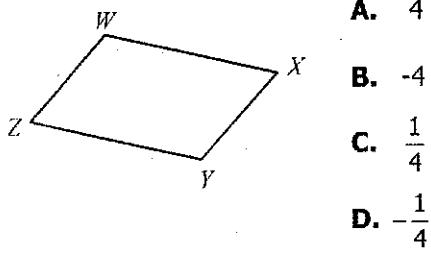
25. Rhombus $CDEF$ is shown below. If the slope of $\overline{FC}$ is $\dfrac{5}{2}$, what must be the slope of $\overline{CD}$ in order for $CDEF$ to be a square?

A. $\dfrac{2}{5}$

B. $-\dfrac{2}{5}$

C. $\dfrac{5}{2}$

D. $-\dfrac{5}{2}$

---

26. Find $m\angle P$.

$(7x + 31)°$

$(21x - 19)°$

$m\angle P =$

27. Find $m\angle T$.

Q —→ R
$(9x - 17)°$ $(4x + 28)°$

T —→ S

$m\angle T =$

28. Find $m\angle J$.

J —→ K
$(3x + 16)°$

$(11x - 18)°$

M —→ L
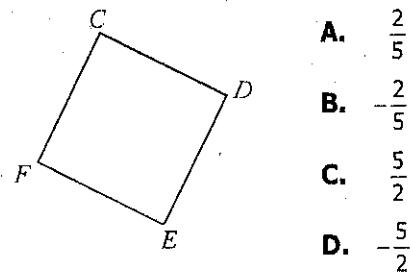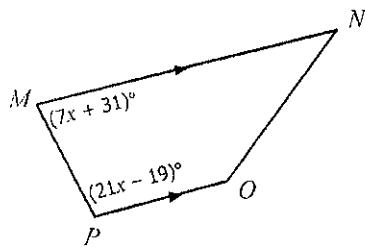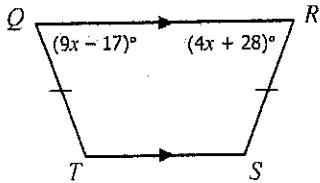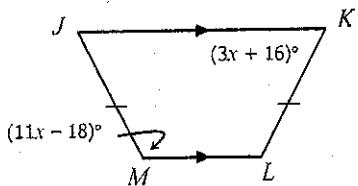
$m\angle J =$

29. If $BD = 8x - 27$ and $EC = 2x + 33$, find BD.
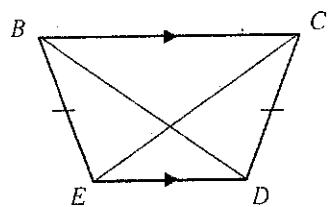
B —→ C

E —→ D

$BD =$

30. Find WX

S $10x + 5$ T

W $7x + 8$ X

U $8x - 1$ V

$WX =$
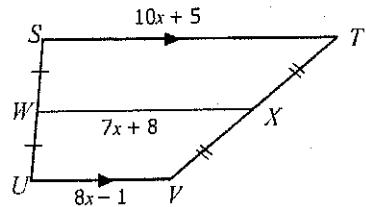
Name: _____

Date: _____ Bell: _____

Directions: For questions 1-4, solve for x. Round your answer to the nearest tenth.

1.
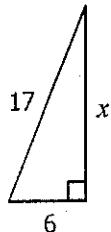
$x =$ ⬚

2.
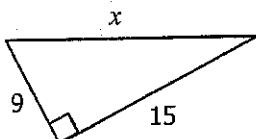
$x =$ ⬚

3.
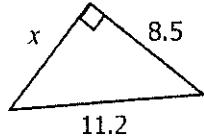
$x =$ ⬚

4. $\triangle DEF$ is an equilateral triangle.
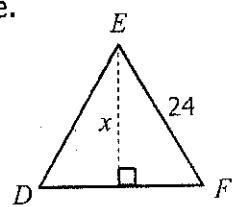
$x =$ ⬚

5. Westfalls is 7 miles south of Edenville and Concord is 13 miles west of Westfalls. What is the distance from Edenville to Concord? Round to the nearest tenth of a mile.

