School Home Letter

Module 1: Transformations and Congruence

Dear Family,

During the next 10 school days, we will be learning about translations, reflections, and rotations and their effects on two-dimensional figures. In this module, we will also be learning new Math vocabulary. You can find definitions for these terms in the eGlossary.

Along the way, ask about these concepts. When students explain or show how to solve a problem, it helps them make sense of the mathematics and deepens their understanding. Go to the *Family Resources* and use digital resources with your child to learn together.

Vocabulary

center of rotation
congruent
image
mapping notation
preimage
prime notation
reflection
rotation
transformation
translation

Lesson		Family Resources Online Support
1.1	Investigate Transformations	Interactive Reteach, Lesson 1.1
1.2	Explore Translations	More Practice/Homework, Problem 5, Math on the Spot Video
1.3	Explore Reflections	Interactive Reteach, Lesson 1.3
1.4	Explore Rotations	Interactive Reteach, Lesson 1.4
1.5	Understand and Recognize Congruent Figures	Interactive Reteach, Lesson 1.5

Home Activity

Look for examples of translations, reflections, and rotations in daily life. You may find examples in tile or fabric patterns. Challenge each other to see how many of each transformation you can locate, and draw sketches of your findings.

Carta a la familia

Módulo 1: Transformaciones y congruencia

Estimada familia:

Durante los próximos 10 días escolares, estudiaremos traslaciones, reflexiones, rotaciones y sus efectos en las figuras bidimensionales. En este módulo, también aprenderemos un nuevo vocabulario matemático. Podrá consultar las definiciones de estos términos en el eGlosario.

En ese tiempo, pregunten acerca de estos conceptos. Cuando los estudiantes explican o muestran cómo resolver un problema, les ayuda a encontrarles sentido a las matemáticas y a profundizar su comprensión. Ingrese en *Recursos familiares* y utilice los recursos digitales con su hijo(a) para estudiar juntos.

Vocabulario

centro de rotación
congruente
imagen
notación cartográfica
imagen original
notación prima
reflexión
rotación
transformación
traslación

Lección		Apoyo en línea para recursos familiares
1.1	Investiga las transformaciones	Refuerzo interactivo, Lección 1.1
1.2	Explora las traslaciones	Más práctica/Tarea, Problema 5, Video de Matemáticas al instante
1.3	Explora las reflexiones	Refuerzo interactivo, Lección 1.3
1.4	Explora las rotaciones	Refuerzo interactivo, Lección 1.4
1.5	Comprende y reconoce las figuras congruentes	Refuerzo interactivo, Lección 1.5

Actividad para la casa

Busque ejemplos de traslaciones, reflexiones y rotaciones en la vida diaria. Puede buscar ejemplos en patrones de tejidos o baldosas. Plantee el desafío de ver cuántas transformaciones pueden encontrar cada uno y dibujen bosquejos de sus hallazgos.

Carta da Escola para Casa

Módulo 1: Transformações e congruência

Prezada Família,

Durante os próximos dez dias de aulas, aprenderemos sobre tradução, reflexão e rotação e seus efeitos sobre figuras bidimensionais. Neste módulo, também aprenderemos novos termos de matemática. Você encontrará definições desses termos no glossário eletrônico, o eGlossary.

Enquanto isso, pergunte sobre esses conceitos. Quando os alunos explicam ou mostram como resolver um problema, isto os ajuda a compreender a matemática e aprofunda sua compreensão. Vá para *Recursos da Família* e use os recursos digitais com seu filho/sua filha para que aprendam juntos.

Vocabulário

centro de rotação
congruente
imagem
notação de mapas
préimagem
notação de Lagrange
reflexão
rotação
transformação
translação

Lição		Recursos da Família - Suporte Online
1.1	Investigar transformações	Reensino interativo, Lição 1.1
1.2	Explorar traduções	Mais Prática/Dever de Casa, Problema 5, Vídeo "Math on the Spot"
1.3	Explorar reflexões	Reensino interativo, Lição 1.3
1.4	Explorar rotações	Reensino interativo, Lição 1.4
1.5	Entender e reconhecer figuras congruentes	Reensino interativo, Lição 1.5

Atividade de casa

Procurem exemplos de traduções, reflexões e rotações na vida cotidiana. Vocês pode encontrar exemplos em padrões de azulejos ou tecidos. Desafiem uns aos outros para ver quanto de cada transformação podem localizar, e tracem esquemas de seus resultados.

Lèt Lekòl Voye Lakay Elèv

Modil 1: Transfòmasyon ak Kongriyans

Chè Fanmi,

Nan 10 pwochen jou lekòl k ap vini yo, nou pral aprann sou translasyon, refleksyon ak wotasyon avèk efè yo sou figi de (2) dimansyon. Nan modil sa a, nou pral aprann nouvo vokabilè Matematik tou. Ou kapab jwenn definisyon pou tèm sa yo nan eGlossary a.

Etan n ap aprann, poze kesyon sou konsèp sa yo. Lè elèv yo esplike oswa montre kijan pou rezoud yon pwoblèm, li ede yo konprann Matematik epi apwofondi konpreyansyon yo. Ale nan *Resous Fanmi yo* epi itilize resous dijital ak pitit ou a pou nou aprann ansanm.

Vokabilè

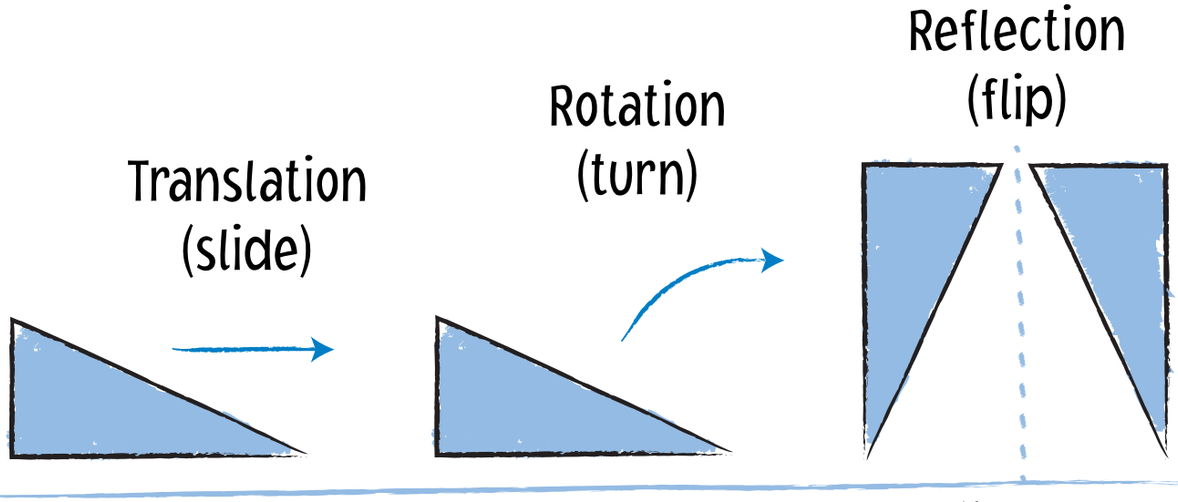
sant wotasyon
kongriyan
imaj
notasyon mapaj
preimaj
notasyon prim
refleksyon
wotasyon
transfòmasyon
translasyon

