GLENCOE MATHEMATICS

Algebra 1

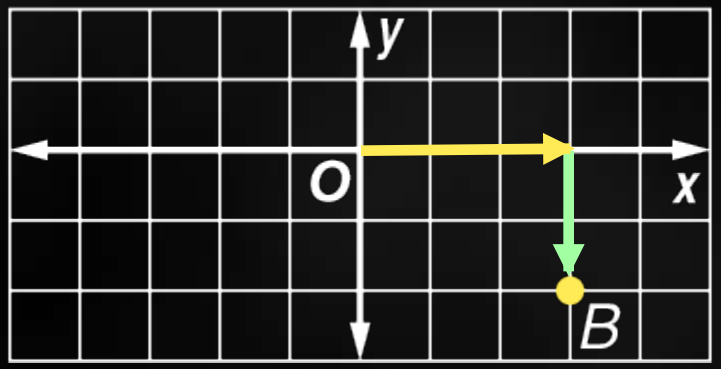
CHAPTER 4
Graphing Relations and Functions

EXIT

Lesson 4-1 Contents

Example 1

Write the ordered pair for point B.



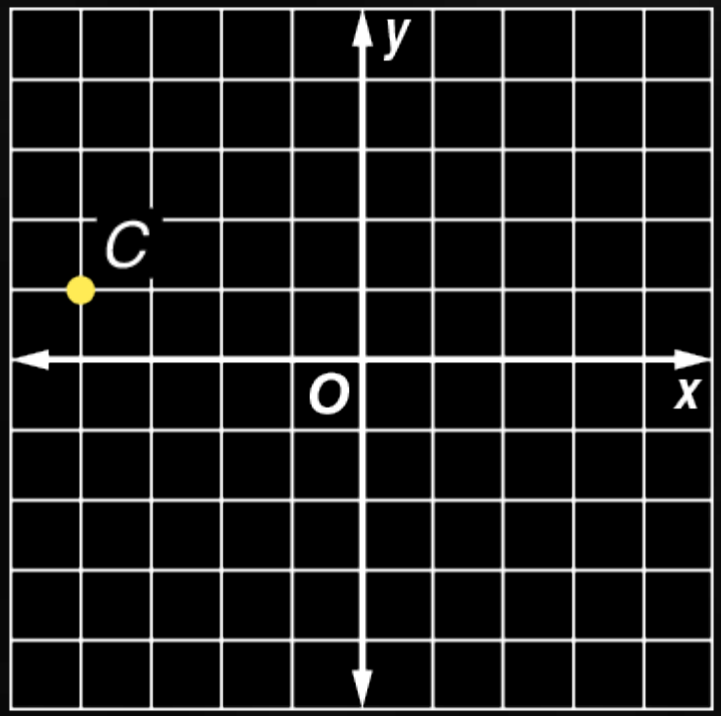
Follow along a horizontal line to find the x-coordinate on the x-axis. The x-coordinate is 3.

Follow along a vertical line through the point to find the y-coordinate on the y-axis. The y-coordinate is -2.

Answer: The ordered pair for point B is $(3, -2)$. This can also be written as $B(3, -2)$.

Your Turn

Write the ordered pair for point C.



Answer: $(-4, 1)$

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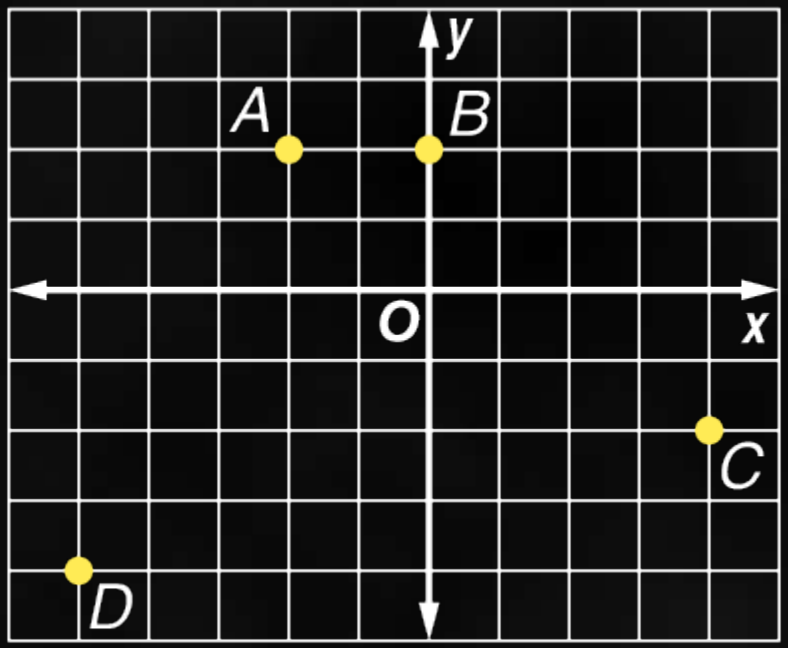
Example 2

Write ordered pairs for points A, B, C, and D. Name the quadrant in which each point is located.



Use a table to help find the coordinates of each point.

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the next slide

Example 2

Point	x-Coordinate	y-Coordinate	Ordered Pair	Quadrant
A	-2	2	$(-2, 2)$	II
B	0	2	$(0, 2)$	None
C	4	-2	$(4, -2)$	IV
D	-5	-4	$(-5, -4)$	III

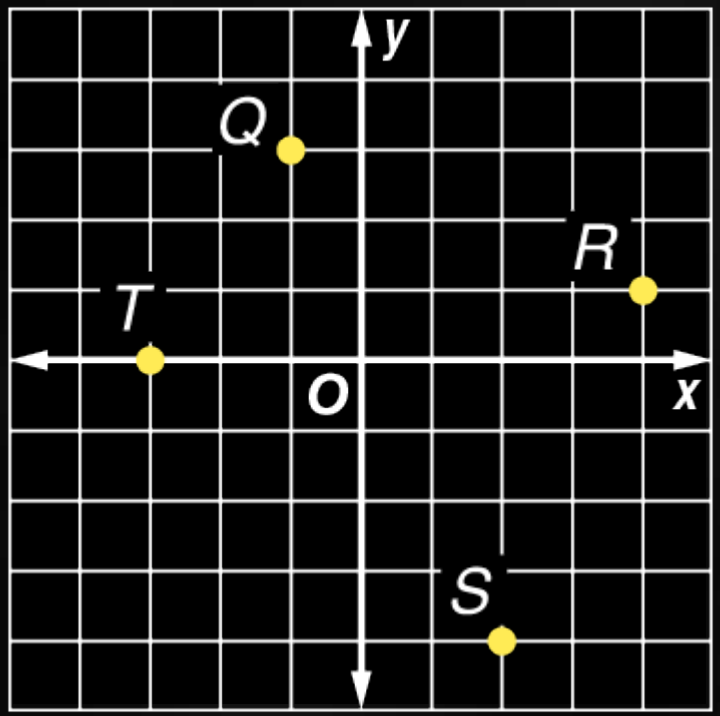
Answer: $A(-2, 2)$; II
$B(0, 2)$; none
$C(4, -2)$; IV
$D(-5, -4)$; III

End of slide

Your Turn

Write ordered pairs for points Q, R, S, and T. Name the quadrant in which each point is located.

Answer: $Q(-1, 3)$; II
$R(4, 1)$; I
$S(2, -4)$; IV
$T(-3, 0)$; none



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Example 3a

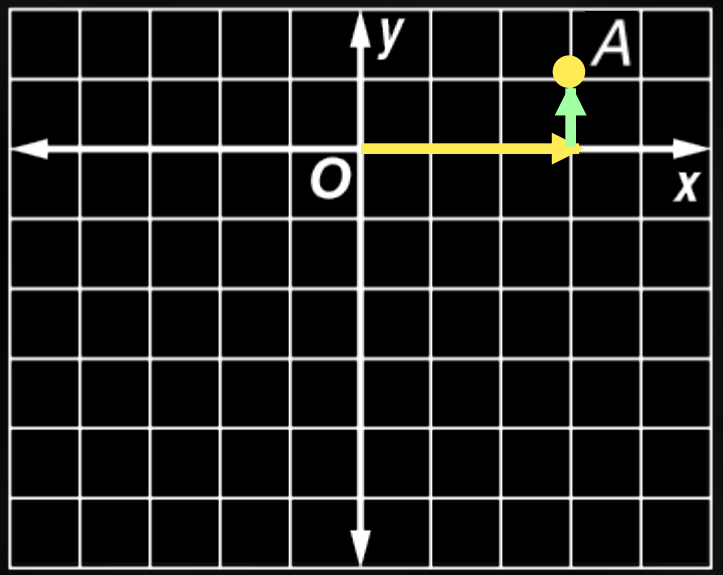
Plot $A(3, 1)$ on the coordinate plane.

Start at the origin.

Move right 3 units since the x-coordinate is 3.

Move up 1 unit since the y-coordinate is 1.

Draw a dot and label it A.



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Example 3b

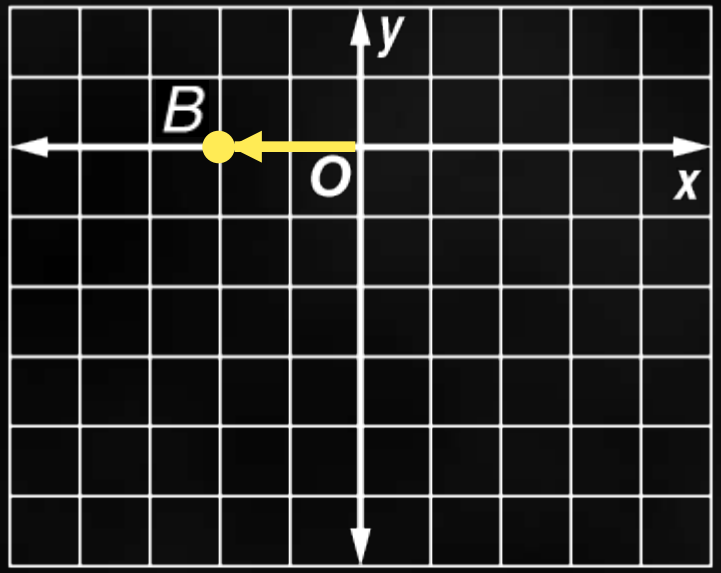
Plot $B(-2, 0)$ on the coordinate plane.

Start at the origin.

Move left 2 units.

Since the y-coordinate is 0, the point will be located on the x-axis.

Draw a dot and label it B.



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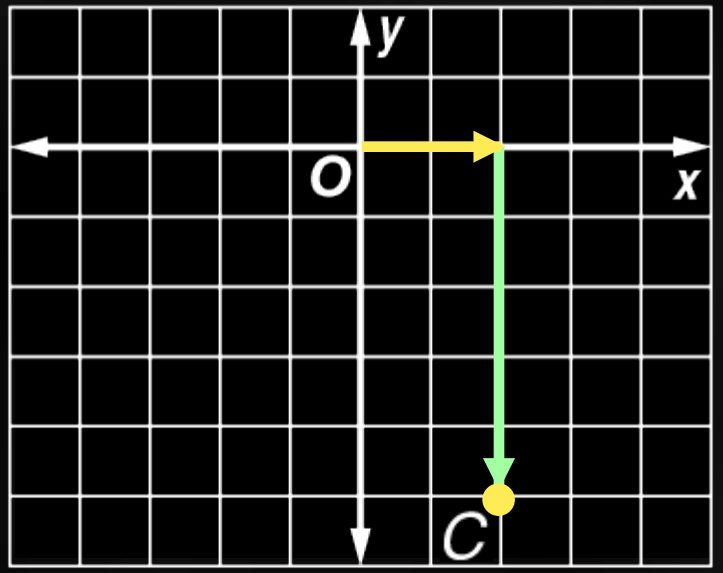
Example 3c

Plot $C(2, -5)$ on the coordinate plane.

Start at the origin.

Move right 2 units and down 5 units.

Draw a dot and label it C.



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Your Turn

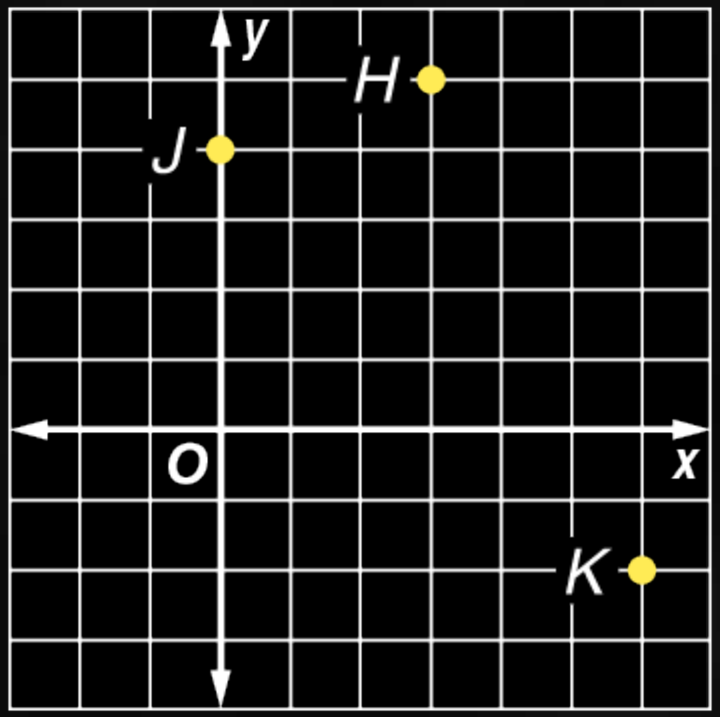
Plot each point on the coordinate plane.

a. $H(3, 5)$

b. $J(0, 4)$

c. $K(6, -2)$

Answer:



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Example 4a

Geography **Use the map in Example 4 on page 194 of your textbook to name the city at about (33°, 80°).**

Locate the latitude line at 33°. Follow the line until it intersects with the longitude line at 80°.

Answer: The city is Charleston.

End of slide

Example 4b

Geography **Use the map in Example 4 on page 194 of your textbook to estimate the latitude and longitude of Las Vegas.**

Locate Las Vegas on the map. It is close to 35° latitude and at 115° longitude.

Answer: There are 5° between each line, so a good estimate is 37° for the latitude and 115° for the longitude.

Your Turn

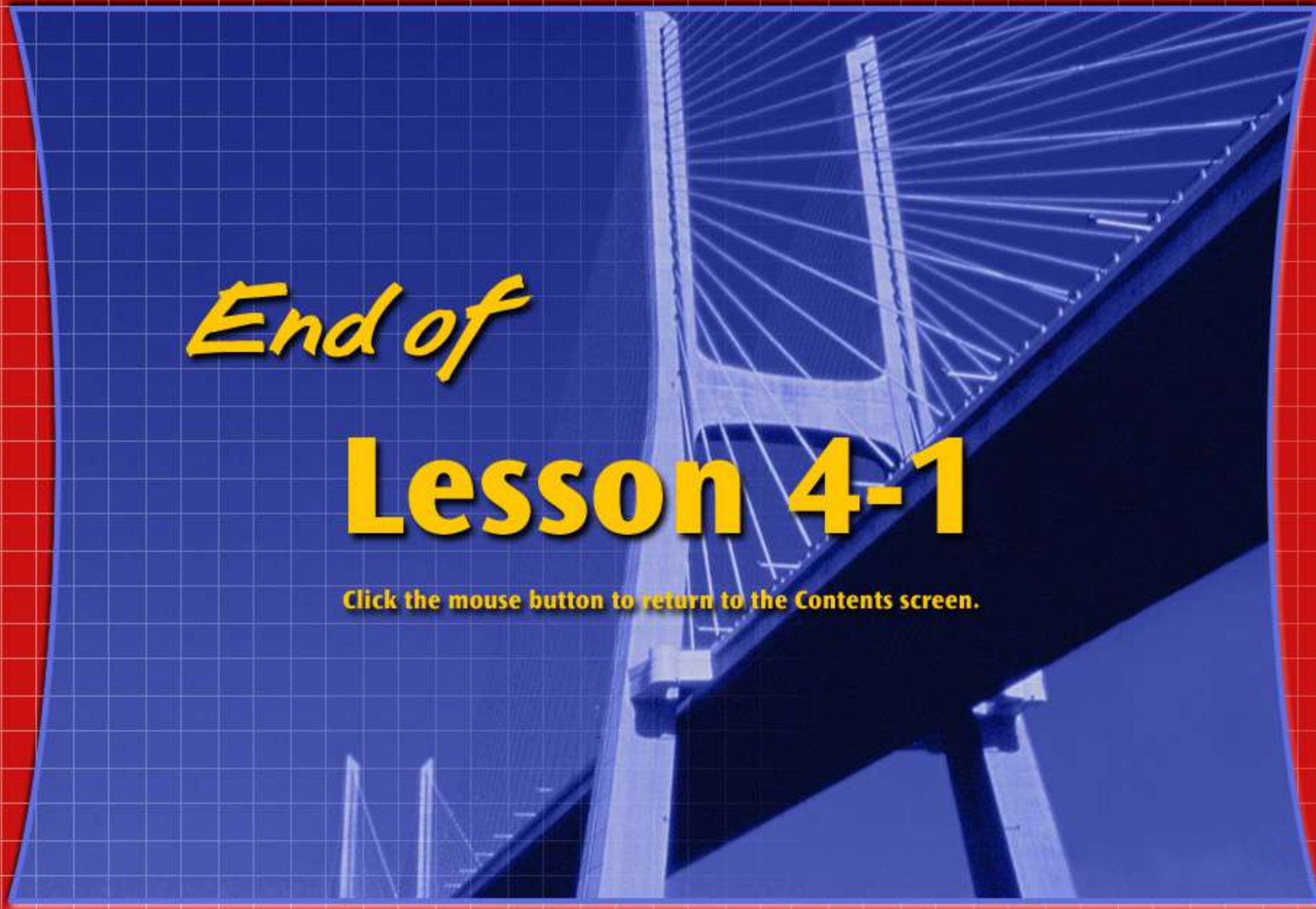
Use the map on page 194 to answer the following questions.

a. Name the city at (35°, 107°).