⬚

6. A rope from the top of a mast on a sailboat is attached to a point 19 feet from the mast. If the rope is 28 feet long, how tall is the mast? Round to the nearest tenth of a foot.

⬚

Directions: Given the side measurements, classify the triangle as acute, right, obtuse, or not a triangle.

7. 11, 13, 25

❑ Not a Δ
❑ Acute
❑ Right
❑ Obtuse

8. 9, 15, 19

❑ Not a Δ
❑ Acute
❑ Right
❑ Obtuse

9. 21, 28, 35

❑ Not a Δ
❑ Acute
❑ Right
❑ Obtuse

10. 8, 12, 14

❑ Not a Δ
❑ Acute
❑ Right
❑ Obtuse

Directions: Find the value of each variable.

11.

x 13 45° y

$x =$ $y =$

12.

x 4 30° y

$x =$ $y =$

13.

21 x 60° y

$x =$ $y =$

14.

22 45° x y

$x =$ $y =$

15.

x 45° 24 30° y z
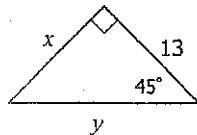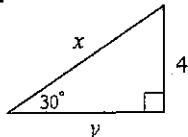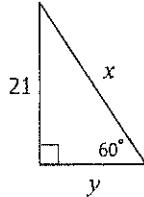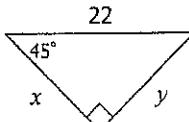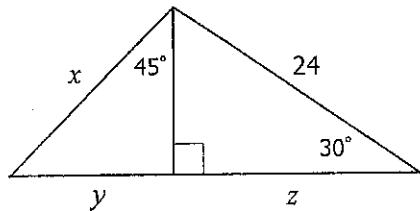
$x =$

$y =$

$z =$

16. Find the sine, cosine, and tangent of angle A. Give your answer as a fraction in simplest form.
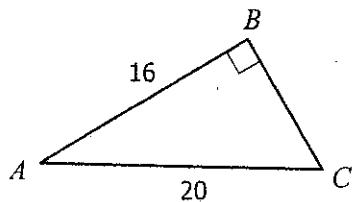
$\sin A = \quad /$

$\cos A = \quad /$

$\tan A = \quad /$

Directions: For questions 17-20, solve for x. Round your answer to the nearest tenth.

17.
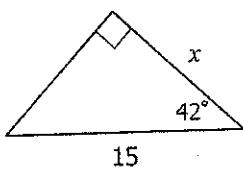
$x =$

18.
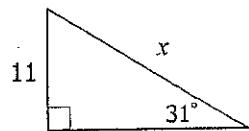
$x =$

19.
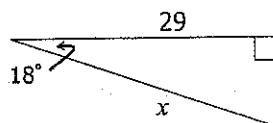
$x =$

20.
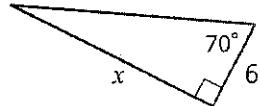
$x =$

21.
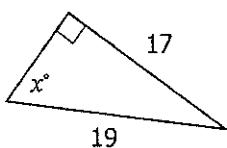
$x =$

22.
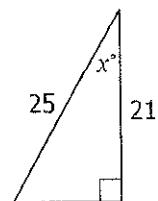
$x =$

Directions: Use a picture to help solve the problem. Round all answers to the nearest tenth.

23. The angle of elevation from a park bench 778 feet from the base of the Gateway Arch in St. Louis, Missouri is 39°. How tall is the Gateway Arch?

24. Disney's Tower of Terror ride in Disney World, Florida is 199 feet tall. If Josh is standing 132 feet from the base of the ride, what is the angle of elevation from the point where Josh is standing to the top of the tower?

25. The angle of depression from a bird sitting on top of a telephone pole to the base of a tree is 63°. If the telephone pole is 18 feet tall, what is the distance between the pole and the tree?