Leson		Sipò pou Resous Fanmi Sou Entènèt
1.1	Envestige Transfòmasyon	Re-ansèyman Entè-aktif, Leson 1.1
1.2	Eksplore Translasyon	Plis Pratik/Devwa Pou Fè Lakay, Pwoblèm 5, Videyo "Math on the Spot"
1.3	Eksplore Refleksyon	Re-ansèyman Entè-aktif, Leson 1.3
1.4	Eksplore Wotasyon	Re-ansèyman Entè-aktif, Leson 1.4
1.5	Konprann epi Rekonèt Figi Kongriyan	Re-ansèyman Entè-aktif, Leson 1.5

Aktivite pou Fè Lakay

Chèche egzanp translasyon, refleksyon ak wotasyon nan lavi toulejou. Ou ka jwenn egzanp nan modèl mozayik oswa tisi. Defye youn lòt pou n wè konbyen nan chak transfòmasyon ou ka lokalize, epi desinen chema rezilta w yo.

Transformations



Rules for Transformations

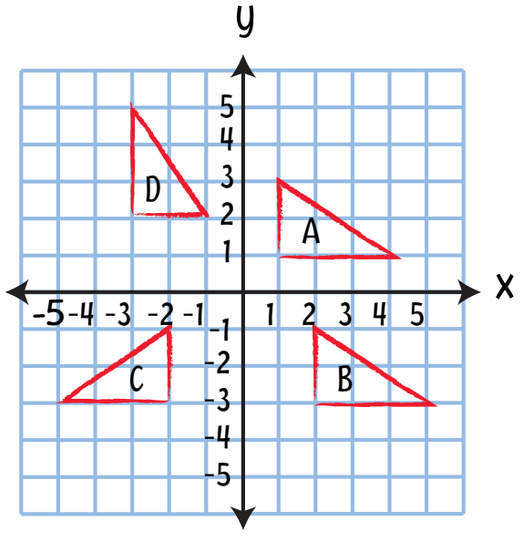
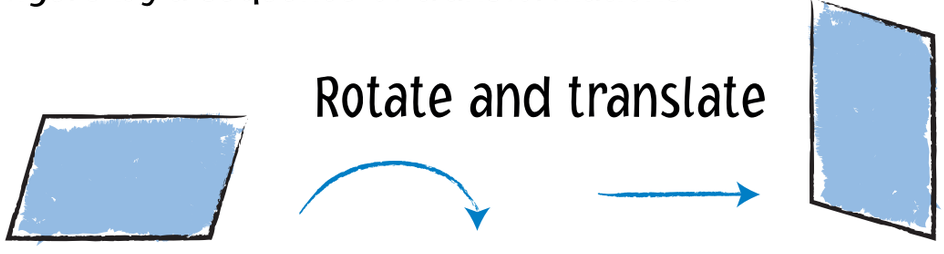


Figure B is Figure A translated right 1 and down 4: (x, y) -> (x + 1, y - 4)
Figure C is Figure B reflected across the y-axis: (x, y) -> (-x, y)
Figure D is Figure C rotated 90° clockwise about the origin: (x, y) -> (y, -x)

Congruent Figures

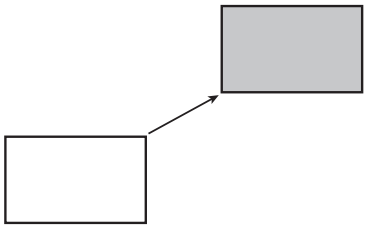
Two figures are congruent if one figure can be moved on top of the other figure by a sequence of transformations.



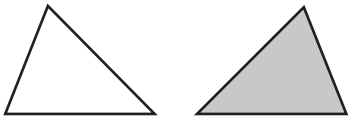
Name _____

Investigate Transformations

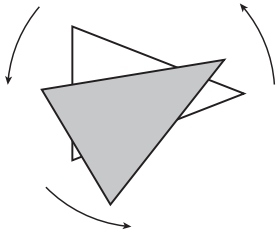
A figure can be **transformed** by **sliding** it in any direction. Sliding a figure does not change its size or shape, but does change its position.



A figure can be transformed by **flipping** it. Flipping a figure does not change its size or shape, but does change its position.



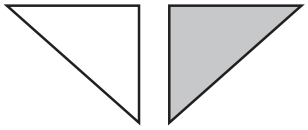
A figure can be transformed by **turning** (rotating) it. Turning a figure does not change its size or shape, but does change its position.



The sides and angles of transformed shapes have the same measurements as in the original shape.

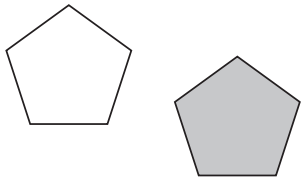
Describe how the figure was transformed to make the shaded figure.

A.



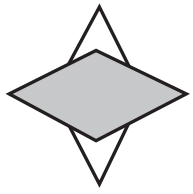
a flip

B.



a slide

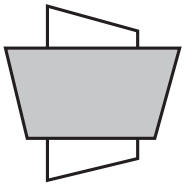
C.



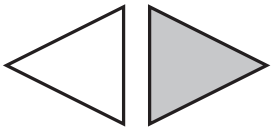
a turn

Describe how the figure was transformed to make the shaded figure.

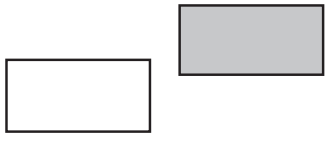
1.



2.



3.



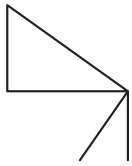
4. A. Complete the drawing of the shape in its new location.