Answer: Albuquerque

b. Estimate the latitude and longitude of Columbus.

Answer: (40°, 83°)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Lesson 4-1
Click the mouse button to return to the Contents screen.

Lesson 4-2 Contents

Example 1a

Identify the transformation as a *reflection, translation, dilation,* or *rotation.*

Answer: The figure has been increased in size. This is a dilation.

Example 1b

Identify the transformation as a *reflection, translation, dilation,* or *rotation.*

Answer: The figure has been shifted horizontally to the right. This is a translation.

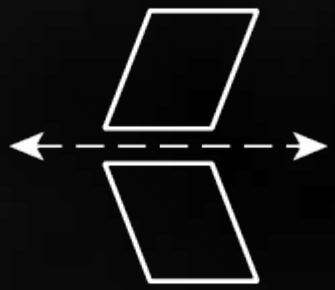
Example 1c

Identify the transformation as a *reflection, translation, dilation,* or *rotation.*

Answer: The figure has been turned around a point. This is a rotation.

Example 1d

Identify the transformation as a *reflection, translation, dilation,* or *rotation.*

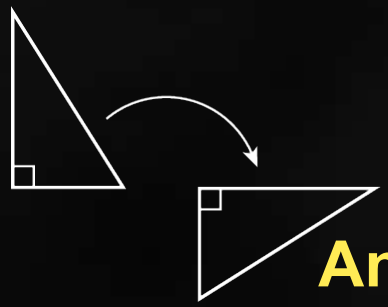


Answer: The figure has been flipped over a line. This is a reflection.

Your Turn

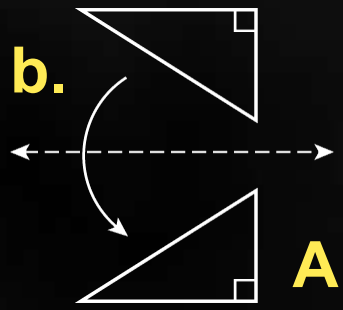
Identify each transformation as a *reflection*, *translation*, *dilation*, or *rotation*.

a.



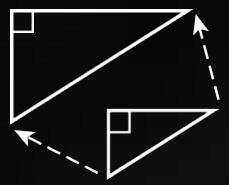
Answer: rotation

b.



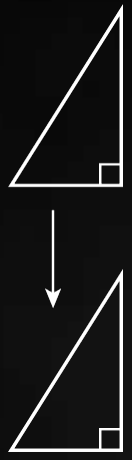
Answer: reflection

c.



Answer: dilation

d.



Answer: translation

End of slide

Example 2a

A trapezoid has vertices $W(-1, 4)$, $X(4, 4)$, $Y(4, 1)$ and $Z(-3, 1)$.

Trapezoid $WXYZ$ is reflected over the y-axis. Find the coordinates of the vertices of the image.

To reflect the figure over the y-axis, multiply each x-coordinate by -1.

$(x, y) \rightarrow (-x, y)$

$W(-1, 4) \rightarrow (1, 4)$

$X(4, 4) \rightarrow (-4, 4)$

$Y(4, 1) \rightarrow (-4, 1)$

$Z(-3, 1) \rightarrow (3, 1)$

Answer: The coordinates of the vertices of the image are $W'(1, 4)$, $X'(-4, 4)$, $Y'(-4, 1)$, and $Z'(3, 1)$.

End of slide

Example 2b

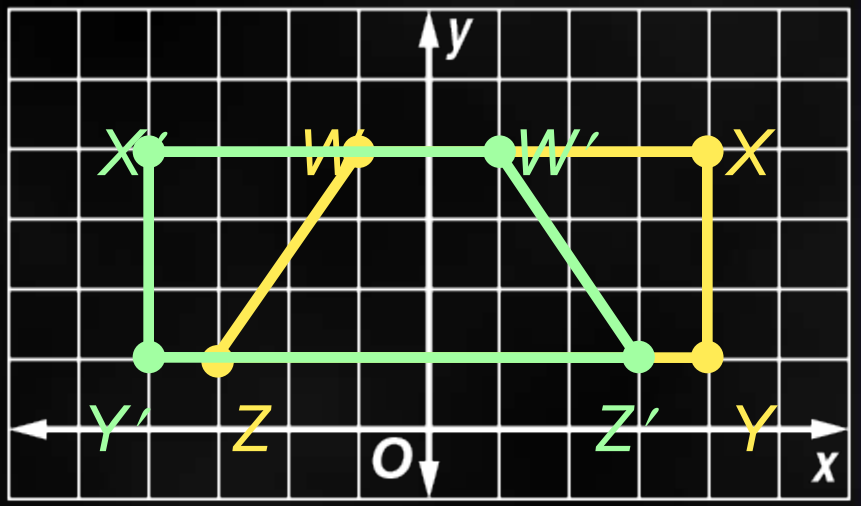
A trapezoid has vertices $W(-1, 4)$, $X(4, 4)$, $Y(4, 1)$, and $Z(-3, 1)$.

Graph trapezoid $WXYZ$ and its image $W'X'Y'Z'$.

Graph each vertex of the trapezoid $WXYZ$. Connect the points.

Graph each vertex of the reflected image $W'X'Y'Z'$. Connect the points.

Answer:



End of slide

Your Turn

A trapezoid has vertices $A(-4, 7)$, $B(2, 7)$, $C(0, 4)$ and $D(-2, 4)$.

a. Trapezoid $ABCD$ is reflected over the x-axis. Find the coordinates of the vertices of the image.

Answer: $A'(-4, -7)$, $B'(2, -7)$, $C'(0, -4)$, $D'(-2, -4)$

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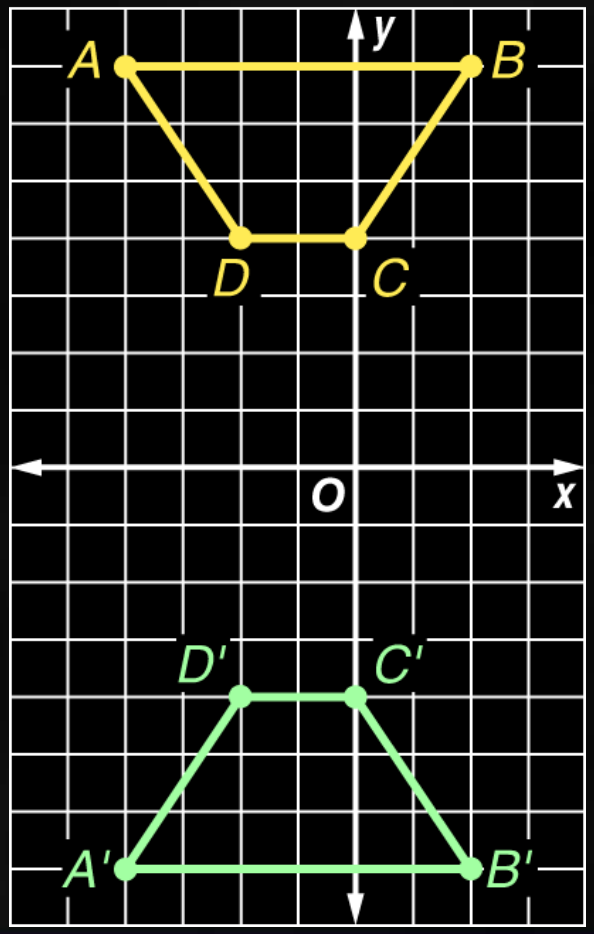
the next slide

Your Turn

b. Graph trapezoid $ABCD$ and its image $A'B'C'D'$.

Answer:



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Example 3a

Triangle ABC has vertices $A(-2, 1)$, $B(2, 4)$, and $C(1, 1)$.

Find the coordinates of the vertices of the image if it is translated 3 units to the right and 5 units down.

To translate the triangle 3 units to the right, add 3 to the x-coordinate of each vertex. To translate the triangle 5 units down, add -5 to the y-coordinate of each vertex.

$$(x, y) \rightarrow (x + 3, y - 5)$$

$$A(-2, 1) \rightarrow A'(-2 + 3, 1 - 5) \rightarrow A'(1, -4)$$

$$B(2, 4) \rightarrow B'(2 + 3, 4 - 5) \rightarrow B'(5, -1)$$

$$C(1, 1) \rightarrow C'(1 + 3, 1 - 5) \rightarrow C'(4, -4)$$

Answer: The coordinates of the vertices of the image are $A'(1, -4)$, $B'(5, -1)$, and $C'(4, -4)$.

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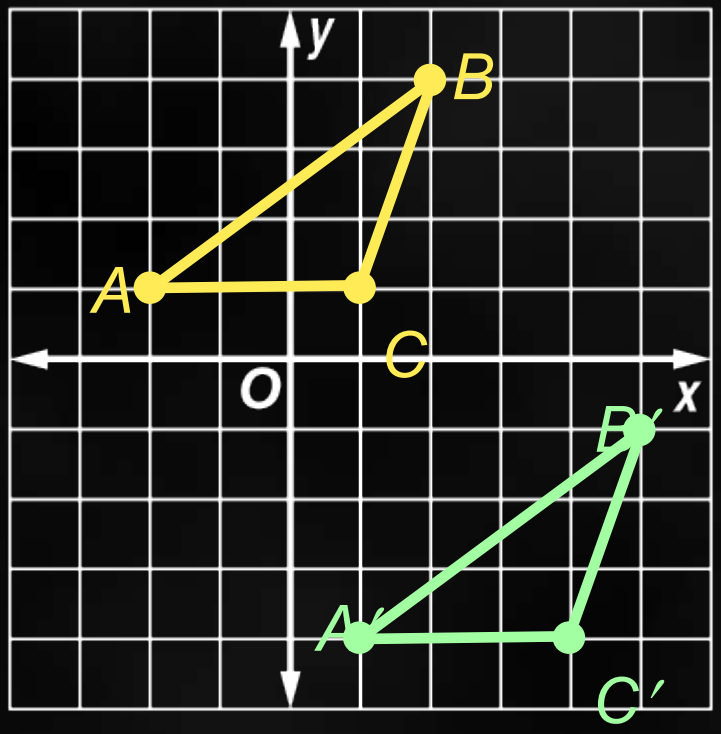
Example 3b

Graph triangle ABC and its image.

Answer:

The preimage is ΔABC.

The translated image is $\Delta A'B'C'$.



STOP! End of slide

Your Turn

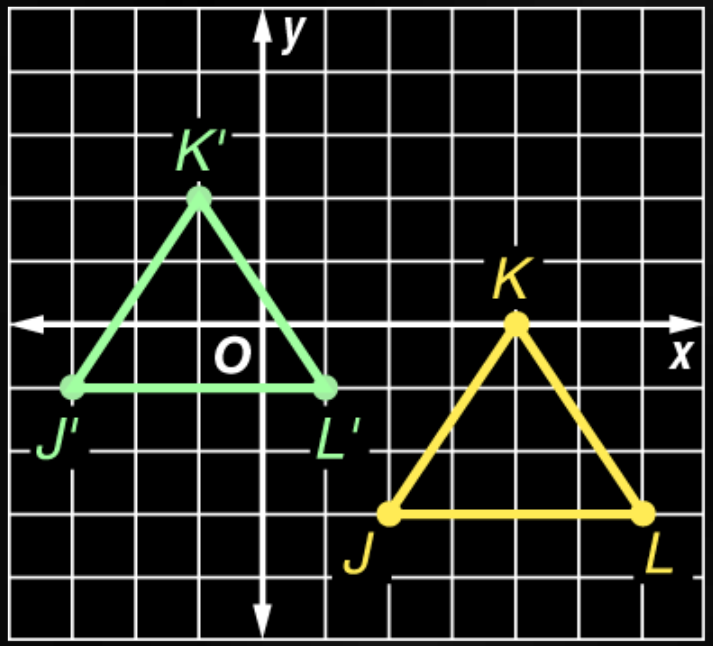
Triangle JKL has vertices $J(2, -3)$, $K(4, 0)$, and $L(6, -3)$.

a. Find the coordinates of the vertices of the image if it is translated 5 units to the left and 2 units up.

Answer: $J'(-3, -1)$, $K'(-1, 2)$, $L'(1, -1)$

b. Graph triangle JKL and its image.

Answer:



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Example 4a

A trapezoid has vertices $E(-1, 2)$, $F(2, 1)$, $G(2, -1)$, and $H(-1, -2)$.

Find the coordinates of the dilated trapezoid $E'F'G'H'$ if the scale factor is 2.

To dilate the figure, multiply the coordinates of each vertex by 2.

$$(x, y) \rightarrow (2x, 2y)$$

$$E(-1, 2) \rightarrow E'(2 \cdot (-1), 2 \cdot 2) \rightarrow E'(-2, 4)$$

$$F(2, 1) \rightarrow F'(2 \cdot 2, 2 \cdot 1) \rightarrow F'(4, 2)$$

$$G(2, -1) \rightarrow G'(2 \cdot 2, 2 \cdot (-1)) \rightarrow G'(4, -2)$$

$$H(-1, -2) \rightarrow H'(2 \cdot (-1), 2 \cdot (-2)) \rightarrow H'(-2, -4)$$

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Example 4a

Answer: The coordinates of the vertices of the image are $E'(-2, 4)$, $F'(4, 2)$, $G'(4, -2)$, and $H'(-2, -4)$.

Example 4b

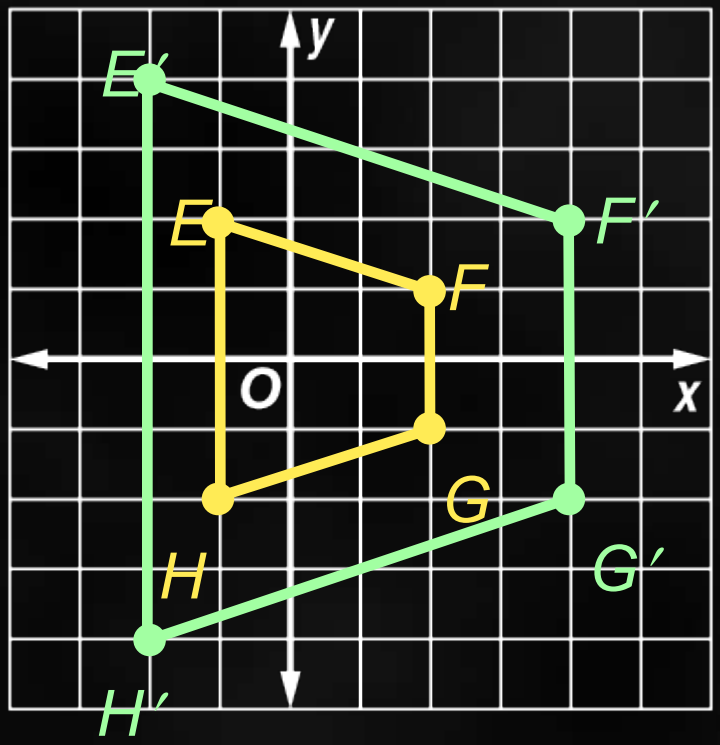
Graph the preimage and its image.

Answer:

The preimage is trapezoid $EFGH$.

The image is trapezoid $E'F'G'H'$.

Notice that the image has sides that are twice the length of the sides of the original figure.



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Your Turn

A trapezoid has vertices $E(-4, 7)$, $F(2, 7)$, $G(0, 4)$, and $H(-2, 4)$.

a. Find the coordinates of the dilated trapezoid $E'F'G'H'$ if the scale factor is $\frac{1}{2}$.

Answer: $E'\left(-2, \frac{7}{2}\right), F'\left(1, \frac{7}{2}\right), G'(0, 2), H'(-1, 2)$

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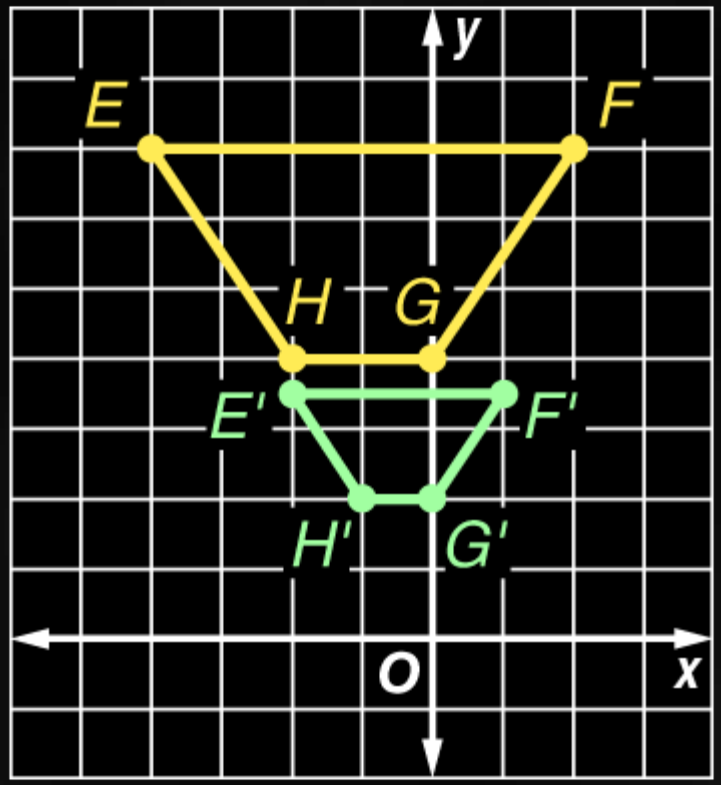
Your Turn

b. Graph the preimage and its image.

Answer:



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Example 5a

Triangle ABC has vertices $A(1, -3)$, $B(3, 1)$, and $C(5, -2)$.

Find the coordinates of the image of ΔABC after it is rotated 180° about the origin.