26. A helicopter flying 3,590 feet above ground spots the top of a 150-foot tall cell phone tower at an angle of depression of 77°. How far must the helicopter fly to be directly over the tower?

BONUS: Malaya is standing directly between a 90-foot tall courthouse and a 54-foot tall bank. If the angle of elevation from the point where Malaya is standing to the top of the courthouse is 72°, while the angle of elevation to the top of the bank is 35°. What is the distance between the courthouse and the bank?

Name: _____

Date: _____ Bell: _____

Directions: Graph and label each figure and its image under the given reflection. Give the new coordinates.

1. Triangle *ABC* with vertices *A*(-3, 2), *B*(-1, 7) and *C*(6, 1): in the *x*-axis

A' (____, ____)

B' (____, ____)

C' (____, ____)
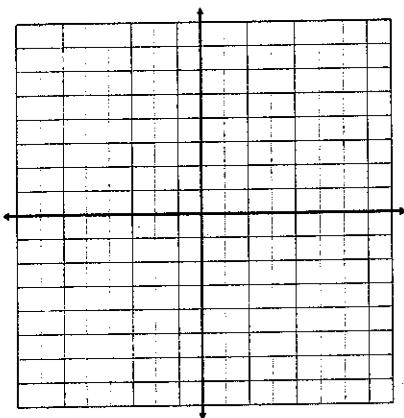
2. Quadrilateral *WXYZ* with vertices *W*(-1, 1), *X*(2, -3), *Y*(0, -6), and *Z*(-2, -5): in the line *x* = -3


W' (____, ____)

X' (____, ____)

Y' (____, ____)

Z' (____, ____)
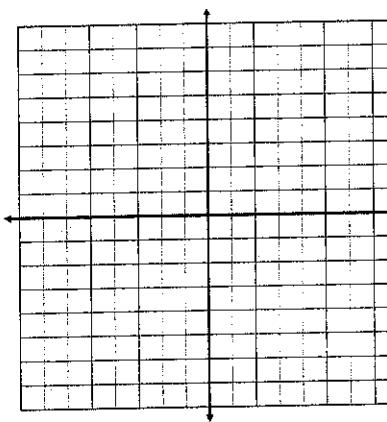
3. Triangle *GHI* with vertices *G*(4, 1), *H*(5, -4) and *I*(2, -8): in the line *y* = *x*

G' (____, ____)

H' (____, ____)

I' (____, ____)
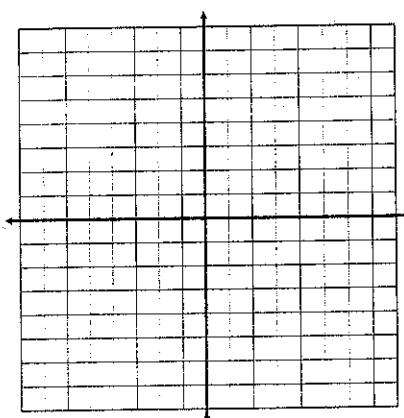
4. Rhombus *PQRS* with vertices *P*(-8, 6), *Q*(-4, 8), *R*(0, 6), and *S*(-4, 4): in the line *y* = 2

P' (____, ____)

Q' (____, ____)

R' (____, ____)

S' (____, ____)
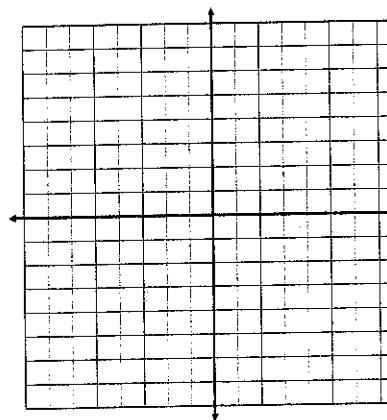
Directions: Graph and label each figure and its image under the given translation. Give the new coordinates.