B. How was the shaped transformed from the first location to the second location?

_____

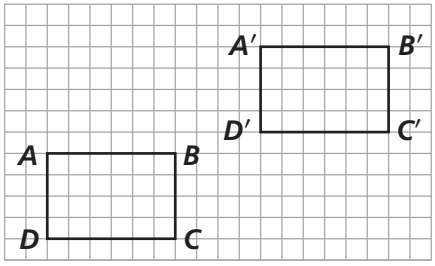
C. Describe how the side lengths and angle measures are affected when the shape is transformed.

_____



Explore Translations

When performing a **translation**, the original figure is called the *preimage*. The figure that results from the translation is called the *image*. Prime notation, indicated by apostrophes after the vertices' labels, is used to label images of figures.



When translating on the coordinate plane, the ordered pairs of the points in the image are determined based on the movement of the translation.

Direction	Coordinate	Change
Up	y	add to
Down	y	subtract from
Right	x	add to
Left	x	subtract from

Translations can also be described using a rule, such as $(x + 3)$ or $(x + 2, y - 2)$.

Identify the coordinates of the translated shape's vertices.

A. Triangle KLM has vertices $K(3, 6)$, $L(4, 9)$, and $M(5, 3)$. The triangle is translated using the rule $(x, y) \rightarrow (x + 2, y - 2)$. What are the coordinates of triangle $K'L'M'$?

$K(3, 6)$ $x = 3 + 2$ $y = 6 - 2$ $K'(5, 4)$

$L(4, 9)$ $x = 4 + 2$ $y = 9 - 2$ $L'(6, 7)$

$M(5, 3)$ $x = 5 + 2$ $y = 3 - 2$ $M'(7, 1)$

B. Quadrilateral $PQRS$ has vertices $P(1, -2)$, $Q(2, 1)$, $R(6, 1)$, and $S(7, -2)$. The quadrilateral is translated four units left and four units up. What are the coordinates of quadrilateral $P'Q'R'S'$?

$P(1, -2)$ $x = 1 - 4$ $y = -2 + 4$ $P'(-3, 2)$

$Q(2, 1)$ $x = 2 - 4$ $y = 1 + 4$ $Q'(-2, 5)$

$R(6, 1)$ $x = 6 - 4$ $y = 1 + 4$ $R'(2, 5)$

$S(7, -2)$ $x = 7 - 4$ $y = -2 + 4$ $S'(3, 2)$

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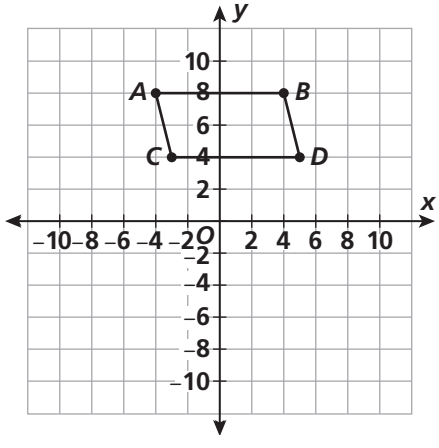
1. A. Translate figure $ABCD$ using the rule $(x, y) \rightarrow (x - 2, y - 6)$. Draw the image of figure $ABCD$. Label it using prime notation.

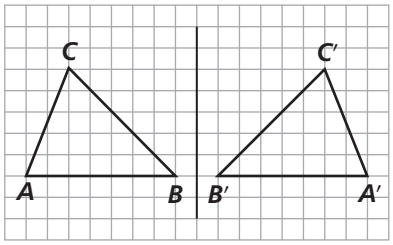


B. Opposite sides of quadrilateral $ABCD$ are parallel and the same length. What is true about opposite sides of quadrilateral $A'B'C'D'$?

C. If figure $ABCD$ is translated two units right and 4 units down, what are the coordinates of the vertices of the image?

Explore Reflections

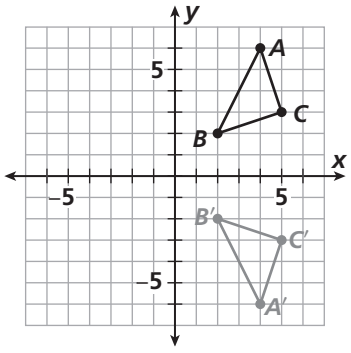
When performing a **reflection**, the original figure is reflected over a central line, called the *line of reflection*. The figure that results from the reflection is called the *image*. Prime notation, indicated by apostrophes after the vertices' labels, is used to label images of figures.



The ordered pairs of the vertices in the image are determined based on whether the figure is reflected over the *x*-axis or *y*-axis.

Point	Reflected over *x*-axis	Reflected over *y*-axis
(x, y)	$(x, -y)$	$(-x, y)$

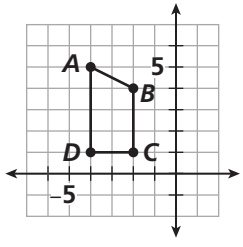
A. Reflect the figure *ABC* over the *x*-axis.



B. Fill in the table with the coordinates of the vertices of the preimage and the image.

Preimage	Image
$A(4, 6)$	$A'(4, -6)$
$B(2, 2)$	$B'(2, -2)$
$C(5, 3)$	$C'(5, -3)$

On a piece of graph paper, draw a trapezoid in the second quadrant of the coordinate plane with vertices at the points shown.



1. A. Where do you think the image of the trapezoid will end up if it is reflected over the *y*-axis?

_____

B. Where do you think the image of the trapezoid will end up if it is reflected over the *x*-axis?

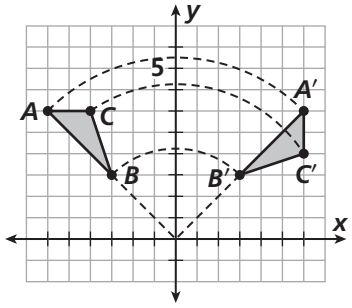
_____

C. Perform both reflections. Fill in the table with the coordinates of the vertices of the preimage and the images.

Point	Preimage	Image after reflection over *y*-axis	Image after reflection over *x*-axis
A			
B			
C			
D			

Explore Rotations

When performing a **rotation**, the original figure is rotated around a point called the *center of rotation*. The figure that results from the rotation is called the *image*. Prime notation, indicated by apostrophes after the vertices' labels, is used to label images of figures.



The direction of a rotation can be either clockwise or counterclockwise. If the rotation is about the origin, then the coordinates of the image's vertices can be found as shown in the table.