To find the coordinates of the image of ΔABC after a $180°$ rotation, multiply both coordinates of each point by -1.

$$(x, y) \rightarrow (-1 \cdot x, -1 \cdot y)$$

$$A(1, -3) \rightarrow A'(-1, 3)$$

$$B(3, 1) \rightarrow B'(-3, -1)$$

$$C(5, -2) \rightarrow C'(-5, 2)$$

Answer: The coordinates of the vertices of the image are $A'(-1, 3)$, $B'(-3, -1)$, and $C'(-5, 2)$.

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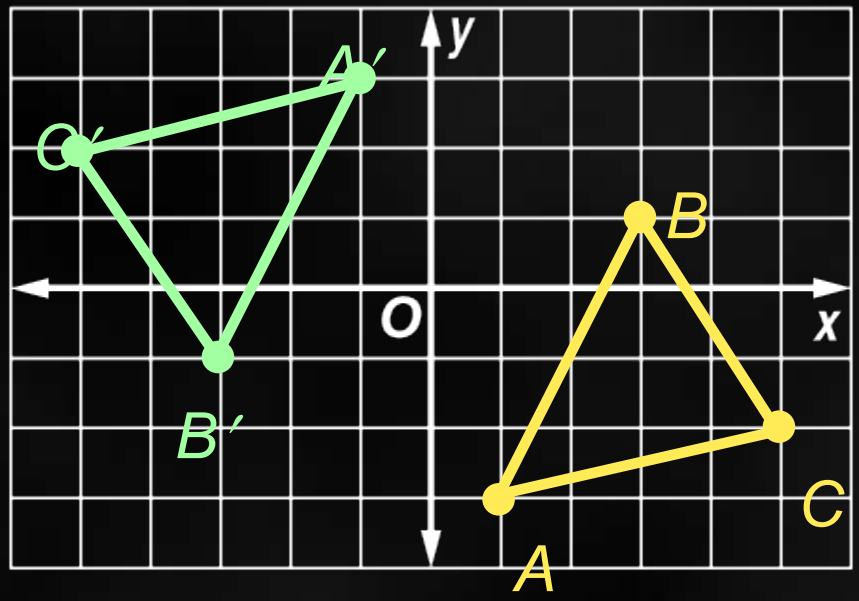
Example 5b

Graph the preimage and its image.

Answer:

The preimage is ΔABC.

The translated image is $\Delta A'B'C'$.



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Your Turn

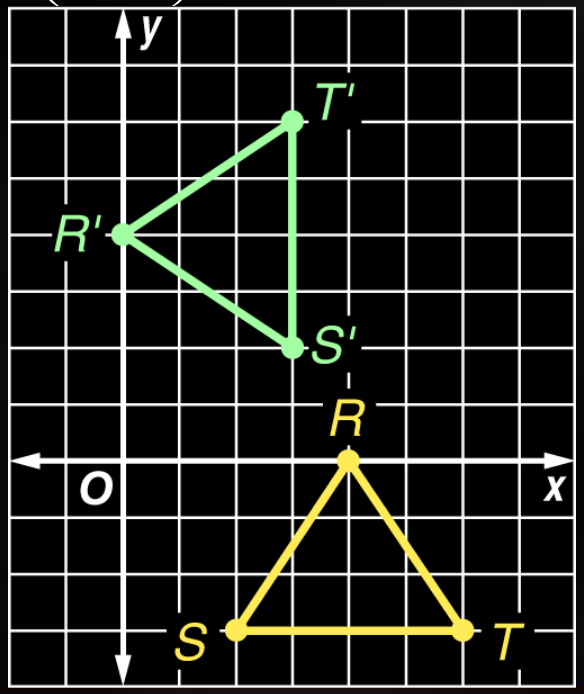
Triangle RST has vertices $R(4, 0)$, $S(2, -3)$, and $T(6, -3)$.

a. Find the coordinates of the image of ΔRST after it is rotated $90°$ counterclockwise about the origin.

Answer: $R'(0, 4)$, $S'(3, 2)$, $T'(3, 6)$

b. Graph the preimage and the image.

Answer:



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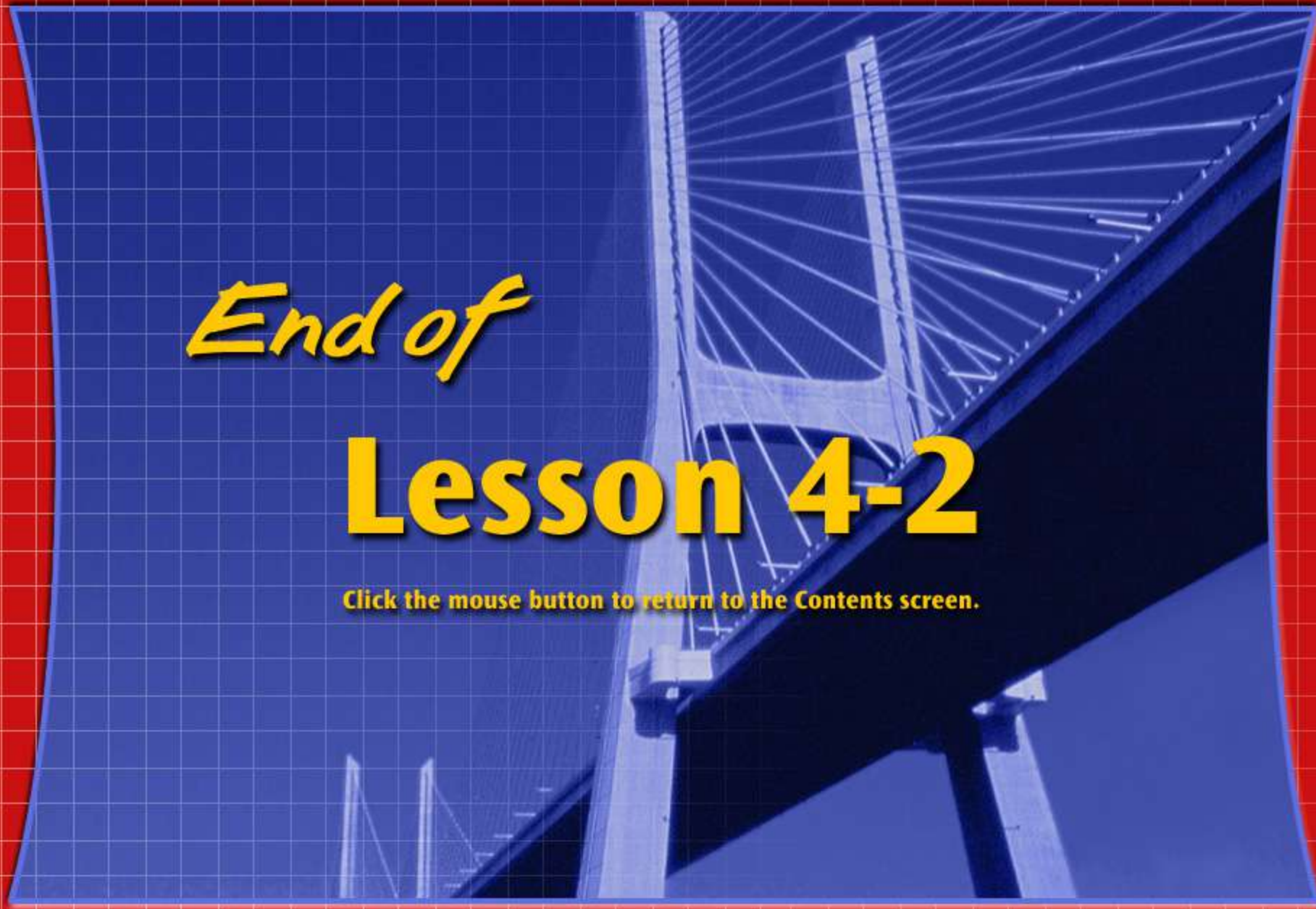
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Lesson 4-2
Click the mouse button to return to the Contents screen.

Lesson 4-3 Contents

Example 1a

Express the relation $\{(4, 3), (–2, –1), (–3, 2), (2, –4), (0, –4)\}$ as a table, a graph and a mapping.

Table List the set of x-coordinates in the first column and the corresponding y-coordinates in the second column.

x	y
4	3
–2	–1
–3	2
2	–4
0	–4

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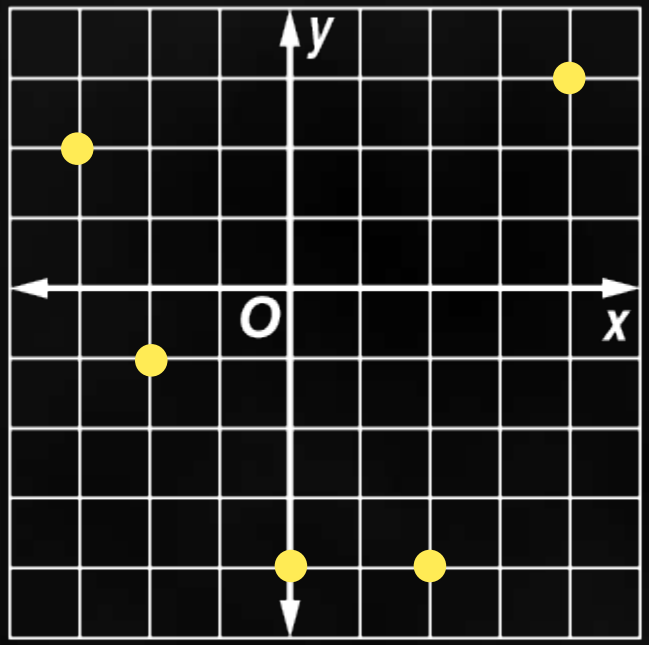
Example 1a

Graph Graph each ordered pair on a coordinate plane.



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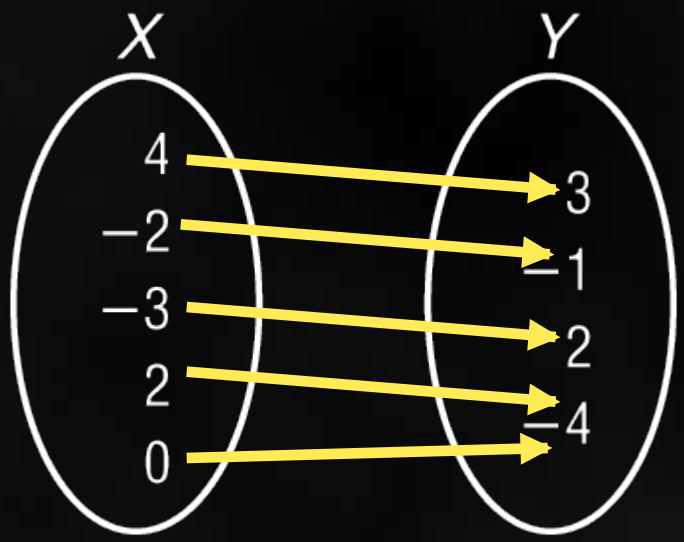
Example 1a

Mapping List the x values in set X and the y values in set Y. Draw an arrow from each x value in X to the corresponding y value in Y.



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Example 1b

Determine the domain and range.

Answer: The domain for this relation is $\{-3, -2, 0, 2, 4\}$. The range is $\{-4, -1, 2, 3\}$.

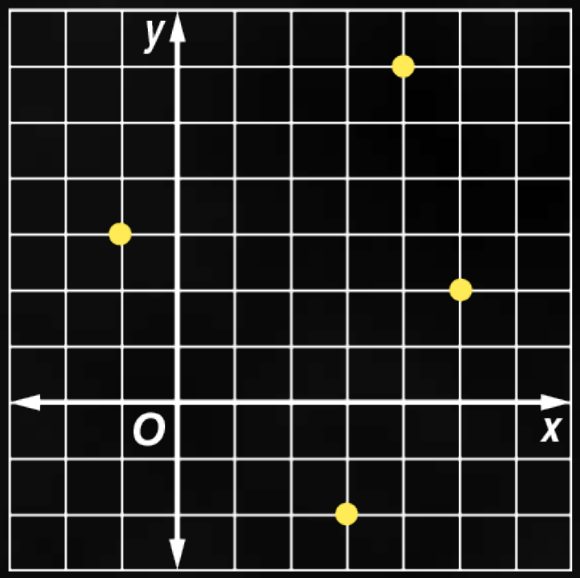
End of slide

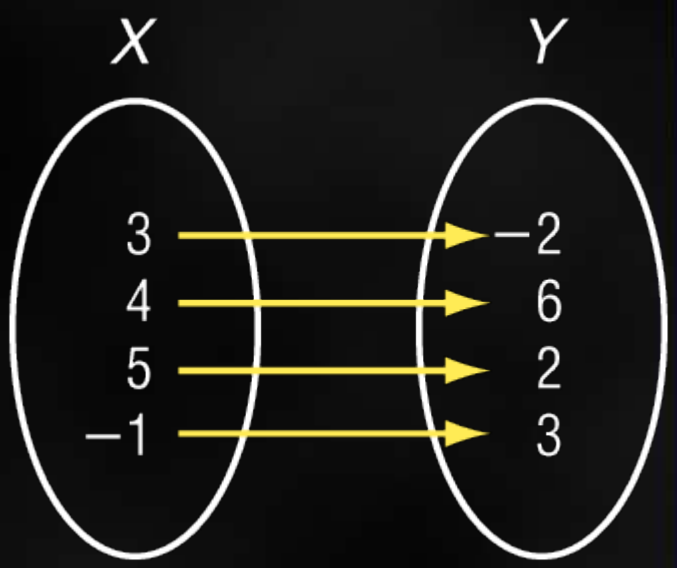
Your Turn

a.Express the relation $\{(3, -2), (4, 6), (5, 2), (-1, 3)\}$ as a table, a graph, and a mapping.

Answer:

x	y
3	–2
4	6
5	2
–1	3





b.Determine the domain and range.

Answer: D = $\{-1, 3, 4, 5\}$; R = $\{-2, 2, 3, 6\}$

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Extra Examples 5-Minute Check

Example 2a

Opinion Polls **The table shows the percent of people satisfied with the way things were going in the U.S. at the time of the survey.**

Year	1992	1995	1998	2001
Percent Satisfied	21	32	60	51

Determine the domain and range of the relation.

Answer: The domain is $\{1992, 1995, 1998, 2001\}$. The range is $\{21, 32, 51, 60\}$.

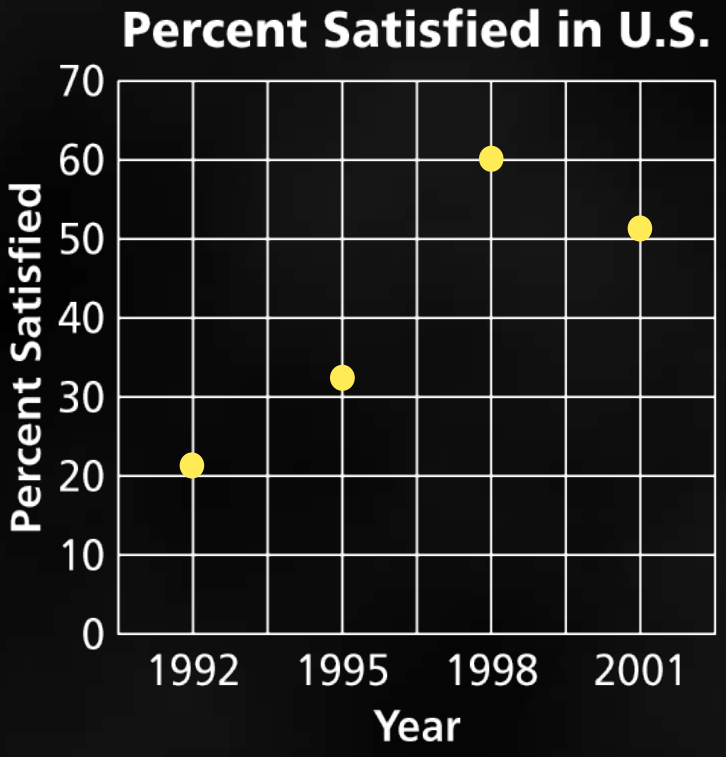
End of slide

Example 2b

Graph the data.

The values of the *x*-axis need to go from 1992 to 2001. It is not practical to begin the scale at 0. Begin at 1992 and extend to 2001 to include all of the data. The units can be 1.5 units per grid square.

The values on the *y*-axis need to go from 21 to 60. In this case it is possible to begin the scale at 0. Begin at 0 and extend to 70. You can use units of 10.



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Example 2c

What conclusions might you make from the graph of the data?

Answer: Americans became more satisfied with the country from 1992-1998, but the percentage dropped from 1998-2001.

Your Turn

Endangered Species **The table shows the approximate world population of the Indian Rhinoceros from 1982 to 1998.**

Indian Rhinoceros Population					
Year	1982	1986	1990	1994	1998
Population	1000	1700	1700	1900	2100

a. Determine the domain and range of the relation.