5. Trapezoid *JKLM* with vertices *J*(-6, 6), *K*(-3, 7), *L*(-1, 3), and *M*(-8, 0): (*x*, *y*) → (*x* + 7, *y* − 3)

J' (____, ____)

K' (____, ____)

L' (____, ____)

M' (____, ____)
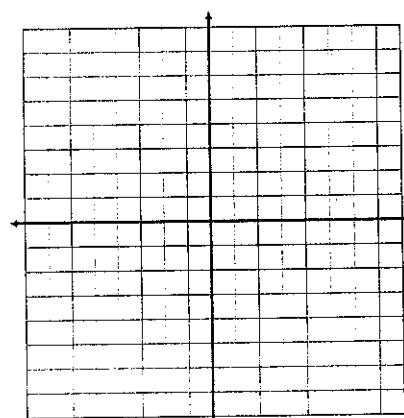
6. Square *RSTU* with vertices *R*(-2, 1), *S*(3, 4), *T*(6, -1), and *U*(1, -4): (*x*, *y*) → (*x* − 4, *y* − 1)

R' (____, ____)

S' (____, ____)

T' (____, ____)

U' (____, ____)
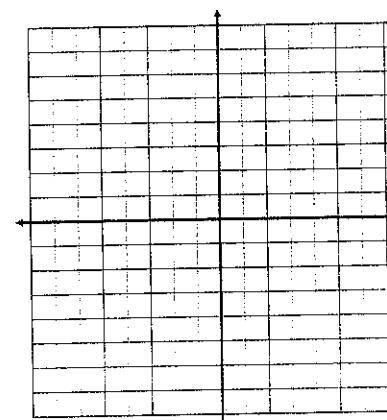
7. Parallelogram *CDEF* has vertices *C*(3, 2), *D*(8, 4), *E*(6, -3) and *F*(1, -5). Its image has vertices *C'*(-6, 6), *D'*(-1, 8), *E'*(-3, 1), and *F'*(-8, -1). Write a rule to represent this translation.
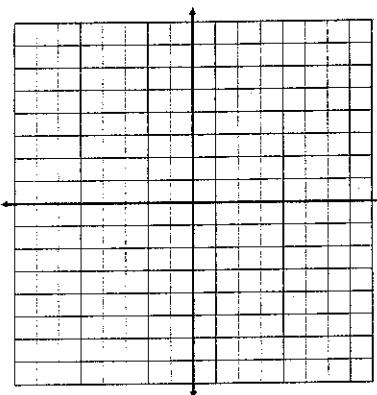
Rule: _____

8. Give each rule for counterclockwise rotations about the origin:

**90°:** $(x, y) \rightarrow$ _____ **180°:** $(x, y) \rightarrow$ _____ **270°:** $(x, y) \rightarrow$ _____

Directions: Graph and label each figure and its image under the given counterclockwise rotation about the origin. Give the new coordinates.

9. Triangle *XYZ* with vertices *X*(4, -1), *Y*(8, -2), and *Z*(1, -8): **180°**

X'(___, ___)
Y'(___, ___)
Z'(___, ___)
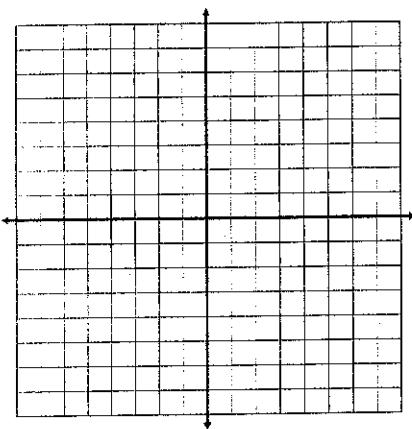
**10.** Rectangle *MNOP* with vertices *M*(-7, -2), *N*(-5, -1), *O*(-2, -7), and *P*(-4, -8): **90°**