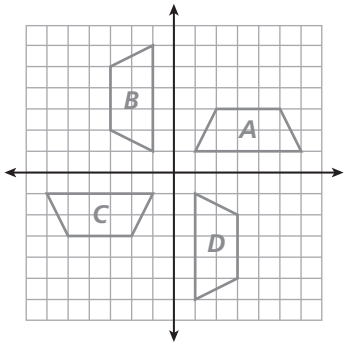
Clockwise Rotation	Counter-clockwise Rotation	Preimage Point	Image Point
90°	270°	(x, y)	$(y, -x)$
180°	180°	(x, y)	$(-x, -y)$
270°	90°	(x, y)	$(-y, x)$
360°	360°	(x, y)	(x, y)

A. Which shape shows a clockwise rotation of 90° about the origin of Shape *A*?

With a rotation of 90°, Point (1, 1) in preimage Shape *A* would become point (1, −1) in the resulting image. Shape *D* is the image of a rotation of 90° of Shape *A*.

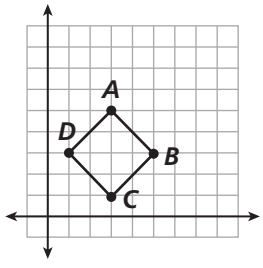
B. Which shape shows a rotation of Shape *A* following the rule $(x, y) \rightarrow (-x, -y)$?

The rule describes a shape that has been rotated 180°. Shape *C* is the image of a rotation of 180° about the origin of Shape *A*.



On a piece of graph paper, draw the figure shown in the first quadrant of the coordinate plane with vertices at the points shown. Label as Shape *A*.

1. A. Draw Shape *B* by rotating Shape *A* 90° counterclockwise about the origin. In what quadrant will you draw Shape *B*?

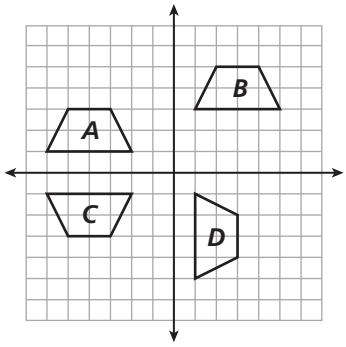


B. Fill in the table with the vertices of the preimage and the image.

Point	Preimage	Image after 90° counter-clockwise rotation
A		
B		
C		
D		

Understand and Recognize Congruent Figures

Two figures are **congruent** if they have the same shape and size. Congruent figures have sides and angles of the same measure. Translations, reflections, and rotations of a preimage result in congruent images.



A. Are shapes *A* and *B* congruent? Explain how you know.

Shape *A* is congruent to Shape *B* because Shape *A* can be mapped onto Shape *B* by a translation right 7 and up 2.

B. Are shapes *A* and *C* congruent? Explain how you know.

Shape *A* is congruent to Shape *C* because Shape *A* can be mapped onto Shape *C* by a reflection across the *x*-axis.

C. Are shapes *C* and *D* congruent? Explain how you know.

Shape *C* is congruent to Shape *D* because Shape *C* can be mapped onto Shape *D* by a 90° counterclockwise rotation about the origin and a translation one unit up.

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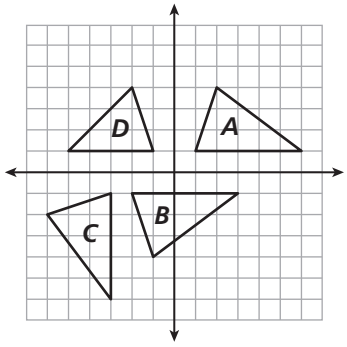
1. **A.** Are shapes *A* and *B* congruent? Explain how you know.



B. Are shapes *A* and *C* congruent? Explain how you know.

C. Are shapes *A* and *D* congruent? Explain how you know.

School Home Letter

Module 2: Transformations and Similarity

Dear Family,

During the next 6 school days, we will be learning about dilations and similar figures. In this module, we will also be learning new Math vocabulary. You can find definitions for these terms in the eGlossary.

Along the way, ask about these concepts. When students explain or show how to solve a problem, it helps them make sense of the mathematics and deepens their understanding. Go to the *Family Resources* and use digital resources with your child to learn together.

Vocabulary

center of dilation
dilation
scale factor
similar

Lesson		Family Resources Online Support
2.1	Investigate Reductions and Enlargements	Interactive Reteach, Lesson 2.1
2.2	Explore Dilations	Interactive Reteach, Lesson 2.2
2.3	Understand and Recognize Similar Figures	More Practice/Homework, Problem 3, Math on the Spot Video

Home Activity

Find an object in your home that represents a reduction, such as a toy car or a photograph. Work together to measure one or more dimensions of the reduction. If possible, measure the same dimension(s) of the actual object represented by the reduction, or look online to find or approximate the actual dimension(s). Then work with your child to calculate the scale of the reduction.

Carta a la familia

Módulo 2: Transformaciones y semejanza

Estimada familia:

Durante los próximos 6 días escolares, estudiaremos las dilataciones y figuras similares. En este módulo, también aprenderemos un nuevo vocabulario matemático. Podrá consultar las definiciones de estos términos en el eGlosario.

Vocabulario

centro de dilatación
dilatación
factor de escala
similar

En ese tiempo, pregunten acerca de estos conceptos. Cuando los estudiantes explican o muestran cómo resolver un problema, les ayuda a encontrarles sentido a las matemáticas y a profundizar su comprensión. Ingrese en *Recursos familiares* y utilice los recursos digitales con su hijo(a) para estudiar juntos.

Lección		Apoyo en línea para recursos familiares
2.1	Investiga las reducciones y las ampliaciones	Refuerzo interactivo, Lección 2.1
2.2	Explora las dilaciones	Refuerzo interactivo, Lección 2.2
2.3	Comprende y reconoce las figuras similares	Más práctica/Tarea, Problema 3, Video de Matemáticas al instante

Actividad para la casa

Busque un objeto en su hogar que represente una reducción, como un auto de juguete o una fotografía. Trabajen juntos para medir una o más dimensiones de la reducción. Si es posible, midan la(s) misma(s) dimensión(es) del objeto real representado por la reducción, o busquen información en internet para conocer las dimensiones reales o aproximadas. Luego calcule la escala de la reducción con su hijo(a).

Carta da Escola para Casa

Módulo 2: **Transformações e semelhanças**

Prezada Família,

Durante os próximos seis dias de aulas, aprenderemos sobre expansões e figuras semelhantes. Neste módulo, também aprenderemos novos termos de matemática. Você encontrará definições desses termos no glossário eletrônico, o eGlossary.

Enquanto isso, pergunte sobre esses conceitos. Quando os alunos explicam ou mostram como resolver um problema, isto os ajuda a compreender a matemática e aprofunda sua compreensão. Vá para *Recursos da Família* e use os recursos digitais com seu filho/sua filha para que aprendam juntos.