Answer: D = {1982, 1986, 1990, 1994, 1998}
R = {1000, 1700, 1900, 2100}

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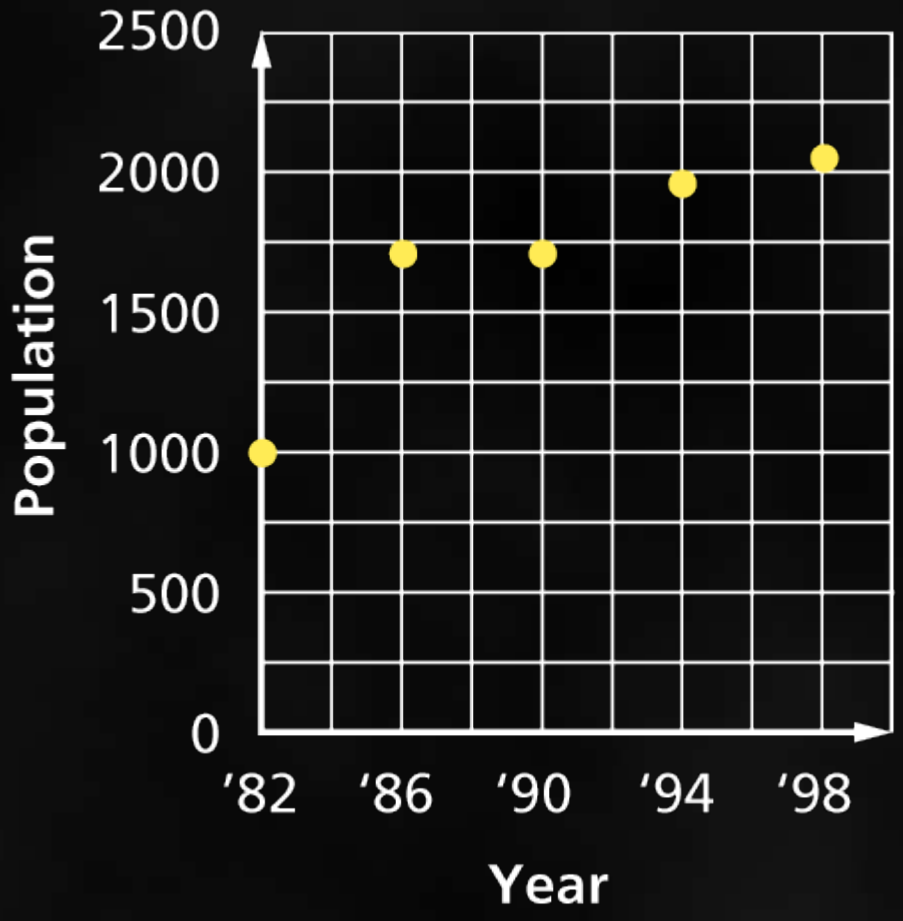
Your Turn

b. Graph the data.

Answer:



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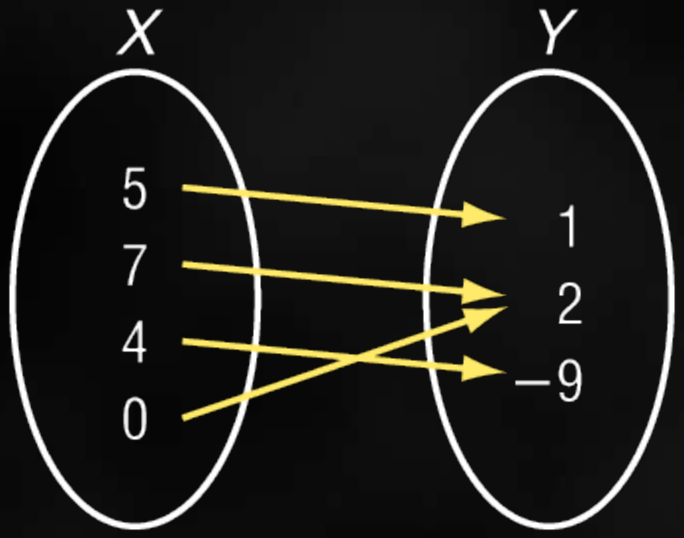
Your Turn

c. What conclusions might you make from the graph of the data?

Answer: The population of the Indian rhinoceros has been increasing since 1982.

Example 3

Express the relation shown in the mapping as a set of ordered pairs. Then write the inverse of the relation.



Relation Notice that both 7 and 0 in the domain are paired with 2 in the range.

Answer: $\{(5, 1), (7, 2), (4, -9), (0, 2)\}$

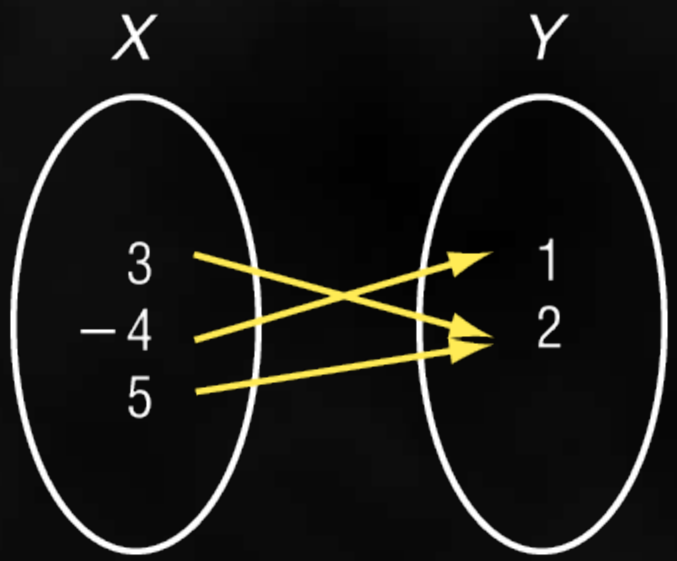
Inverse Exchange X and Y in each ordered pair to write the inverse relation.

Answer: $\{(1, 5), (2, 7), (-9, 4), (2, 0)\}$

STOP! End of slide

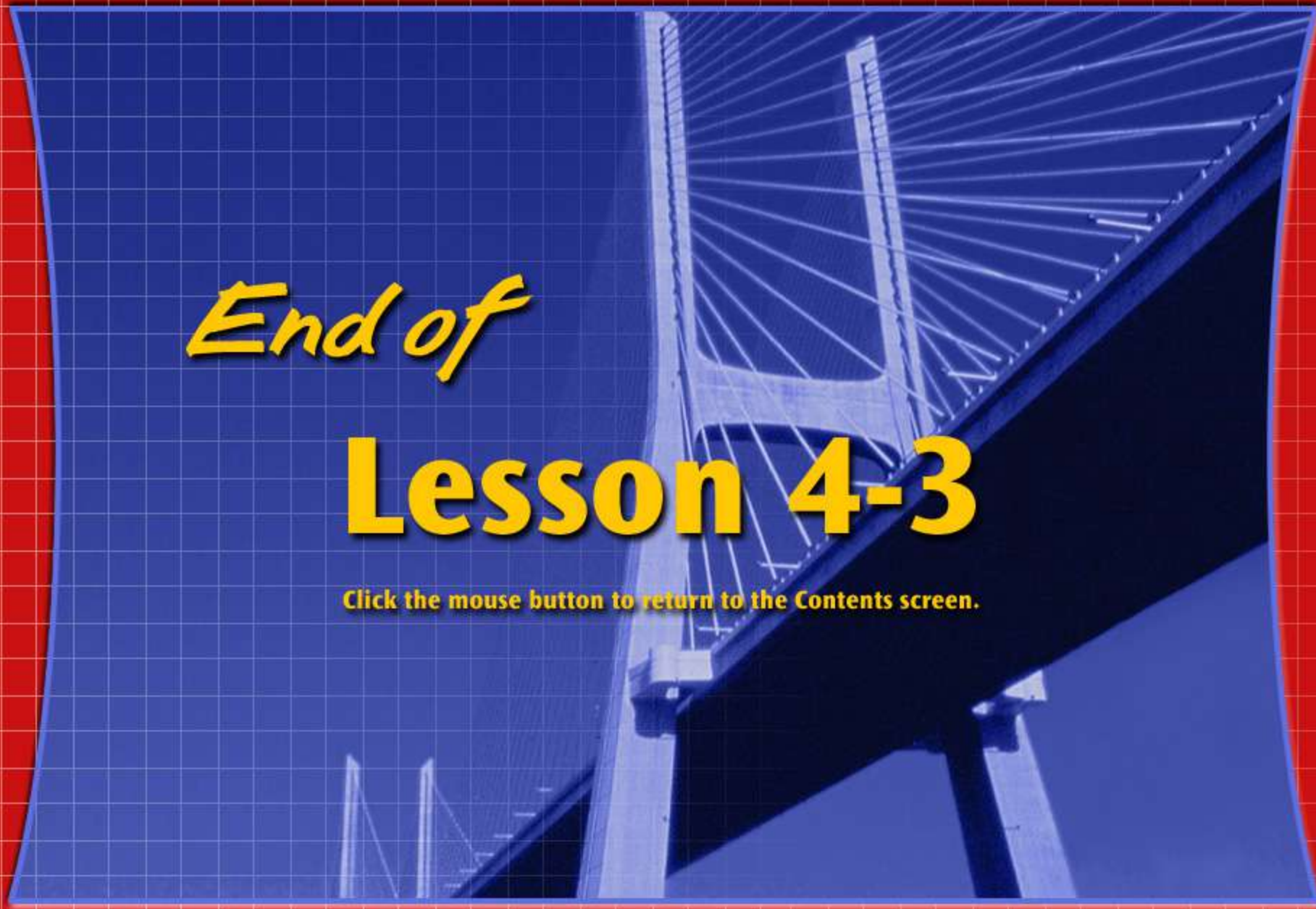
Your Turn

Express the relation shown in the mapping as a set of ordered pairs. Then write the inverse of the relation.



Answer: Relation: $\{(3, 2), (-4, 1), (5, 2)\}$

Inverse: $\{(2, 3), (1, -4), (2, 5)\}$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Lesson 4-3
Click the mouse button to return to the Contents screen.

Lesson 4-4 Contents

Example 1

Find the solution set for $y = 7 + 3x$ given the replacement set $\{(-5, 0), (-3, -2), (2, 13), (4, 19)\}$.

Make a table. Substitute each ordered pair into the equation.

x	y	$y = 7 + 3x$	True or False?
-5	0	$0 = 7 + 3(-5)$ $0 = -8$	false
-3	-2	$-2 = 7 + 3(-3)$ $-2 = -2$	true ✓
2	13	$13 = 7 + 3(2)$ $13 = 13$	true ✓
4	19	$19 = 7 + 3(4)$ $19 = 19$	true ✓

End of slide—
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the next slide

Example 1

The ordered pairs $(-3, -2)$, $(2, 13)$ and $(4, 19)$ result in true statements.

Answer: The solution set is $\{(-3, -2), (2, 13), (4, 19)\}$.

End of slide

Your Turn

Find the solution set for $y = 3x + 2$ given the replacement set $\{(3, 1), (6, 8), (1, 5), (-1, -1)\}$.

Answer: $\{(1, 5), (-1, -1)\}$

End of slide

Example 2

Solve $d = 8 - c$ if the domain is $\{-2, 0, 3, 5, 8\}$.

Make a table. The values of c come from the domain. Substitute each value of c into the equation to determine the values of d in the range.

c	$8 - c$	d	(c, d)
-2	$8 - (-2)$	10	$(-2, 10)$
0	$8 - 0$	8	$(0, 8)$
3	$8 - 3$	5	$(3, 5)$
5	$8 - 5$	3	$(5, 3)$
8	$8 - 8$	0	$(8, 0)$

Answer: The solution set is $\{(-2, 10), (0, 8), (3, 5), (5, 3), (8, 0)\}$.

End of slide

Your Turn

Solve $y = 2x - 4$ if the domain is $\{-1, 0, 2, 5\}$.

Answer: $\{(-1, -6), (0, -4), (2, 0), (5, 6)\}$

End of slide

Example 3

Solve $9x + 3y = 15$ if the domain is $\{0, 1, 2, 3\}$. Graph the solution set.

First solve the equation for y in terms of x. This makes creating a table of values easier.

$$9x + 3y = 15$$ Original equation

$$9x + 3y - 9x = 15 - 9x$$ Subtract $9x$ from each side.

$$3y = 15 - 9x$$ Simplify.

$$\frac{3y}{3} = \frac{15 - 9x}{3}$$ Divide each side by 3.

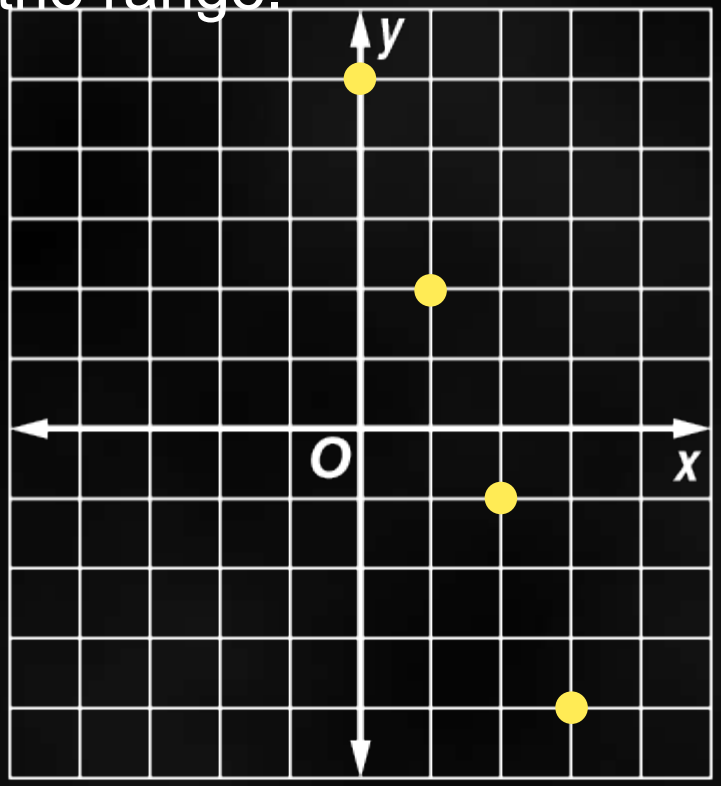
$$y = 5 - 3x$$ Simplify.

End of slide– continued on the next slide

Example 3

Substitute each value of x from the domain to determine the corresponding values of y in the range.

x	$5-3x$	y	(x, y)
0	$5-3(0)$	5	$(0, 5)$
1	$5-3(1)$	2	$(1, 2)$
2	$5-3(2)$	-1	$(2, -1)$
3	$5-3(3)$	-4	$(3, -4)$



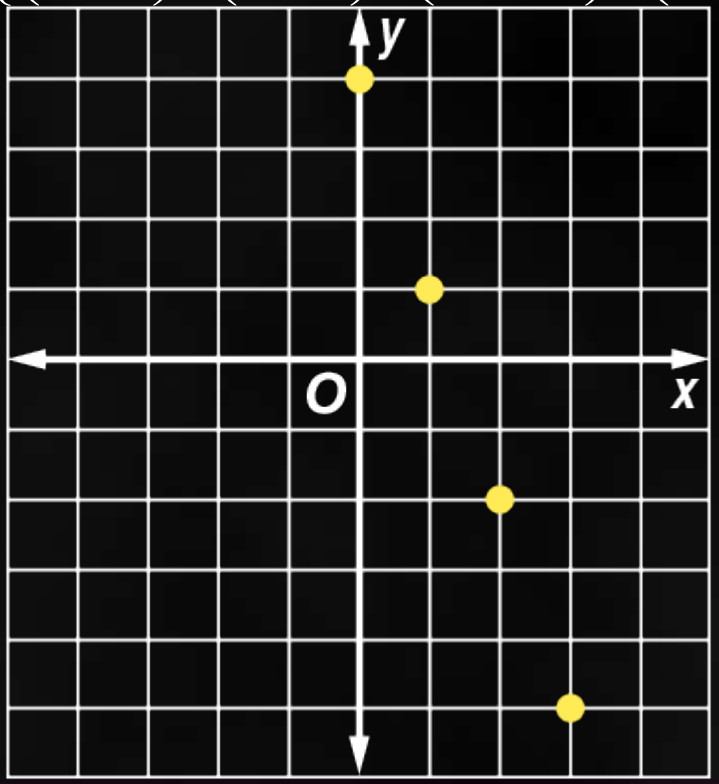
Answer: The solution set is $\{(0, 5), (1, 2), (2, -1), (3, -4)\}$.

Graph the ordered pairs.

Your Turn

Solve $6x + 2y = 8$ if the domain is $\{0, 1, 2, 3\}$. Graph the solution set.

Answer: $\{(0, 4), (1, 1), (2, -2), (3, -5)\}$



Example 4

Travel In 2002, 12 countries in Europe made the switch to a single currency, the euro. Suppose the exchange rate between U.S. dollars and euros is one dollar = 1.11 euros. The equationcan be used to convert $E = 1.11D$ U.S. dollars to euros. If a traveler is going to spend the following amounts per day while in Europe, find the equivalent U.S. dollars for the amounts given in euros (EUR) Graph the ordered pairs.

Hotel	90 EUR
Food	50 EUR
Transportation	30 EUR
Gifts	20 EUR

End of slide—
continued on
the next slide

Example 4

Explore In the equation, $E = 1.11D$, D represents U.S. dollars and E represents the euro. However, we are given values in euros and want to find values in dollars. Solve the equation for D since the values for D depend on the given values of E.

$$E = 1.11D$$ Original equation

$$\frac{E}{1.11} = \frac{1.11D}{1.11}$$ Divide each side by 1.11.

$$0.90E = D$$ Simplify and round to the nearest hundredth.

Plan The values of E, $\{90, 50, 30, 20\}$, are the domain. Use the equation $0.90E = D$ to find the values for range.

End of slide– continued on the next slide

Example 4

Solve Make a table of values. Substitute each value of E from the domain to determine the corresponding values of D. Round to the nearest dollar.

E	$0.90E$	D	(E, D)
90	$0.90(90)$	\$81	(90, 81)
50	$0.90(50)$	\$45	(50, 45)
30	$0.90(30)$	\$27	(30, 27)
20	$0.90(20)$	\$18	(20, 18)

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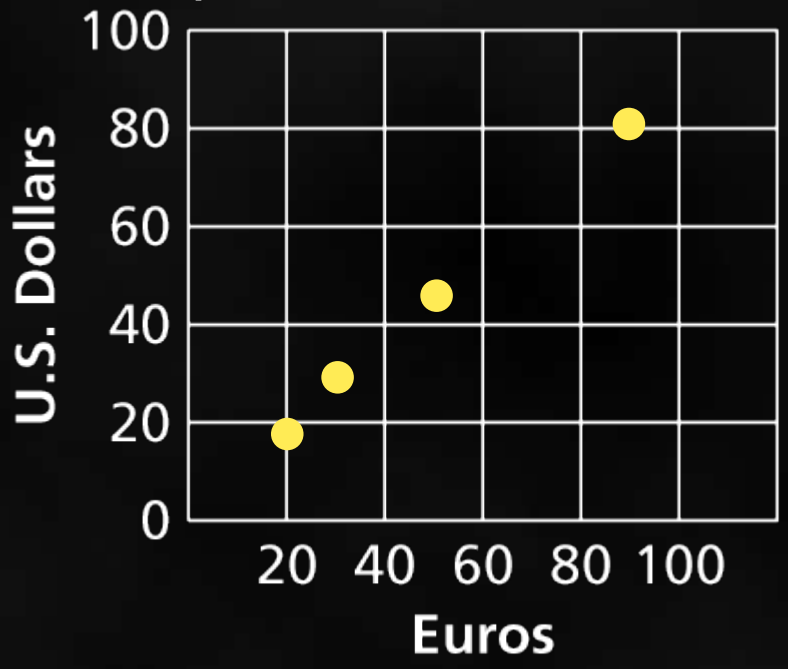
Example 4

Graph the ordered pairs.