M'(___, ___)
N'(___, ___)
O'(___, ___)
P'(___, ___)
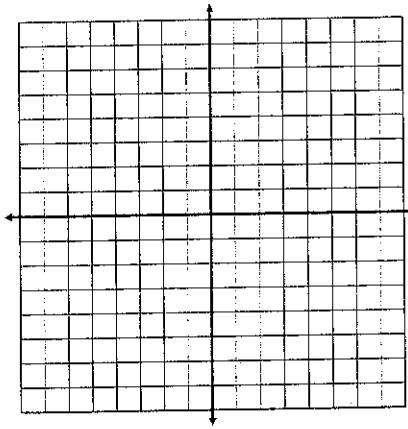
11. Quadrilateral *ABCD* with vertices *A*(4, 0), *B*(6, -2), *C*(8, -7), and *D*(0, -5): **270°**
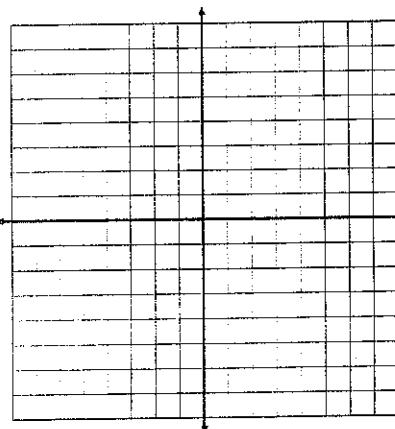
A'(___, ___)
B'(___, ___)
C'(___, ___)
D'(___, ___)

12. Triangle *LMN* below: **180°**

L'(___, ___)
M'(___, ___)
N'(___, ___)
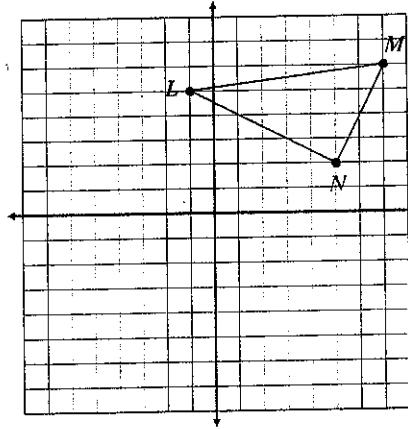
Directions: Determine whether the figure has line, point, and/or rotational symmetry.

13.

❑ Line
❑ Point
❑ Rotational
❑ None

14.
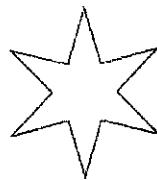
❑ Line
❑ Point
❑ Rotational
❑ None

15.
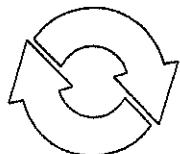
❑ Line
❑ Point
❑ Rotational
❑ None

16.
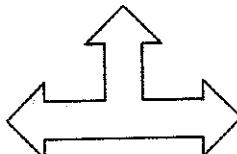
❑ Line
❑ Point
❑ Rotational
❑ None

17.
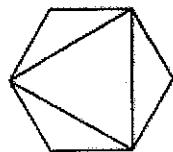
❑ Line
❑ Point
❑ Rotational
❑ None

18.

❑ Line
❑ Point
❑ Rotational
❑ None

Directions: Graph and label each figure and its image under the given dilation. Give the new coordinates

19. Rhombus $WXYZ$ with vertices $W(1, 0)$, $X(4, -1)$, $Y(5, -4)$, and $Z(2, -3)$: $k = 3$

$W'(\underline{\quad}, \underline{\quad})$

$X'(\underline{\quad}, \underline{\quad})$

$Y'(\underline{\quad}, \underline{\quad})$

$Z'(\underline{\quad}, \underline{\quad})$
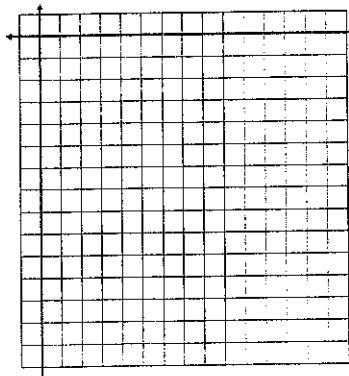
20. Triangle BCD with vertices $B(4, 4)$, $C(8, 14)$, and $D(12, 0)$: $k = 1/4$