Vocabulário

centro de dilatação
dilatação
fator de escala
similar

Lição		Recursos da Família - Suporte Online
2.1	Investigar reduções e ampliações	Reensino interativo, Lição 2.1
2.2	Explorar dilatações	Reensino interativo, Lição 2.2
2.3	Entender e reconhecer figuras semelhantes	Mais Prática/Dever de Casa, Problema 3, Vídeo "Math on the Spot"

Atividade de casa

Encontre um objeto em sua casa que represente uma redução, como um carrinho de brinquedo ou uma fotografia. Trabalhem juntos para medir uma ou mais dimensões da redução. Se possível, meça as mesmas dimensões do objeto real representado pela redução ou procure as dimensões reais ou aproximadas na internet. Em seguida, trabalhe com seu filho para calcular a escala da redução.

Lèt Lekòl Voye Lakay Elèv

Modil 2: Transfòmasyon ak Similarite

Chè Fanmi,

Nan 6 pwochen jou lekòl k ap vini yo, nou pral aprann sou dilatasyon ak figi sanblab. Nan modil sa a, nou pral aprann nouvo vokabilè Matematik tou. Ou kapab jwenn definisyon pou tèm sa yo nan eGlossary a.

Vokabilè

sant dilatasyon
dilatasyon
faktè echèl
sanblab

Etan n ap aprann, poze kesyon sou konsèp sa yo. Lè elèv yo esplike oswa montre kijan pou rezoud yon pwoblèm, li ede yo konprann Matematik epi apwofondi konpreyansyon yo. Ale nan *Resous Fanmi yo* epi itilize resous dijital ak pitit ou a pou nou aprann ansanm.

Leson		Sipò pou Resous Fanmi Sou Entènèt
2.1	Envestige Rediksyon ak Elajisman	Re-ansèyman Entè-aktif, Leson 2.1
2.2	Eksplore Dilatasyon	Re-ansèyman Entè-aktif, Leson 2.2
2.3	Konprann epi Rekonèt Figi Sanblab	Plis Pratik/Devwa Pou Fè Lakay, Pwoblèm 3, Videyo "Math on the Spot"

Aktivite pou Fè Lakay

Jwenn yon objè lakay ou ki reprezante yon rediksyon, tankou yon jwèt oswa yon foto. Travay ansanm pou mezire youn oswa plis dimansyon rediksyon an. Si li posib, mezire menm dimansyon (yo) pou objè aktyèl la ke rediksyon an reprezante, oswa gade sou entènèt pou jwenn oswa fè apwoksimasyon dimansyon aktyèl la (yo). Apresa travay avèk pitit ou a pou kalkile echèl rediksyon an.

Scale Factor

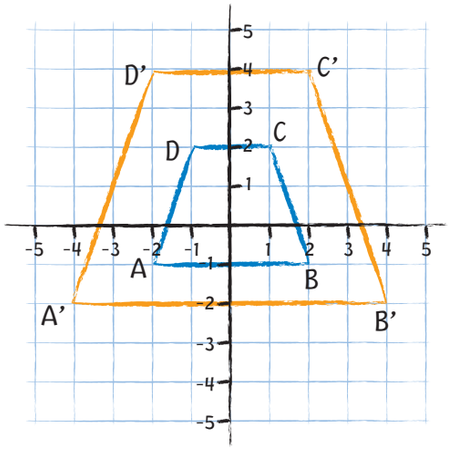
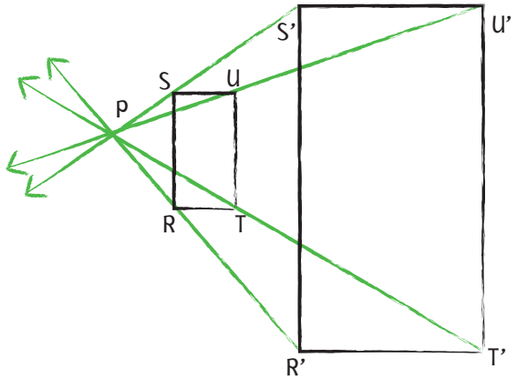


Figure A'B'C'D' is a dilation of Figure ABCD by a scale factor of 2: (x, y) -> (2x, 2y)

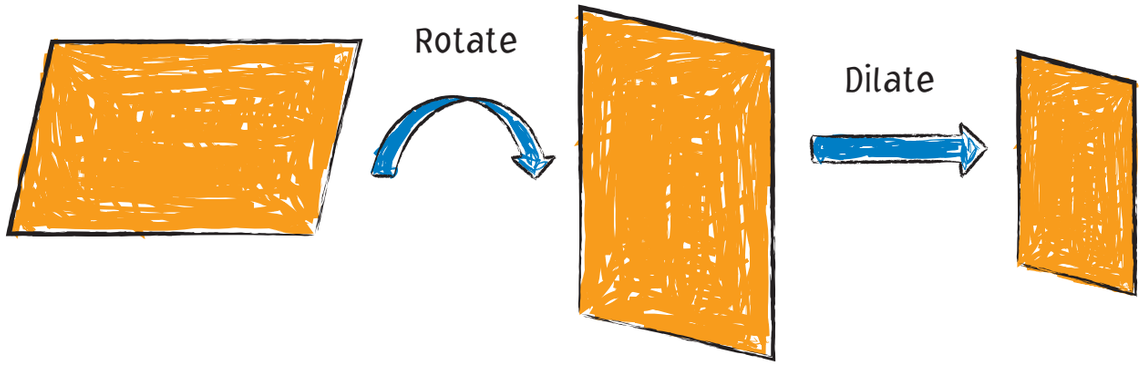
Center of Dilation

The center of dilation is where all rays through corresponding points intersect.



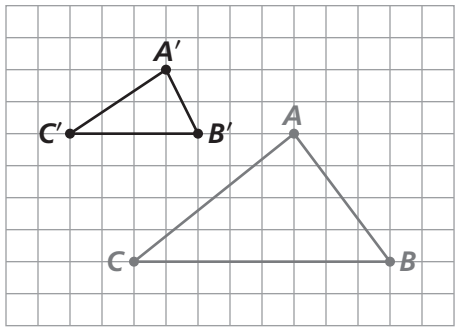
Similar Figures

Similar figures can be mapped onto each other through a series of transformations, including a dilation.

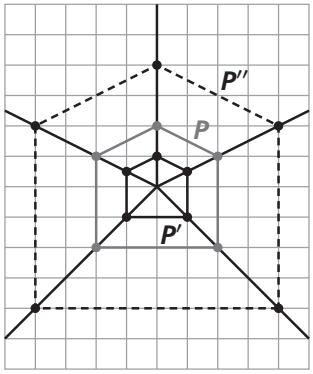


Investigate Reductions and Enlargements

Reductions and **enlargements** are transformations that keep the shape of the original image, but are smaller or larger in size.