Answer:

Notice that the values for the independent variable E are graphed along the horizontal axis, and the values for the dependent variable D are graphed along the vertical axis.

End of slide—continued on the next slide

Example 4

The equivalent amounts in U.S. dollars for the given amounts in euros is shown in the table.

Expense	Euros	Dollars
Hotel	90	81
Food	50	45
Transportation	30	27
Gifts	20	18

Examine Look at the values in the range. The cost in dollars is lower than the cost in euros. Do the results make sense?

End of slide

Your Turn

Travel The exchange rate between U.S. dollars and Swiss francs is one dollar $= 1.68$ Swiss francs. The equation $F = 1.68D$ can be used to convert U.S. dollars to Swiss francs F. If a traveler is going to spend the following amounts per day while he is in Switzerland, find the equivalent U.S. dollars for the amounts given. Graph the ordered pairs.

Answer:

Hotel	80 francs	$48
Food	45 francs	$27
Transportation	35 francs	$21
Gifts	15 francs	$9

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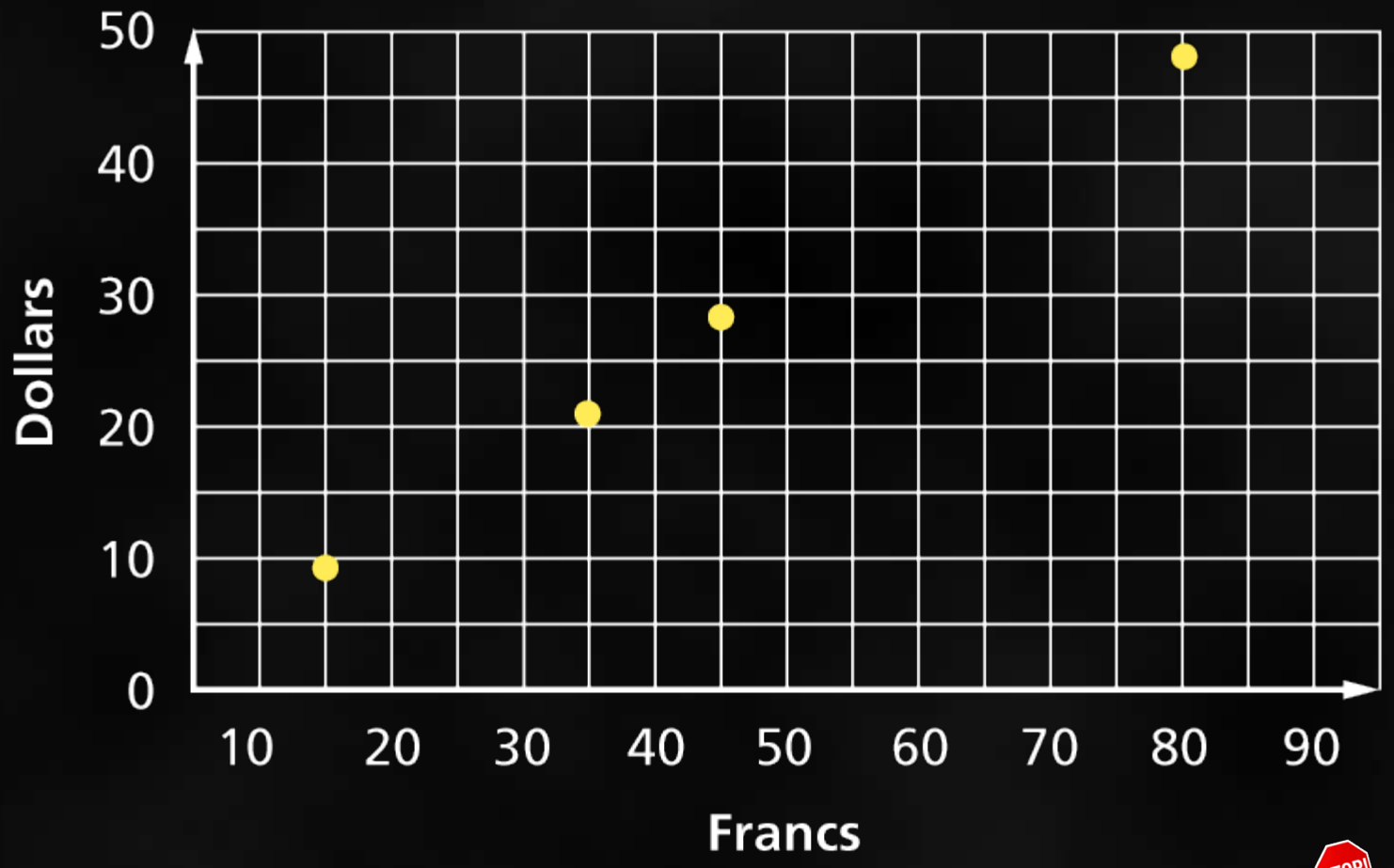
the next slide

Your Turn



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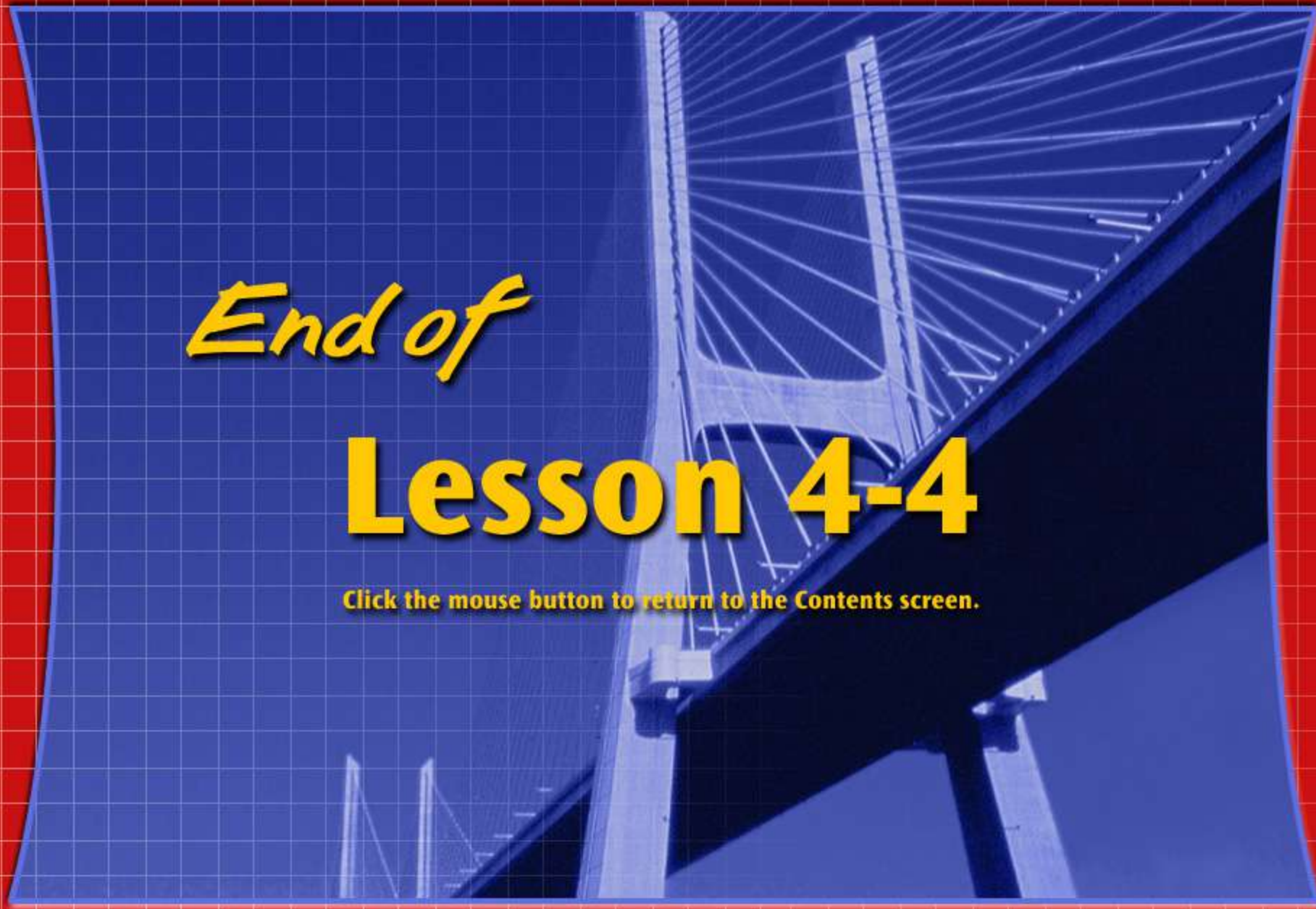
End of
Lesson 4-4
Click the mouse button to return to the Contents screen.

Lesson 4-5 Contents

Example 1a

Determine whether $5x + 3y = z + 2$ is a linear equation. If so, write the equation in standard form.

First rewrite the equation so that the variables are on the same side of the equation.

$$5x + 3y = z + 2$$ Original equation

$$5x + 3y - z = z + 2 - z$$ Subtract z from each side.

$$5x + 3y - z = 2$$ Simplify.

Since $5x + 3y - z$ has 3 different variables, it cannot be written in the form $Ax + By = C$.

Answer: This is not a linear equation.

End of slide

Example 1b

Determine whether $\frac{3}{4}x = y + 8$ is a linear equation.

If so, write the equation in standard form.

Rewrite the equation so that both variables are on the same side.

$$\frac{3}{4}x = y + 8$$ Original equation

$$\frac{3}{4}x - y = y + 8 - y$$ Subtract y from each side.

$$\frac{3}{4}x - y = 8$$ Simplify.

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Example 1b

To write the equation with integer coefficients, multiply each term by 4.

$$\frac{3}{4}x - y = 8$$

Original equation

$$4\left(\frac{3}{4}x\right) - 4(y) = 8(4)$$

Multiply each side of the equation by 4.

$$3x - 4y = 32$$

Simplify.

The equation is now in standard form where $A = 3$, $B = -4$, and $C = 32$.

Answer: This is a linear equation.

End of slide

Example 1c

Determine whether $3x - 6y = 27$ is a linear equation. If so, write the equation in standard form.

Since the GCF of 3, 6, and 27 is not 1, the equation is not written in standard form. Divide each side by the GCF.

$$3x - 6y = 27$$ Original equation

$$3(x - 2y) = 27$$ Factor the GCF.

$$\frac{3(x - 2y)}{3} = \frac{27}{3}$$ Divide each side by 3.

$$x - 2y = 9$$ Simplify.

Answer: The equation is now in standard form where $A = 1$, $B = -2$, and $C = 9$.

End of slide

Example 1d

Determine whether $\frac{1}{4}x = -7$ is a linear equation.

If so, write the equation in standard form.

To write the equation with integer coefficients, multiply each term by 4.

$$\frac{1}{4}x = -7$$ Original equation

$$4\left(\frac{1}{4}x\right) = -7 \cdot 4$$ Multiply each side of the equation by 4.

$$x = -28$$ Simplify.

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the next slide

Example 1d

Answer: The equation $x = -28$ can be written as $x + 0y = -28$. Therefore, it is a linear equation in standard form where $A = 1, B = 0, C = -28.$

End of slide

Your Turn

Determine whether each equation is a linear equation. If so, write the equation in standard form.

a. $y = 4x - 5$

Answer: linear equation; $-4x + y = -5$

b. $8y - xy = 7$

Answer: not a linear equation

c. $6x + 24y = 36$

Answer: linear equation; $x + 4y = 6$

d. $\frac{2}{3}x = 9$

Answer: linear equation; $2x = 27$

Example 2

Graph $\frac{1}{2}y - x = 1$.

In order to find values for y more easily, solve the equation for y.

$$\frac{1}{2}y - x = 1$$ Original equation

$$\frac{1}{2}y - x + x = 1 + x$$ Add x to each side.

$$\frac{1}{2}y = 1 + x$$ Simplify.

End of slide—continued on the next slide

Example 2

$$2\left(\frac{1}{2}y\right) = 2(1+x)$$ Multiply each side by 2.

$$y = 2 + 2x$$ Simplify.

Select five values for the domain and make a table. Then graph the ordered pairs.

x	$2+2x$	y	(x, y)
-3	$2+2(-3)$	-4	$(-3, -4)$
-1	$2+2(-1)$	0	$(-1, 0)$
0	$2+2(0)$	2	$(0, 2)$
2	$2+2(2)$	6	$(2, 6)$
3	$2+2(3)$	8	$(3, 8)$

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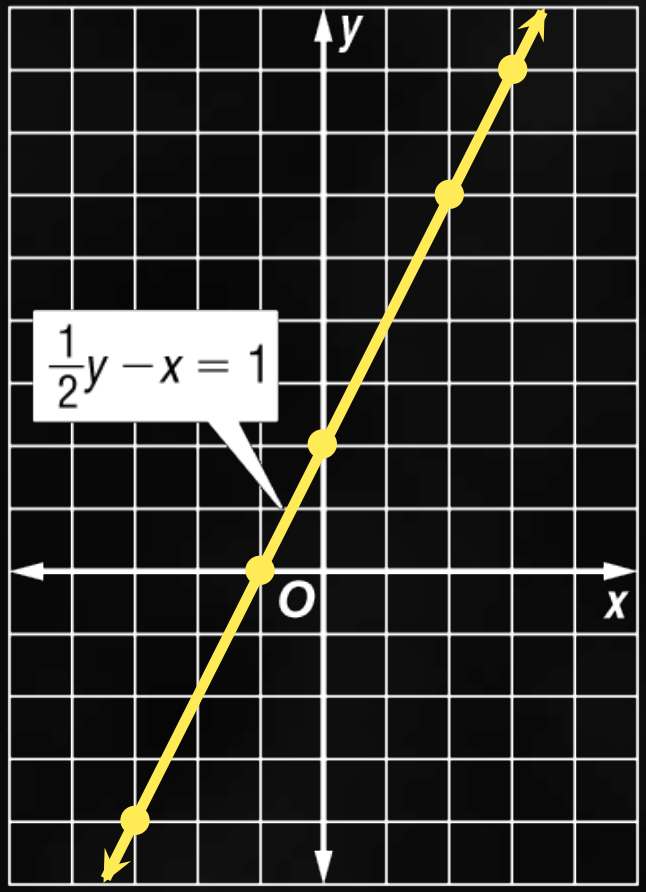
Example 2

Answer:



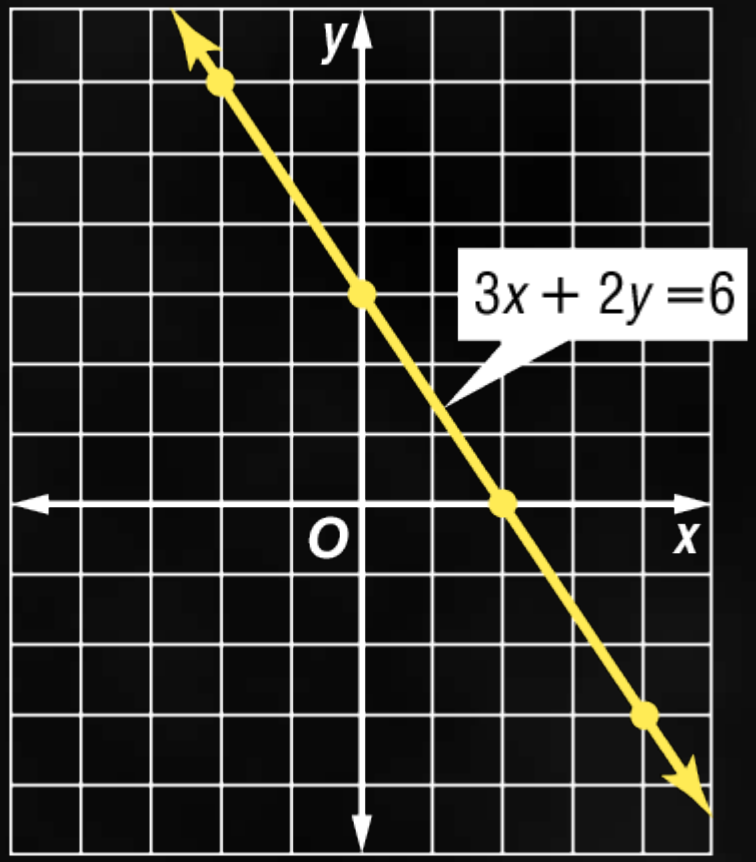
When you graph the ordered pairs, a pattern begins to form. The domain of $y = 2 + 2x$ is the set of all real numbers, so there is an infinite number of solutions of the equation. Draw a line through the points. This line represents all the solutions of $y = 2 + 2x$.

End of slide

Your Turn

Graph $3x + 2y = 6$.