$B'(\underline{\quad}, \underline{\quad})$

$C'(\underline{\quad}, \underline{\quad})$

$D'(\underline{\quad}, \underline{\quad})$
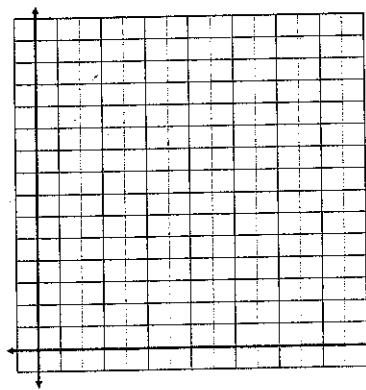
21. Graph the image of the trapezoid below using a scale factor of $k = 3/2$.

$R'(\underline{\quad}, \underline{\quad})$

$S'(\underline{\quad}, \underline{\quad})$

$T'(\underline{\quad}, \underline{\quad})$

$U'(\underline{\quad}, \underline{\quad})$
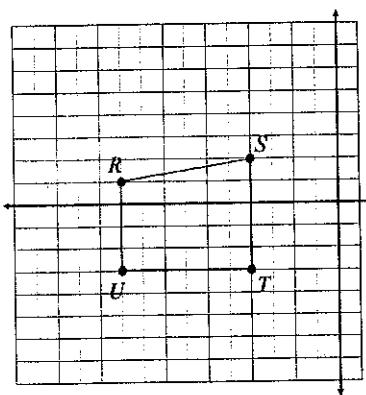
22. Graph the image of the parallelogram below using a scale factor of $k = 2/5$.

$E'(\underline{\quad}, \underline{\quad})$

$F'(\underline{\quad}, \underline{\quad})$

$G'(\underline{\quad}, \underline{\quad})$

$H'(\underline{\quad}, \underline{\quad})$
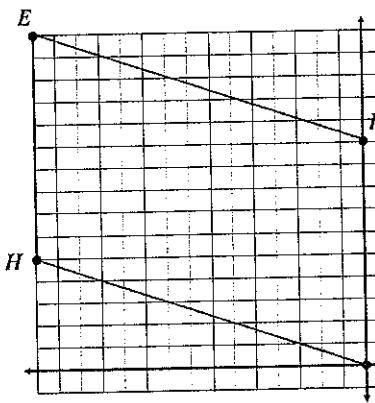
23. Identify the scale factor used to graph the image below.


$k =$ _____
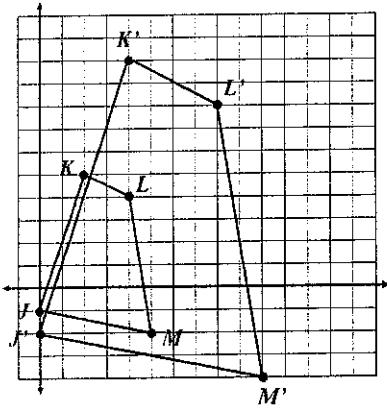
24. Identify the scale factor used to graph the image below.

$k =$ _____
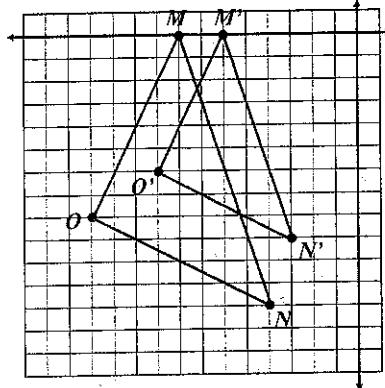
BONUS: Graph triangle ABC with vertices $A(7, -2)$, $B(8, -5)$, $C(3, -8)$ and its image after the following transformations. Give the coordinates of the final image.

(a) Translation: $(x, y) \rightarrow (x - 9, y + 10)$
(b) Rotation: 270° counterclockwise about the origin
(c) Reflection: in the line $y = -x$

$A'($ ____ , ____ $)$

$B'($ ____ , ____ $)$

$C'($ ____ , ____ $)$