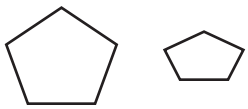
The sides of reduced or enlarged images are proportional to the sides of the original image. The angle measures of reduced or enlarged images are the same as in the original image.



You can draw reductions or enlargements on the coordinate grid by drawing rays from a point of origin, often the center of the image, through each of the vertices in the original image.

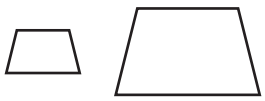
These rays will also pass though the vertices of any image made through a reduction or an enlargement.

A. Does this pair show a reduction? Why or why not?



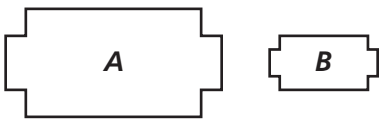
No. They are not the same shape. The angles are not the same and the side lengths are not proportional.

B. Does this pair show an enlargement? Why or why not?

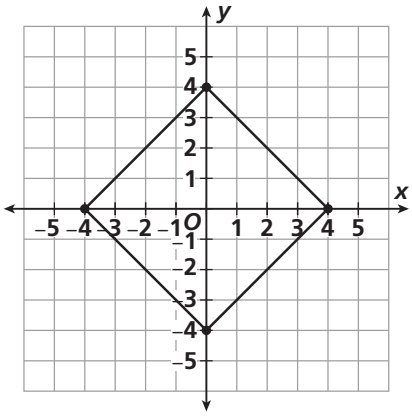


Yes. They are the same shape. The angles are the same and the lengths are proportional.

1. Does this pair show a reduction? Why or why not?



2. Use the coordinate plane to reduce the side lengths of the figure below by half.



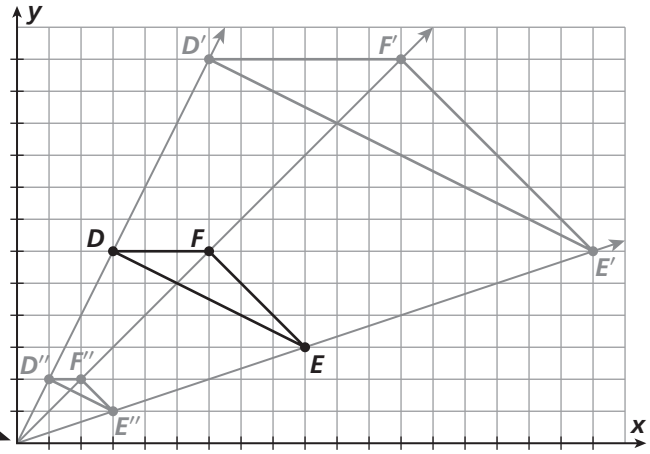
Explore Dilations

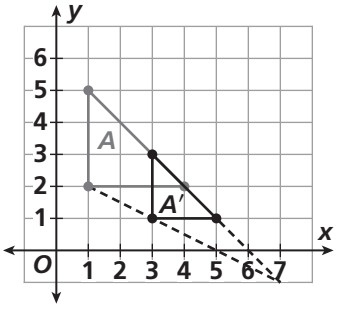
Dilations are transformations that change the size of an object but keep the shape of the original image. Dilations can be larger (enlargement) or smaller (reduction) than the original shape.

The sides of dilated images are proportional to the sides of the original image, and the angle measures are the same as in the original image.

The **scale factor** is the ratio of the size of the dilation to the size of the original image. If the scale factor is greater than 1, then the transformed image is an enlargement. If the scale factor is less than 1, then the transformed image is a reduction.

The point of intersection of lines through each pair of corresponding vertices in a dilation is called the **center of dilation**.



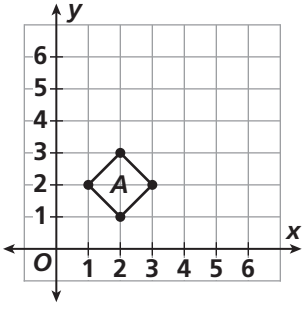


A. What is the scale factor of the dilation from the larger triangle to the smaller triangle?

$\frac{\text{base of } A'}{\text{base of } A} = \frac{2}{3}$ scale factor

B. Draw lines through the corresponding vertices of both figures to find the center of dilation. What is the center of dilation?

(7, −1)



1. Dilate figure A with scale factor 2 and center (0, 0).

A. Find the ordered pairs of the vertices of figure A.

B. Multiply each coordinate of each vertex by the scale factor to find the coordinates of the vertices of figure A′.

C. Graph A′. Draw lines to connect each corresponding vertex with the center of dilation.

D. Represent the dilation algebraically.

Understand and Recognize Similar Figures

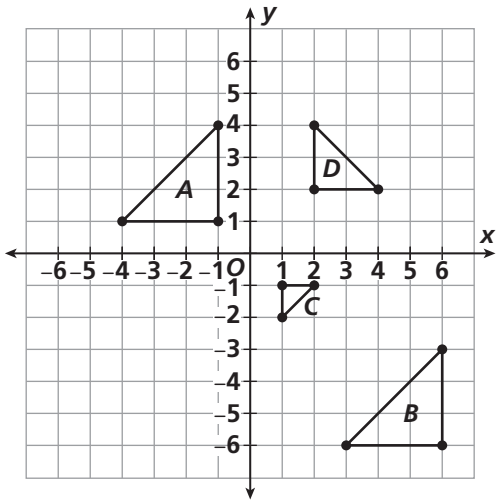
Two figures are **similar** if one can be obtained from the other by a sequence of transformations that may include a dilation. Similar figures are considered **congruent** if the measure of their sides and angles are the same.

A. Which pair of congruent triangles can be mapped from one to the other through a translation?

Triangle *A* and Triangle *B*

B. Which pair of similar triangles can be mapped from one to the other by a dilation with scale factor $\frac{1}{3}$ and center of dilation (0, 0), followed by a rotation of 180° counter-clockwise around the origin?