Answer:



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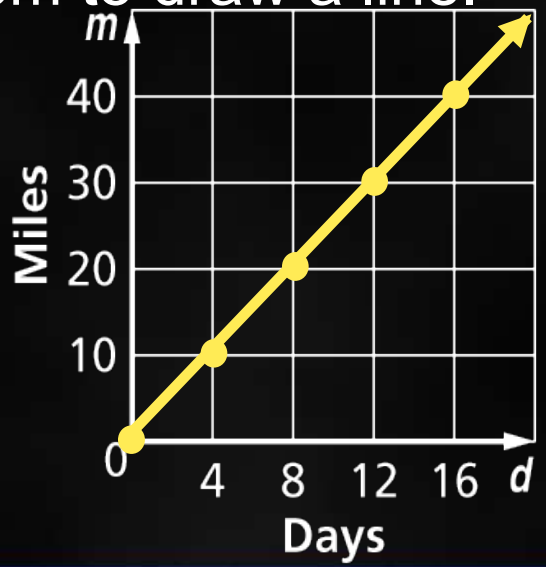
Example 3a

Shiangtai walks his dog 2.5 miles around the lake every day. Graph $m = 2.5d$ where m represents the number of miles walked and d represents the number of days walking.

Select five values for d and make a table. Graph the ordered pairs and connect them to draw a line.

d	$2.5d$	m	(d, m)
0	2.5(0)	0	(0, 0)
4	2.5(4)	10	(4, 10)
8	2.5(8)	20	(8, 20)
12	2.5(12)	30	(12, 30)
16	2.5(16)	40	(16, 40)



STOP!

End of slide

Example 3b

Suppose Shiangtai wanted to walk 50 miles, how many days would it take him?

Since any point on the line is a solution of the equation, use the graph to estimate the value of the x-coordinate in the ordered pair that contains 50 as the y-coordinate.

Answer: The ordered pair $(20, 50)$ appears to be on the line so it should take Shiangtai 20 days to walk 50 miles. Check this solution algebraically by substituting $(20, 50)$ into the original equation.

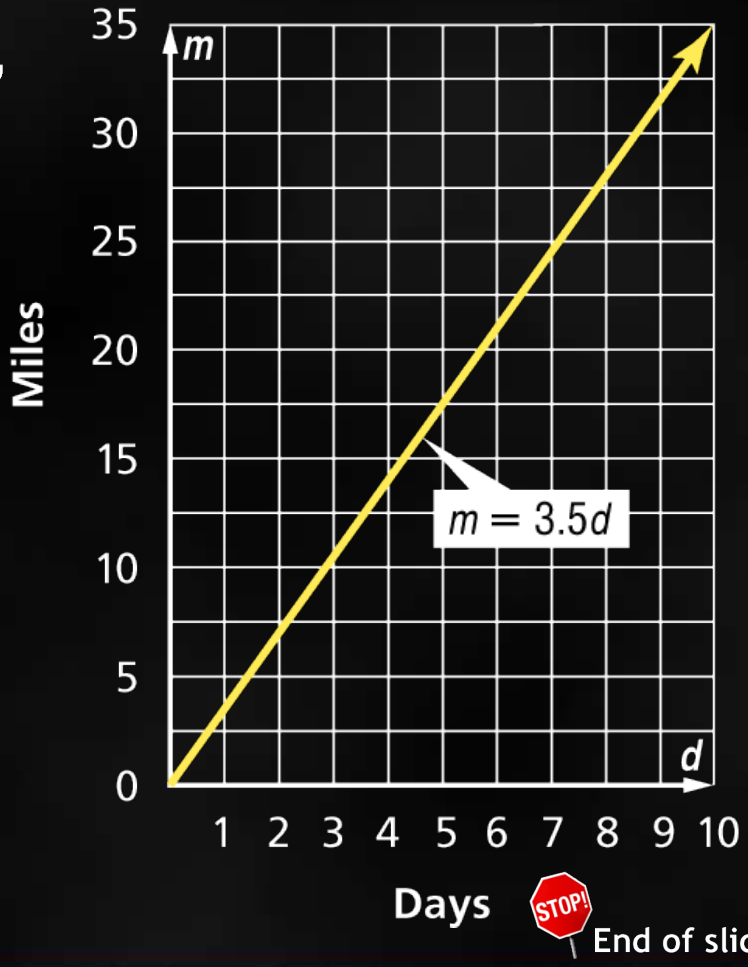
End of slide

Your Turn

Lily rides her bike 3.5 miles every day.

a. Graph the equation $m = 3.5d$, where m represents the number of miles Lily rides and d represents the number of days she rides.

Answer:



b. Suppose Lily wanted to ride 28 miles, how many days would it take her?

Answer: 8 days

Example 4

Determine the x-intercept and the y-intercept of $4x - y = 4$. Then graph the equation.

To find the x-intercept, let. $y = 0$

$$4x - y = 4$$ Original equation

$$4x - 0 = 4$$ Replace y with 0.

$$4x = 4$$ Divide each side by 4.

$$x = 1$$

To find the y-intercept, let. $x = 0$

$$4x - y = 4$$ Original equation

$$4(0) - y = 4$$ Replace x with 0.

$$-y = 4$$ Divide each side by -1.

$$y = -4$$

End of slide–
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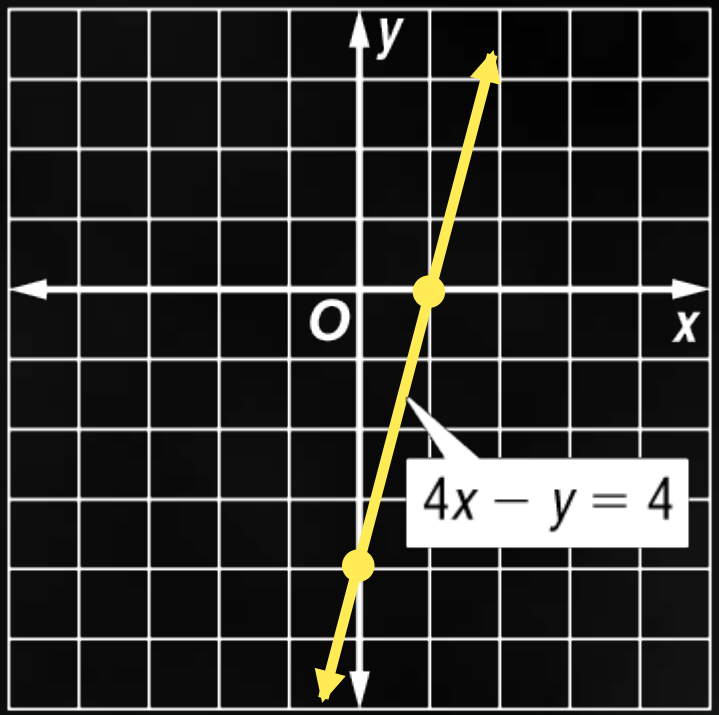
the next slide

Example 4

Answer: The x-intercept is 1, so the graph intersects the x-axis at $(1, 0)$. The y-intercept is -4, so the graph intersects the y-axis at $(0, -4)$.

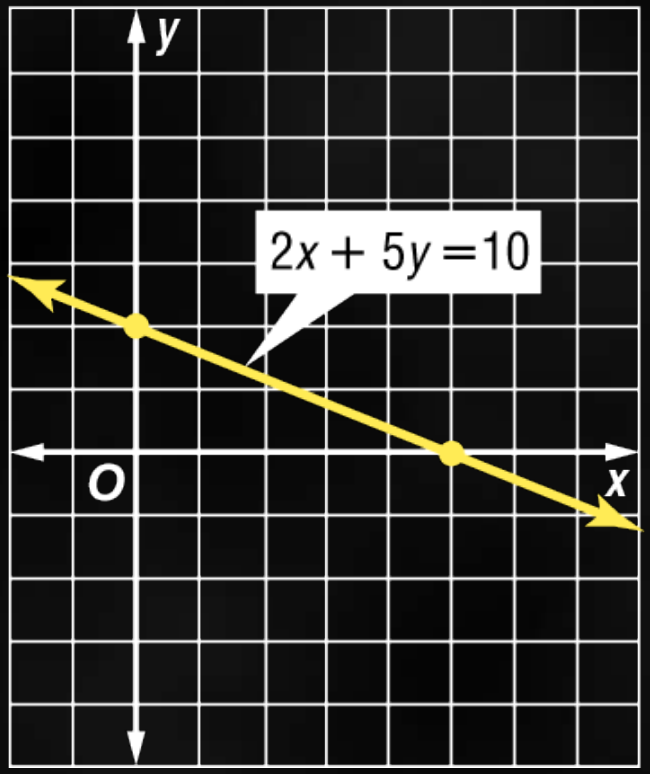
Plot these points. Then draw a line that connects them.



Your Turn

Determine the x-intercept and the y-intercept of $2x + 5y = 10$. Then graph the equation.

Answer: x-intercept $(5, 0)$; y-intercept $(0, 2)$



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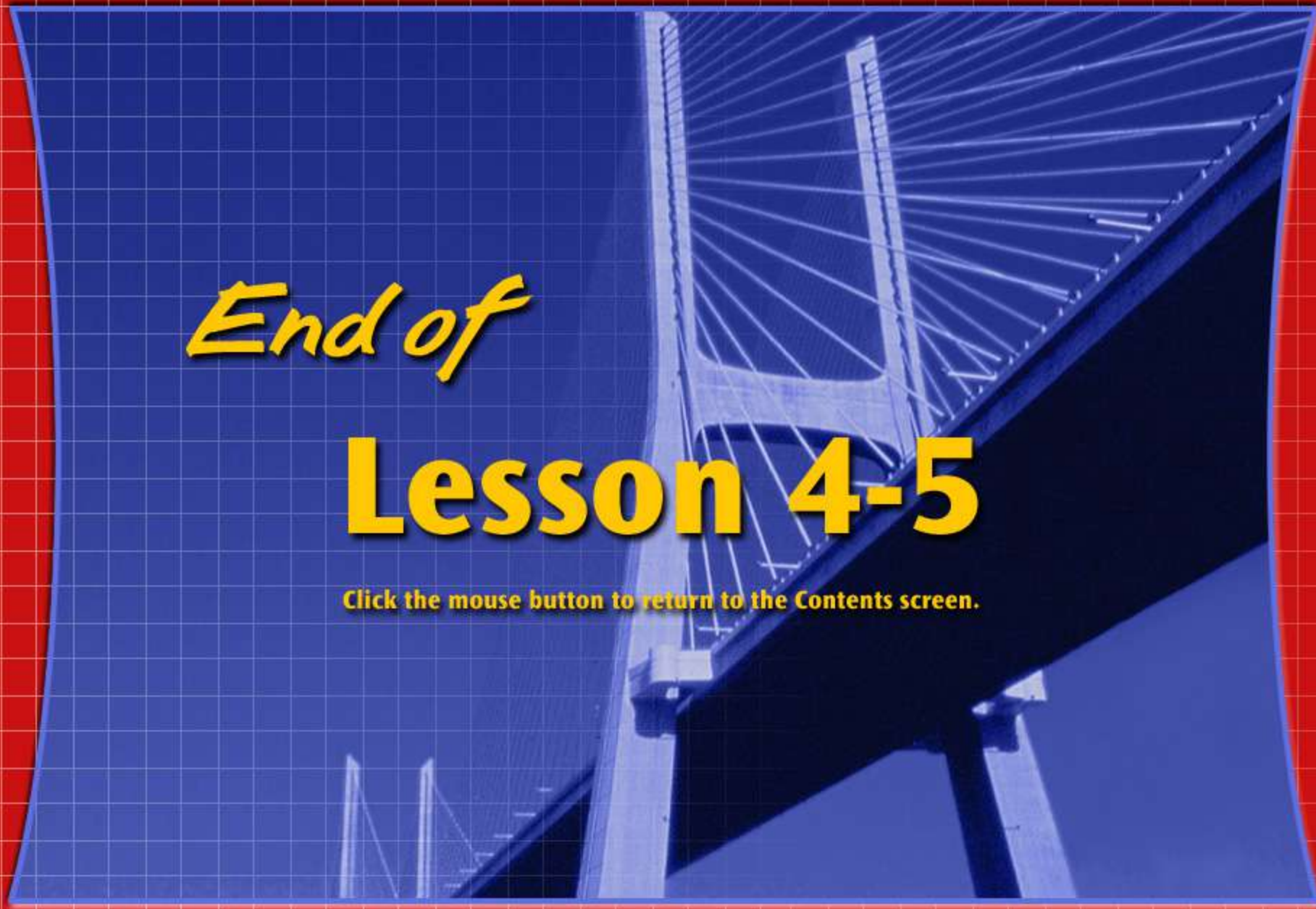
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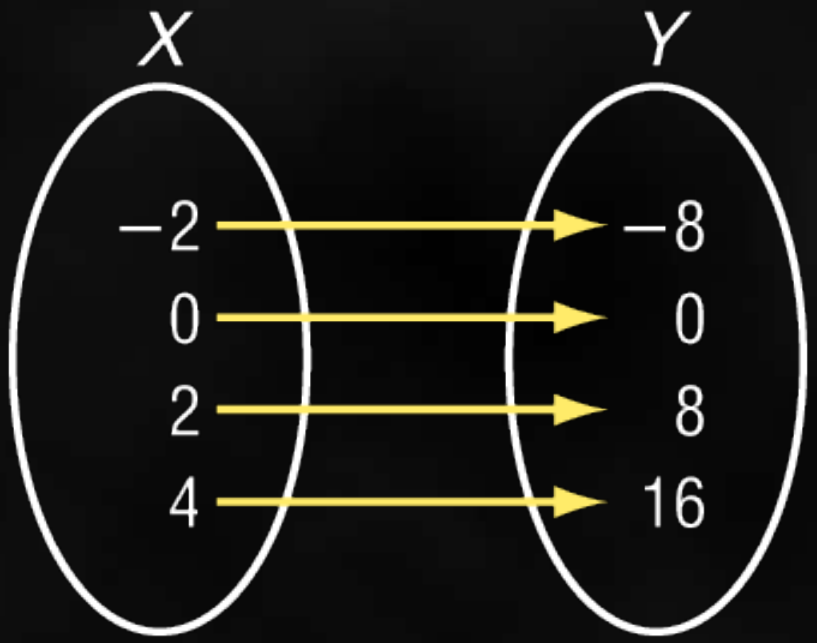
Lesson 4-5
Click the mouse button to return to the Contents screen.

Lesson 4-6 Contents

Example 1a

Determine whether the relation is a function. Explain.



Answer: This is a function because the mapping shows each element of the domain paired with exactly one member of the range.

Example 1b

Determine whether the relation is a function. Explain.

x	y
–7	–12
–4	–9
2	–3
5	0

Answer: This table represents a function because the table shows each element of the domain paired with exactly one element of the range.

End of slide

Example 1c

Determine whether $\{(-5, 2), (-2, 5), (0, 7), (0, 9)\}$ is a function. Explain.

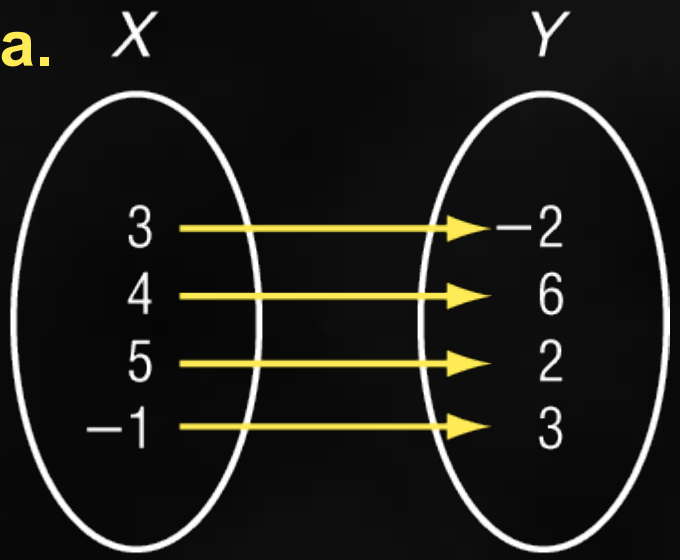
Answer: This relation is not a function because the element 0 in the domain is paired with both 7 and 9 in the range.

End of slide

Your Turn

Determine whether each relation is a function. Explain.

a.



Answer: This mapping represents a function since, for each element of the domain, there is only one corresponding element in the range.

End of slide—
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the next slide

Your Turn

b.

X	Y
3	2
1	–2
2	–4
3	–1

Answer: This relation is not a function because the element 3 in the domain is paired with both 2 and –1 in the range.

c. $\{(3, 0), (1, 2), (4, 0), (5, -1)\}$

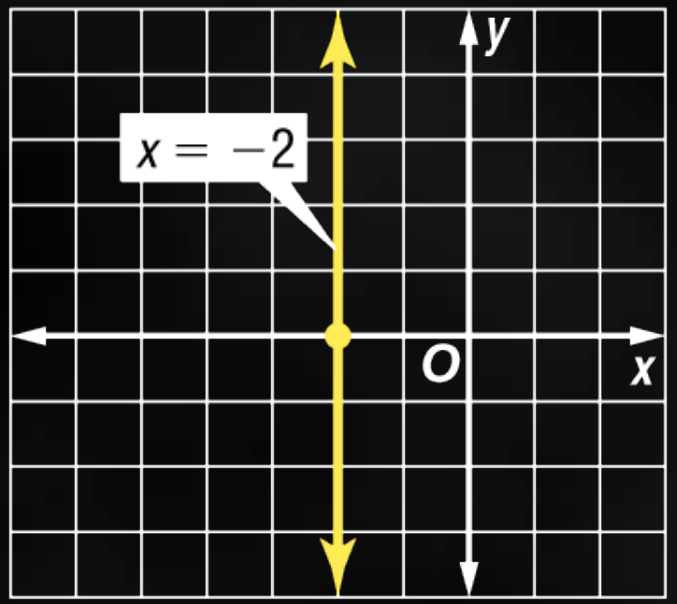
Answer: This is a function because this is not a mapping. Each element of the domain is paired with exactly one member of the range.

End of slide

Example 2

Determine whether $x = -2$ is a function.

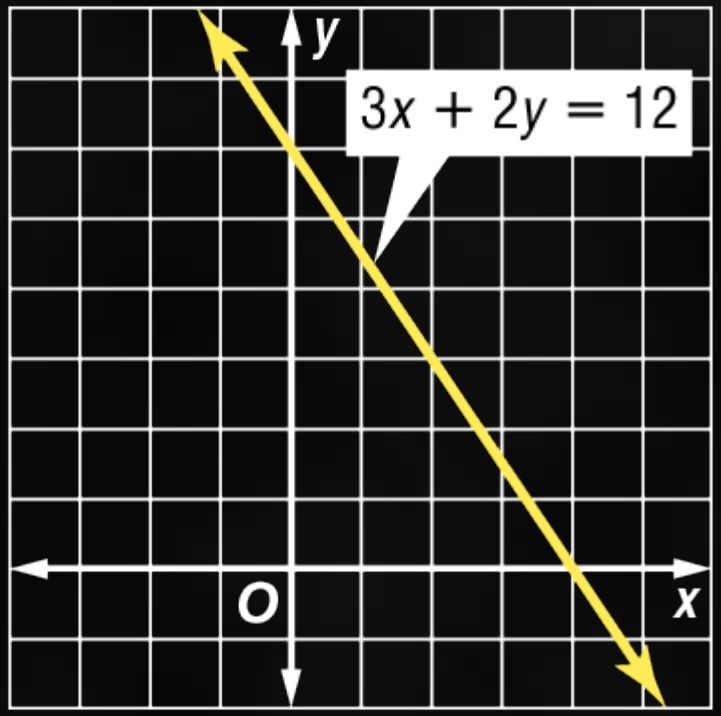
Graph the equation. Since the equation is in the form $Ax + By = C$, the graph of the equation will be a line. Place your pencil at the left of the graph to represent a vertical line. Slowly move the pencil to the right across the graph. At $x = -2$, this vertical line passes through more than one point on the graph.



Answer: The graph does not pass the vertical line test. Thus, the line does not represent a function.

Your Turn

Determine whether $3x + 2y = 12$ is a function.



Answer: yes

End of slide

Example 3a

If $f(x) = 3x - 4$, **find** $f(4)$.

$$f(4) = 3(4) - 4$$

Replace x with 4.

$$= 12 - 4$$

Multiply.

$$= 8$$

Subtract.

Answer: $f(4) = 8$

End of slide

Example 3b

If $f(x) = 3x - 4$, find $f(-5)$.

$$f(-5) = 3(-5) - 4$$

Replace x with -5.

$$= -15 - 4$$

Multiply.

$$= -19$$

Subtract.

Answer: $f(-5) = -19$

End of slide

Example 3c

If $f(x) = 3x - 4$, find $f(2 - x)$.

$$f(2 - x) = 3(2 - x) - 4$$

Replace x with $2 - x$.

$$= 6 - 3x - 4$$

Distributive Property

$$= 2 - 3x$$

Simplify.

Answer: $f(2 - x) = 2 - 3x$

End of slide

Your Turn

If $f(x) = 2x + 5$, find each value.

a. $f(3)$

Answer: 11

b. $f(-8)$

Answer: -11

c. $f(x + 3)$

Answer: $2x + 11$

Example 4a

If $k(m) = m^2 - 4m + 5$, find $k(-3)$.

$$k(-3) = (-3)^2 - 4(-3) + 5$$ Replace m with -3.

$$= 9 + 12 + 5$$ Multiply.

$$= 26$$ Simplify.

Answer: $k(-3) = 26$

End of slide

Example 4b

If $k(m) = m^2 - 4m + 5$, find $k(6z)$.

$$k(6z) = (6z)^2 - 4(6z) + 5$$

Replace m with $6z$.

$$= 36z^2 - 24z + 5$$

Simplify.

Answer: $k(6z) = 36z^2 - 24z + 5$

End of slide

Example 4c

If $k(m) = m^2 - 4m + 5$, find $-4[k(y)]$.

$$-4[k(y)] = -4[(y)^2 - 4y + 5]$$

Evaluate $k(y)$ by replacing m with y.

$$= -4[(y)^2 - 4y + 5]$$

Multiply the value of $k(y)$ by -4.

$$= -4y^2 + 16y - 20$$

Simplify.

Answer: $-4[k(y)] = -4y^2 + 16y - 20$

End of slide

Your Turn

$h(x) = 3x^2 - 4$

If find each value.

a. $h(2)$

Answer: 8

b. $h(3t)$

Answer: $27t^2 - 4$

c. $3[h(p)]$

Answer: $9p^2 - 12$

End of slide

Example 5

Multiple-Choice Test Item

If $<< x >> = 3x^2 + x - 1$, then $<< -5 >> =$

A 69. **B** 70. **C** 79. **D** 81.

Read the Test Item

The symbol $<< x >>$ is just a different notation for $f(x)$.

Solve the Test Item

Replace x with -5.

$<< x >> = 3x^2 + x - 1$

Think:. $<< x >> = f(x)$

$<< -5 >> = 3(-5)^2 + (-5) - 1$

Replace x with -5.

$= 75 - 5 - 1$ or 69

Simplify.

Answer: A

End of slide

Your Turn

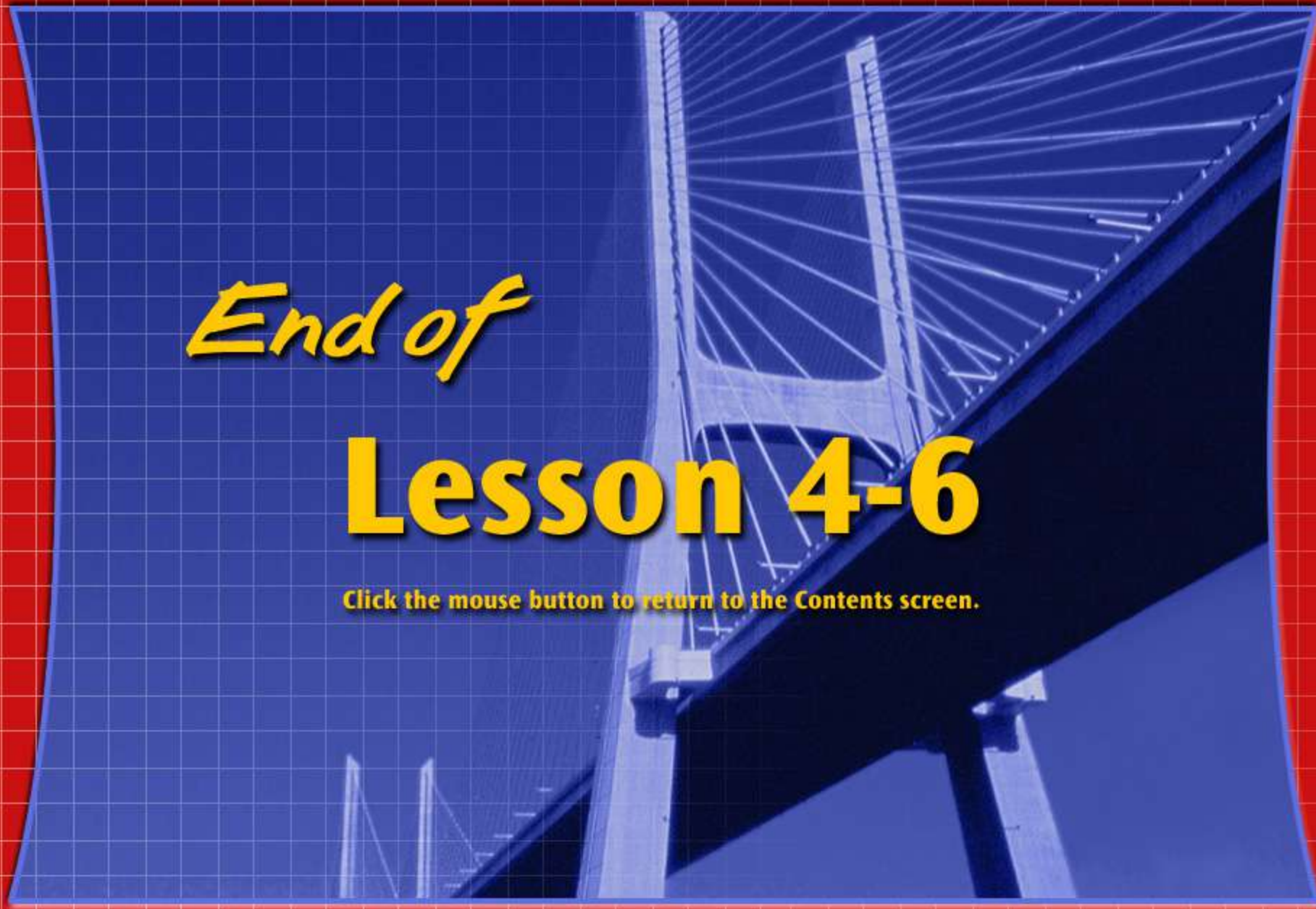
Multiple-Choice Test Item

If $<< x >> = 2x^2 - 5x + 8$, **then** $<< 4 >> =$

A 35. **B** 30. **C** 20. **D** 19.

Answer: C

End of slide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Lesson 4-6
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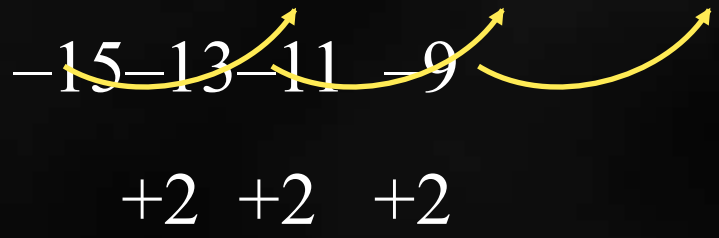
Lesson 4-7 Contents

Example 1a

Determine whether $-15, -13, -11, -9, \ldots$ is arithmetic. Justify your answer.



Answer: This is an arithmetic sequence because the difference between terms is constant.

Example 1b

Determine whether $\frac{7}{8}, \frac{5}{8}, \frac{1}{8}, -\frac{5}{8}$ is arithmetic.

Justify your answer.

$\frac{7}{8}$ $\frac{5}{8}$ $\frac{1}{8}$ $-\frac{5}{8}$

$-\frac{1}{4}$ $-\frac{1}{2}$ $-\frac{3}{4}$

Answer: This is not an arithmetic sequence because the difference between terms is not constant.

End of slide

Your Turn

Determine whether each sequence is arithmetic. Justify your answer.

a. 2, 4, 8, 10, 12, ...

Answer: This is not an arithmetic sequence because the difference between terms is not constant.

b. $\frac{2}{3}, 1, \frac{4}{3}, \frac{5}{3}, 2, \ldots$

Answer: This is an arithmetic sequence because the difference between terms is constant.

End of slide

Example 2

Find the next three terms of the arithmetic sequence.

$-8, -11, -14, -17, \ldots$

Find the common difference by subtracting successive terms.

$-8 \quad -11 \quad -14 \quad -17$

$-3 \quad -3 \quad -3$

The common difference is -3.

Add -3 to the last term of the sequence to get the next term in the sequence. Continue adding -3 until the next three terms are found.

$-17 \quad -20 \quad -23 \quad -26$

$-3 \quad -3 \quad -3$

Answer: The next three terms are $-20, -23, -26$.

STOP! End of slide

Your Turn

Find the next three terms of the arithmetic sequence.
5, 12, 19, 26, ...

Answer: 33, 40, 47

Example 3

Find the 9th term of the arithmetic sequence.

$7, 11, 15, 19, \ldots$

In this sequence, the first term, a_1, is 7. You want to find the 9th term, so $n = 9$. Find the common difference.

The common difference is 4.

End of slide—continued on the next slide

Example 3

Use the formula for the nth term of an arithmetic sequence.

$a_n = a_1 + (n-1)d$ Formula for the nth term

$a_9 = 7 + (9-1)(4)$ $a_1 = 7,\ n = 9,\ d = 4$

$a_9 = 7 + (8)(4)$ Simplify.

$a_9 = 39$

Answer: The 9th term in the sequence is 39.

Your Turn

Find the 12th term in the arithmetic sequence.

12, 17, 22, 27, ...

Answer: 67

Example 4a

Consider the arithmetic sequence $-8, 1, 10, 19, \ldots$. Write an equation for the nth term of the sequence.

In this sequence, the first term, a_1, is -8. Find the common difference.

The common difference is 9.

Use the formula for the nth term to write an equation.

$a_n = a_1 + (n-1)d$ Formula for nth term

$a_n = -8 + (n-1)9$ $a_1 = -8,\ d = 9$

$a_n = -8 + 9n - 9$ Distributive Property

$a_n = 9n - 17$ Simplify.

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the next slide

Example 4a

Answer: An equation for the *n*th term in this sequence is $a_n = 9n - 17$.

Check

For $n = 1$, $9(1) - 17 = -8$.

For $n = 2$, $9(2) - 17 = 1$.

For $n = 3$, $9(3) - 17 = 10$, and so on.

Example 4b

Find the 12th term of the sequence.

Replace n with 12 in the equation written in part a.

$a_n = 9n - 17$ Equation for the nth term

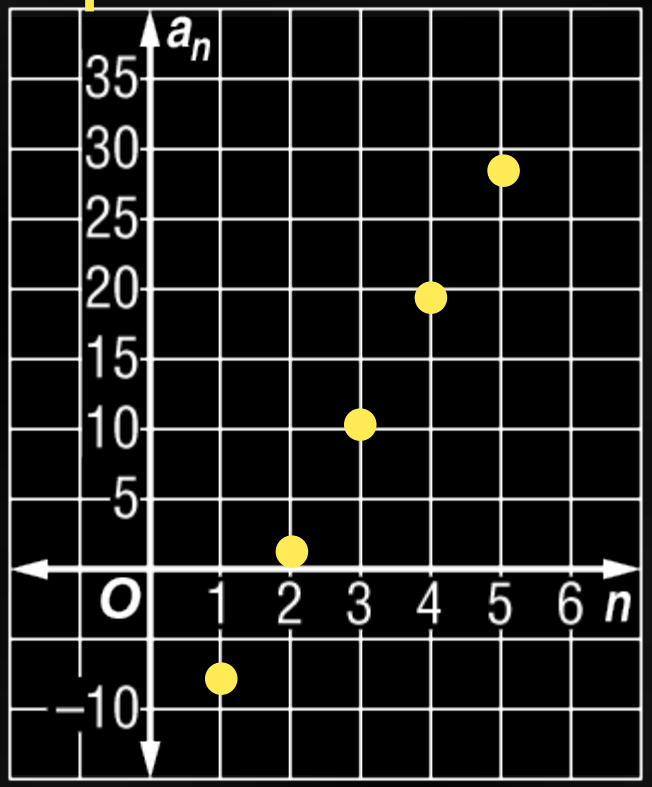
$a_{12} = 9(12) - 17$ Replace n with 12.

Answer: $a_{12} = 91$ Simplify.

Example 4c

Graph the first five terms of the sequence.

n	$9n-17$	a_n	(n, a_n)
1	$9(1)-17$	-8	$(1, -8)$
2	$9(2)-17$	1	$(2, 1)$
3	$9(3)-17$	10	$(3, 10)$
4	$9(4)-17$	19	$(4, 19)$
5	$9(5)-17$	28	$(5, 28)$



Answer:

Notice the points fall on a line. The graph of an arithmetic sequence is linear.

Your Turn

Consider the arithmetic sequence $-3, 0, 3, 6, \ldots$

a. Write an equation for the nth term of the sequence.

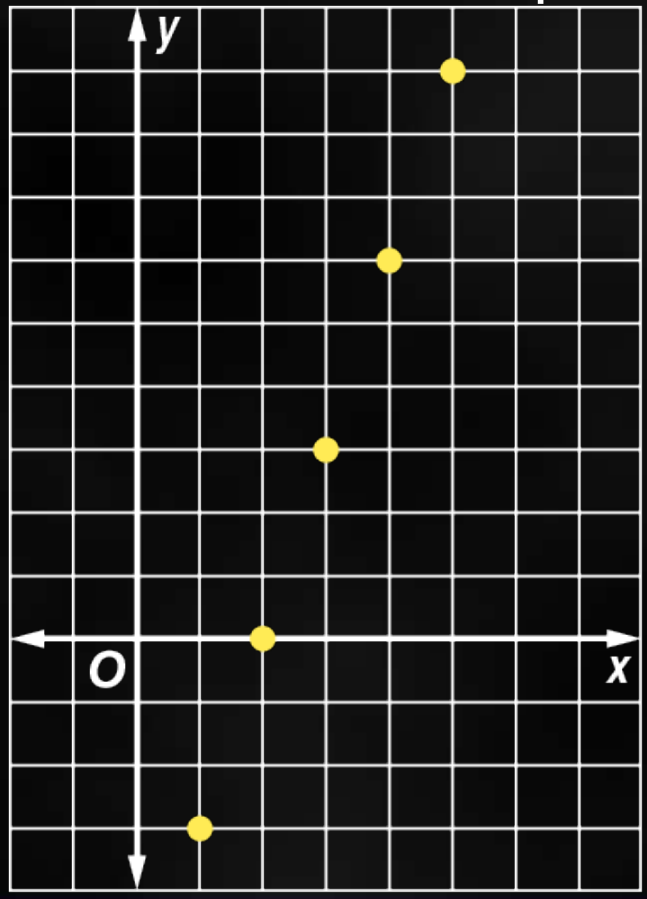
Answer: $a_n = 3n - 6$

b. Find the 18th term in the sequence.

Answer: 48

c. Graph the first five terms in the sequence.