Triangle *A* and Triangle *C*

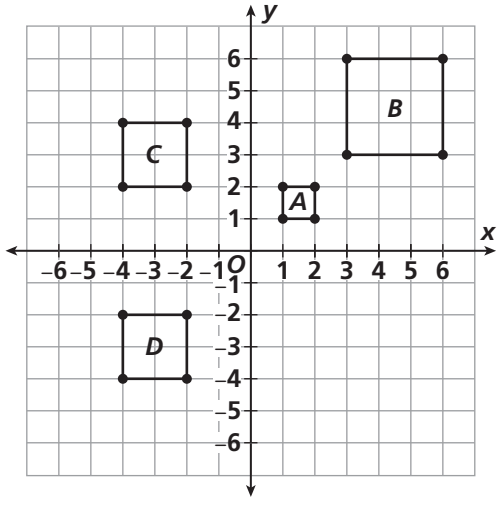


C. Which pair of similar triangles can be mapped from one to the other by a dilation with scale factor 2 and center of dilation (0, 0), and a reflection across the *x*-axis?

Triangle *C* and Triangle *D*

D. Describe a sequence of transformations that can be used to map Triangle *D* to Triangle *A*.

dilation with scale factor $\frac{3}{2}$ and center of dilation (0, 0), followed by reflection across the *y*-axis, followed by a translation 2 units right and 2 units down.



1. Use the figures on the coordinate plane to answer the following questions.

A. Which pair of congruent figures can be mapped from one to the other through a translation?

B. Which pair of similar figures can be mapped from one to the other by a dilation with scale factor $\frac{2}{3}$ and center of dilation (0, 0), and a reflection across the *y*-axis?.

C. Which pair of similar figures can be mapped from one to the other by a dilation with scale factor 2 and center of dilation (0, 0), and a rotation of 180° clockwise around the origin?

School Home Letter

Module 3: **Solve Linear Equations**

Dear Family,

During the next 6 school days, we will be learning how to solve multi-step linear equations and special cases of linear equations, and we will use linear equations to solve real-world problems.

Along the way, ask about these concepts. When students explain or show how to solve a problem, it helps them make sense of the mathematics and deepens their understanding. Go to the *Family Resources* and use digital resources with your child to learn together.

Vocabulary

infinitely many solutions
no solution

Lesson		Family Resources Online Support
3.1	Solve Multi-step Linear Equations	More Practice/Homework, Problem 2, Math on the Spot Video
3.2	Examine Special Cases	More Practice/Homework, Problem 10, Math on the Spot Video
3.3	Apply Linear Equations	More Practice/Homework, Problem 3, Math on the Spot Video

Home Activity

You and your child should each think of a numerical fact about yourself, such as your age, your shoe size, or your apartment number. Do not share your facts. Write a linear equation that has your fact as its solution. Then exchange equations, solve, and guess the numerical fact represented by the solution. For example, if you receive the equation $2b - 9 = 19$, you would solve to find $b = 14$. Then you might guess that this represents your child's age.

Carta a la familia

Módulo 3: **Resuelve las ecuaciones lineales**

Estimada familia:

Durante los próximos 6 días escolares, aprenderemos cómo resolver ecuaciones lineales de varios pasos y casos especiales de ecuaciones lineales y las usaremos para resolver problemas del mundo real.

Vocabulario

soluciones infinitas
sin solución

En ese tiempo, pregunten acerca de estos conceptos. Cuando los estudiantes explican o muestran cómo resolver un problema, les ayuda a encontrarles sentido a las matemáticas y a profundizar su comprensión. Vayan a los *Recursos familiares* y usen recursos digitales con su hijo(a) para que aprendan juntos.

Lección		Apoyo en línea para recursos familiares
3.1	Resuelve ecuaciones lineales de varios pasos	Más práctica/Tarea, Problema 2, Video de Matemáticas al instante
3.2	Examina casos especiales	Más práctica/Tarea, Problema 10, Video de Matemáticas al instante
3.3	Aplica las ecuaciones lineales	Más práctica/Tarea, Problema 3, Video de Matemáticas al instante

Actividad para la casa

Usted y su hijo(a) deben pensar cada uno en un dato numérico acerca de sí mismos, como edad, número de zapato o número de apartamento. No compartan sus datos. Escriban una ecuación lineal que tenga su dato como solución. Luego intercambien ecuaciones, resuelvan y adivinen el dato numérico representado por la solución. Por ejemplo, si reciben la ecuación $2b - 9 = 19$, resolverían para calcular $b = 14$. Entonces adivinarían que esto representa la edad de su hijo(a).

Carta da Escola para Casa

Módulo 3: **Resolver equações lineares**

Prezada Família,

Durante os próximos seis dias de aulas, aprenderemos a resolver equações lineares com múltiplas etapas, casos especiais de equações lineares, e usaremos equações lineares para resolver problemas do mundo real.

Vocabulário

um número infinito de soluções
sem solução

Enquanto isso, pergunte sobre esses conceitos. Quando os alunos explicam ou mostram como resolver um problema, isto os ajuda a compreender a matemática e aprofunda sua compreensão. Vá para *Recursos da Família* e use os recursos digitais com seu filho para que aprendam juntos.

Lição		Recursos da Família - Suporte Online
3.1	Resolver equações lineares com múltiplas etapas	Mais Prática/Dever de Casa, Problema 2, Video "Math on the Spot"
3.2	Examinar casos especiais	Mais Prática/Dever de Casa, Problema 10, Video "Math on the Spot"
3.3	Aplicar equações lineares	Mais Prática/Dever de Casa, Problema 3, Video "Math on the Spot"

Atividade de casa

Você e seu filho devem, separadamente, pensar em um fato numérico sobre vocês mesmos, como idade, quanto você calça, ou o número de seu apartamento. Mantenha o fato em que pensar em segredo. Escreva uma equação linear cuja solução seja o seu fato. Troquem as equações, resolvam as equações, e adivinhem o fato numérico representado pela solução. Por exemplo, se receber a equação $2b - 9 = 19$, você resolveria para encontrar $b = 14$. Então, você poderia adivinhar que este número representa a idade de seu filho.

Lèt Lekòl Voye Lakay Elèv

Modil 3: Rezoud Ekwasyon Lineyè

Chè Fanmi,

Pandan 6 pwochen jou lekòl yo, nou pral aprann kijan pou rezoud ekwasyon lineyè ki gen plizyè etap ak ka espesyal ekwasyon lineyè, epi nou pral itilize ekwasyon lineyè pou rezoud pwoblèm mond reyèl la.

Etan n ap aprann, poze kesyon sou konsèp sa yo. Lè elèv yo esplike oswa montre kijan pou rezoud yon pwoblèm, li ede yo konprann Matematik epi apwofondi konpreyansyon yo. Ale nan *Resous Fanmi yo* epi itilize resous dijital ak pitit ou a pou nou aprann ansanm.

Vokabilè

plizyè solisyon
alenfini
pa gen solisyon

Leson		Sipò pou Resous Fanmi Sou Entènèt
3.1	Rezoud Ekwasyon Lineyè Ki Gen Plizyè Etap	Plis Pratik/Devwa Pou Fè Lakay, Pwoblèm 2, Videyo Math on the Spot (Matematik Sou Plas)
3.2	Egzamine Ka Espesyal	Plis Pratik/Devwa Pou Fè Lakay, Pwoblèm 10, Videyo Math on the Spot (Matematik Sou Plas)
3.3	Aplike Ekwasyon Lineyè	Plis Pratik/Devwa Pou Fè Lakay, Pwoblèm 3, Videyo Math on the Spot (Matematik Sou Plas)

Aktivite pou Fè Lakay

Ou menm ak pitit ou, nou chak dwe panse ak yon eleman nimerik sou tèt nou, tankou laj nou, nimewo pye nou oswa nimewo apatman nou. Pa pataje eleman nou yo. Ekri yon ekwasyon lineyè ki gen eleman ou a kòm solisyon. Apresa fè echanj ekwasyon, rezoud epi devine eleman nimerik ke solisyon an reprezante a. Pa egzanp, si w resevwa ekwasyon $2b - 9 = 19$, w ap rezoud pou w jwenn $b = 14$. Apresa ou ka devine ke sa reprezante laj pitit ou a.

Eliminate Fractions and Decimals

$$\frac{6}{5}n - \frac{8}{5} = \frac{2}{5}n$$

$$5\left(\frac{6}{5}n\right) - 5\left(\frac{8}{5}\right) = 5\left(\frac{2}{5}n\right)$$

$$6n - 8 = 2n$$

$$4n = 8$$

$$n = 2$$

$$1.2n - 1.6 = 0.4n$$

$$10(1.2n) - 10(1.6) = 10(0.4n)$$

$$12n - 16 = 4n$$

$$8n = 16$$

$$n = 2$$

Special cases

Solution	Meaning	Number of Solutions	Example
$x = a$	one value of x makes the equation true	1	$x = 5$
$a = b$, where $a \neq b$	no value of x makes the equation true	0	$3 = 5$
$a = a$ or $x = x$	any value of x makes the equation true	infinitely many	$4.5 = 4.5$

Apply Linear Equations

Josh is 3 years older than Lynette. The sum of their ages is 49.
The equation $j + (j - 3) = 49$ can be solved to determine Josh's age in years.

j is Josh's age

j - 3 is Lynette's age

$$j + j - 3 = 49$$
$$2j - 3 = 49$$
$$2j = 52$$
$$j = 26$$

Josh is 26 years old and Lynette is 23 years old.

Solve Multi-step Linear Equations

A **multi-step linear equation** takes several steps to solve by applying basic algebraic rules.

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

A. To rewrite the equation without fractions, multiply both sides of the equation by the least common multiple of the two denominators.

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

$12(\frac{1}{4}x - 4) = 12(3 - \frac{1}{3}x)$

B. Apply the Distributive Property to remove the parentheses.

$3x - 48 = 36 - 4x$

C. Use the Addition Property to bring the variable terms to one side of the equation and the number terms to the other side.

$3x - 48 = 36 - 4x$

$4x + 48 \quad 48 + 4x$

$7x \quad = 84$

D. Isolate the variable by multiplying both sides of the equation by $\frac{1}{7}$.

$\frac{1}{7}(7x) = \frac{1}{7}(84)$

$x = 12$

E. Check your solution by substituting the value of the variable in the original equation.

$\frac{1}{4}(12) - 4 = 3 - \frac{1}{3}(12)$

$3 - 4 = 3 - 4; -1 = -1$

Solve each equation. Check your solution.

1. $-4(2x - 2) = -(4x - 4)$

2. $\frac{-8 + n}{3} = 6$

3. $0.5b - 8 = -6$

4. $-7 = -(-4 + 3n) + 2(n - 2)$

Examine Special Cases

You know that to solve a linear equation means to find the values for the variable that make a true statement. Some algebraic equations are considered **special cases** if the equation does not have one unique solution.

Special Cases

Solution	Meaning	Number of Solutions
$x = a$	one value of x makes the equation true	one solution
$a = b$, where $a \neq b$	no value of x makes the equation true	no solution
$a = a$ or $x = x$	any value of x makes the equation true	infinite solutions

Tell whether each equation has one solution, no solution, or infinitely many solutions.

A. $0.50 + 3x = 3x - 1.25$

$-0.50 - 3x = -3x - 0.50$

$0 = -1.75$

no solution

B. $4x + 2 = 2x + 6$

$-2x - 2 = -2x - 2$

$2x = 4$

$x = 2$

one solution

C. $\frac{1}{2}x + 3 + \frac{1}{4}x = 2 + \frac{3}{4}x + 1$

$\frac{3}{4}x + 3 = \frac{3}{4}x + 3$

$-\frac{3}{4}x - 3 = -\frac{3}{4}x - 3$

$0 = 0$

infinite solutions

Tell whether each equation has one solution, no solution, or infinitely many solutions.

1. $-28 = -7(3x + 4) + 21x$

2. $154 = -4(8 + 6r) + 24r$

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

Complete each equation so that it has the number of solutions shown.

4. infinitely many solutions

$\frac{3}{5} + 2x = 3x - x + \_\_\_\_$

5. no solution

$8x + 5 = 2x + 3 + \_\_\_\_$

6. infinitely many solutions

$4n - 6(3 - n) + \_\_\_\_ = 10n - 15$

Apply Linear Equations

You can use a linear equation to solve real-world problems.

On an algebra test, the lowest grade was 42 points lower than the highest grade. The sum of the two grades was 138. Find the highest grade.

Step 1

What are you asked to find? — the highest grade on an algebra test

Step 2

Assign a variable for the unknown number. Write down what the variable represents. — Let h = the highest grade.

Step 3

Write an equation using the information given in the problem. — If the highest grade = h, then the lowest grade = $(h - 42)$. Together the grades = 138.

$h + (h - 42) = 138$

Step 4

Solve the equation.

$h + (h - 42) = 138$

$2h - 42 = 138$

$2h = 180$

$h = 90$

Step 5

Check the answer.

$90 + (90 - 42) = 138$

$138 = 138$

Step 6

Answer the question in the problem. — The highest grade on the algebra test was 90.

Write an equation. Solve.

1. Zhang is 5 years younger than Robert. The sum of their ages is 39. What are their ages?

_____

2. There are two drama classes offered at a middle school. The 8th grade class has 13 fewer students than the 7th grade class. If the total number of students in both classes is 67, how many students are in the 8th grade class?

_____