Answer:



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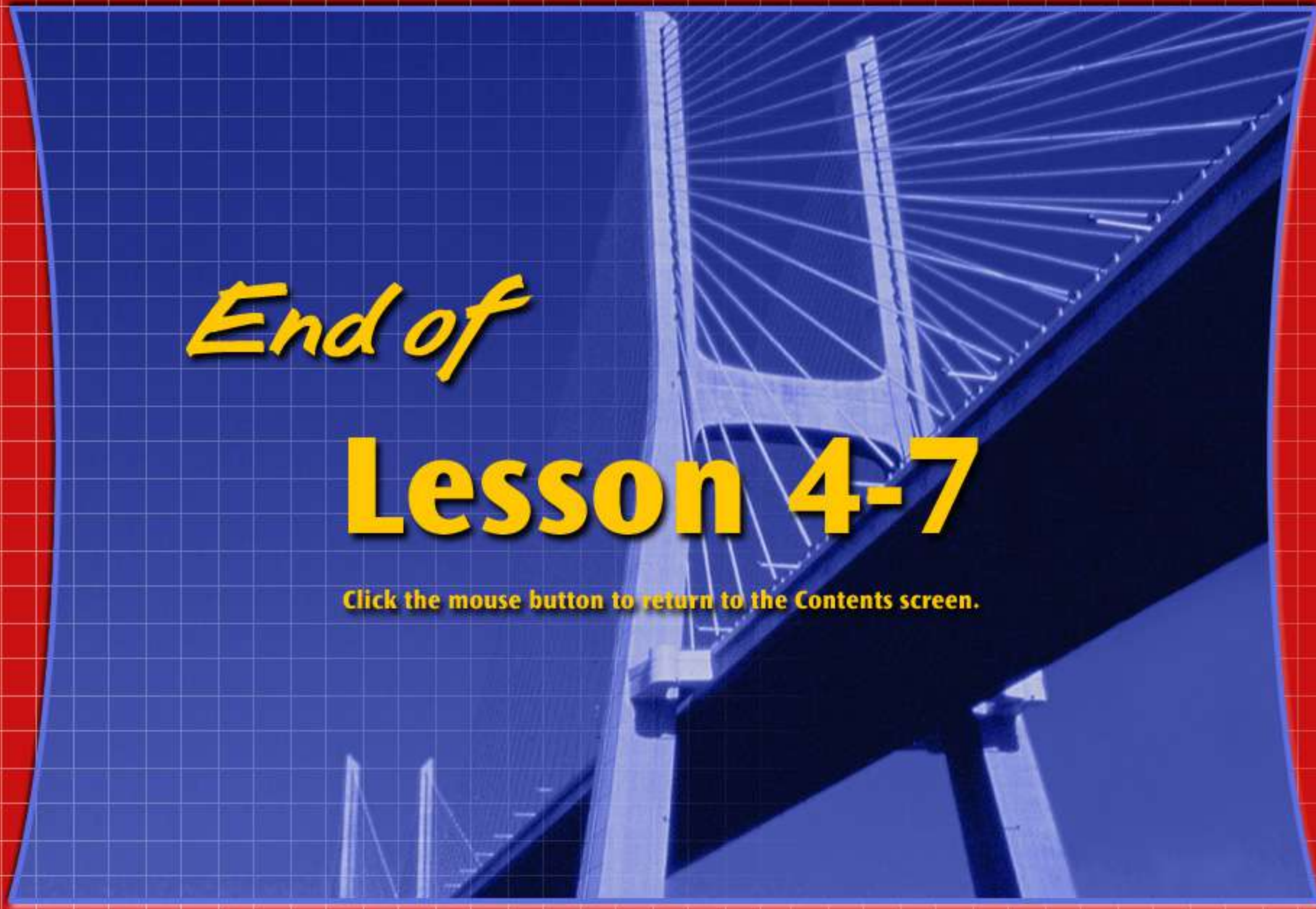
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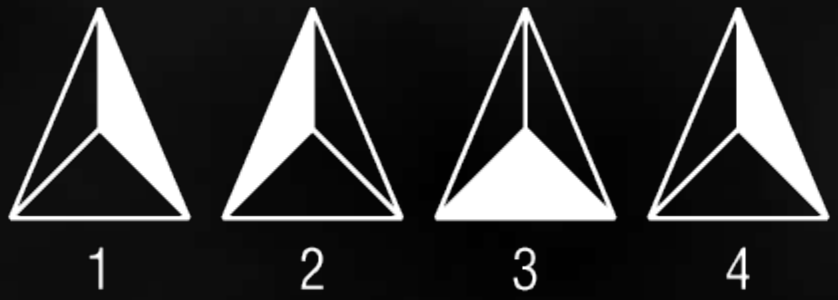
Lesson 4-7
Click the mouse button to return to the Contents screen.

Lesson 4-8 Contents

Example 1a

Study the pattern below. Draw the next three figures in the pattern.



The pattern consists of triangles with one-third shaded. The section that is shaded is rotated in a counterclockwise direction. The next three figures are shown.

Answer:

Example 1b

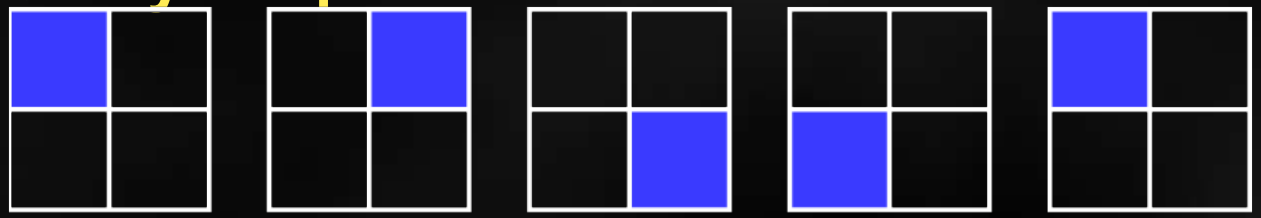
Study the pattern below. Draw the 17th triangle in the pattern.

The pattern repeats every third design. Therefore, designs 3, 6, 9, 12, 15, and so on will all be the same. Since 15 is the greatest number less than 17 that is a multiple of 3, the 17th triangle in the pattern will be the same as the second triangle.

Answer:

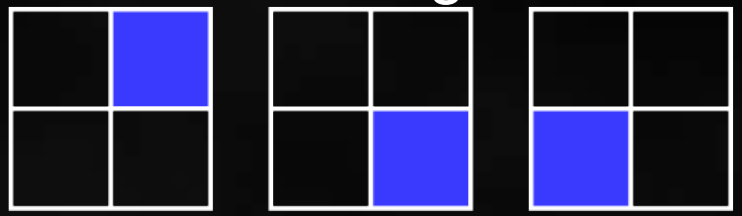
Your Turn

Study the pattern below.



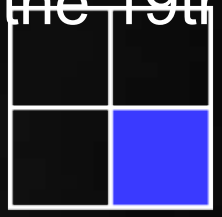
a. Draw the next three figures in the pattern.

Answer:



C. Draw the 19th square in the pattern.

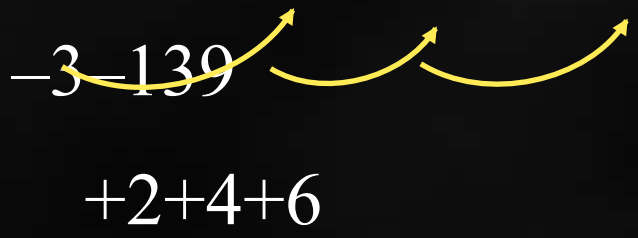
Answer:



STOP! End of slide

Example 2

Find the next three terms in the sequence $-3, -1, 3, 9, \ldots$. Study the pattern in the sequence.



You can use inductive reasoning to find the next term in the sequence. Notice the pattern $2, 4, 6, \ldots$. The difference between each term increases by two in each successive term. To find the next three terms in the sequence, continue adding two to each successive difference.

Add 8, 10, and 12.

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the next slide

Example 2

Answer: The next three terms are 17, 27, and 39.

End of slide

Your Turn

Find the next three terms in the sequence.
1, 4, 10, 19, ...

Answer: 31, 46, 64

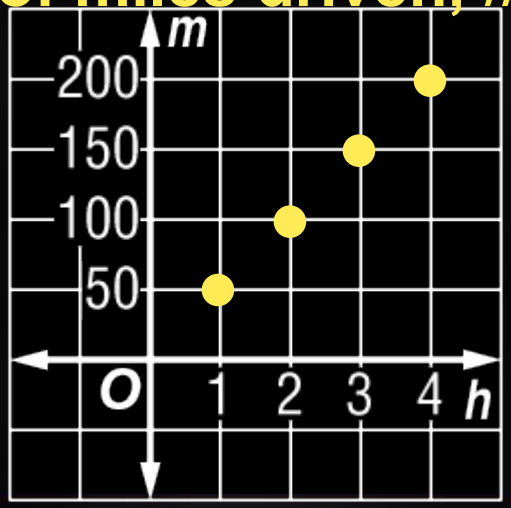
Example 3a

The table shows the number of miles driven for each hour of driving.

Hours	1	2	3	4
Miles	50	100	150	200

Graph the data. What conclusion can you make about the relationship between the number of hours driving, h and the numbers of miles driven, m?

Answer:
The graph shows a linear relationship between the number of hours driving and the number of miles driven.



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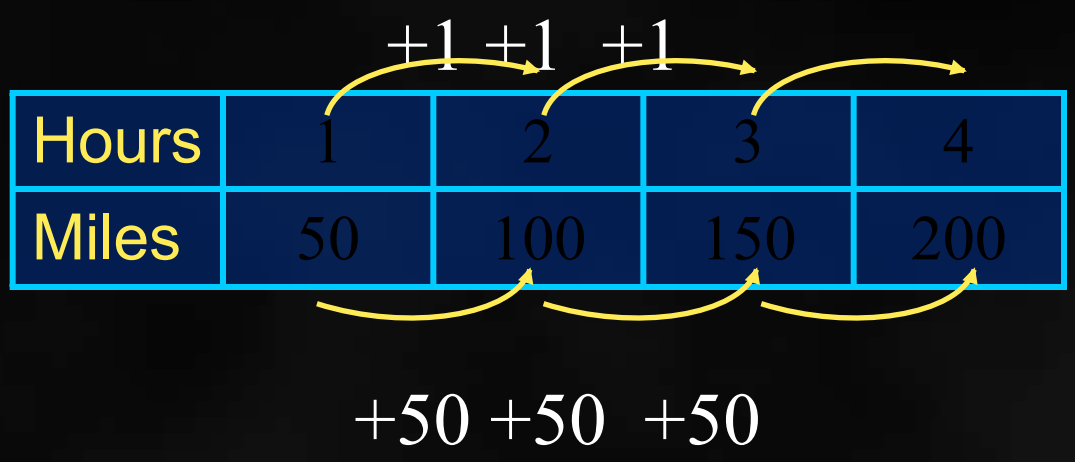
Example 3b

Write an equation to describe this relationship.

Look at the relationship between the domain and the range to find a pattern that can be described as an equation.



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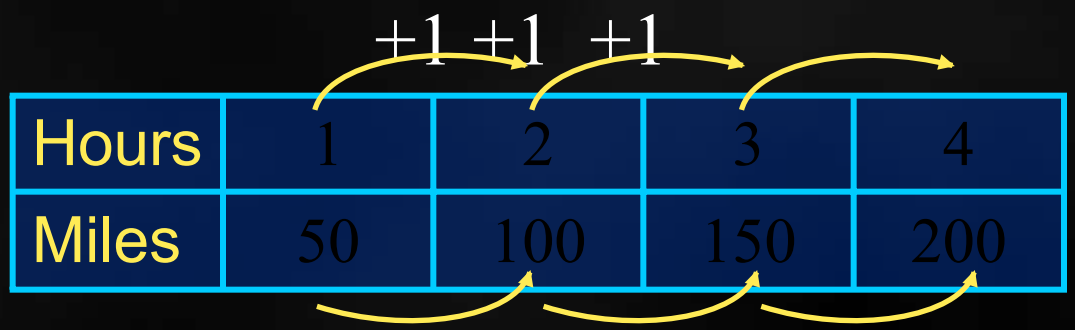
Example 3b



Since this is a linear relationship, the ratio of the range values to the domain values is constant. The difference of the values for h is 1, and the difference of the values for m is 50. This suggests that $m = 50h$. Check to see if this equation is correct by substituting values of h into the equation.

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Example 3b

Check If $h = 1$, then $m = 50(1)$ or 50. ✓

If $h = 2$, then $m = 50(2)$ or 100. ✓

If $h = 3$, then $m = 50(3)$ or 150. ✓

If $h = 4$, then $m = 50(4)$ or 200. ✓

The equation checks.

Answer: $m = 50h$

Since this relation is also a function, we can write the equation as $f(h) = 50h$ where $f(h)$ represents the number of miles driven.

End of slide

Your Turn

The table below shows the number of miles walked for each hour of walking.

Hours	1	2	3	4	5
Miles	1.5	3	4.5	6	7.5

a. Graph the data. What conclusion can you make about the relationship between the number of miles and the time spent walking?

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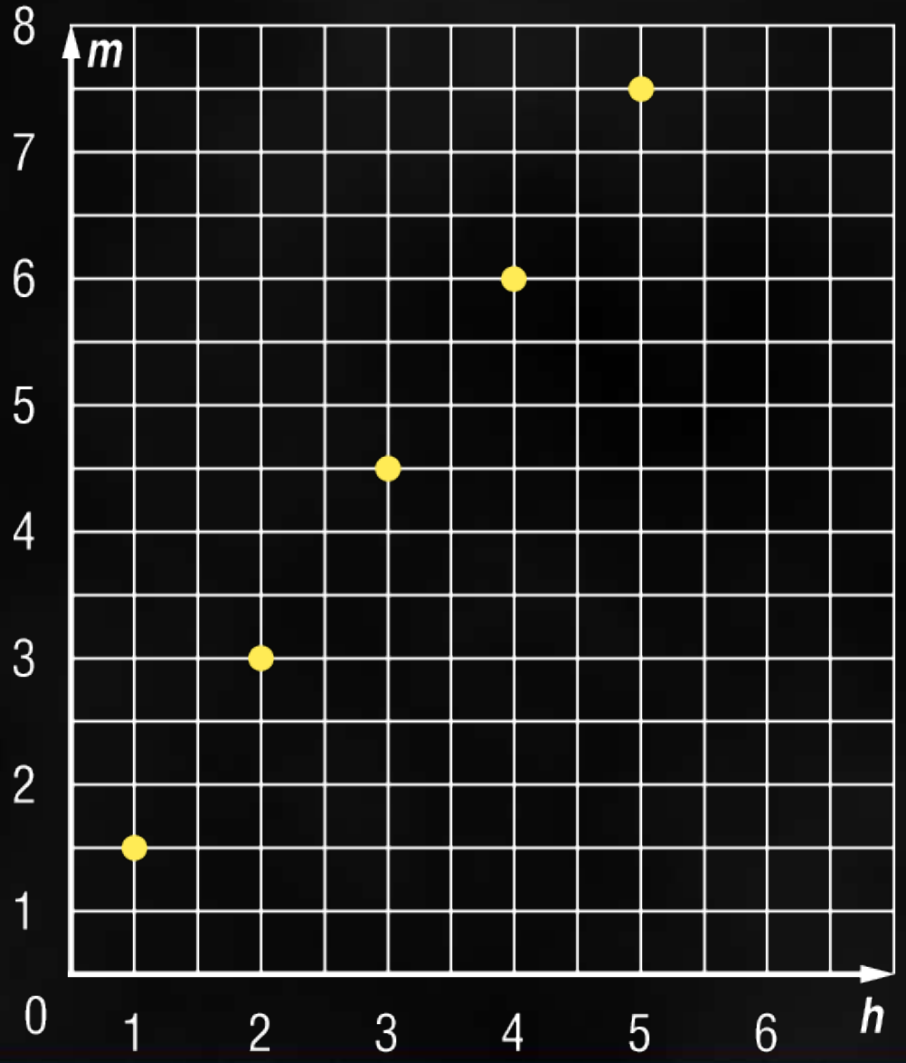
the next slide

Your Turn

Answer:



The graph shows a linear relationship between the number of miles walked m and the time spent walking h.

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the next slide

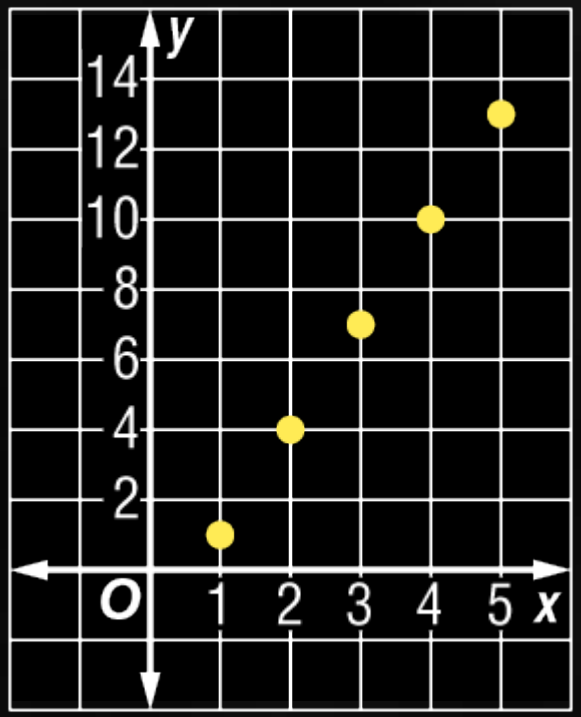
Your Turn

b. Write an equation to describe the relationship.

Answer: $m = 1.5h$ or $f(h) = 1.5h$

Example 4

Write an equation in function notation for the relation graphed below.



Make a table of ordered pairs for several points on the graph.

+1 +1 +1 +1

x	1	2	3	4	5
y	1	4	7	10	13

+3 +3 +3 +3

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Example 4

The difference in the x values is 1, and the difference in the y values is 3. The difference in y values is three times the difference of the x values. This suggests that $y = 3x$. Check this equation.

Check If, then $x = 1$ $y = 3(1)$ or 3. But the y value for $x = 1$ is 1. This is a difference of -2. Try some other values in the domain to see if the same difference occurs.

x	1	2	3	4	5
$3x$	3	6	9	12	15
y	1	4	7	10	13

y is always 2 less than $3x$.

End of slide–
continued on
the next slide

Example 4

This pattern suggests that 2 should be subtracted from one side of the equation in order to correctly describe the relation. Check $y = 3x - 2$.

If $x = 2$, then $y = 3(2) - 2$ or 4.

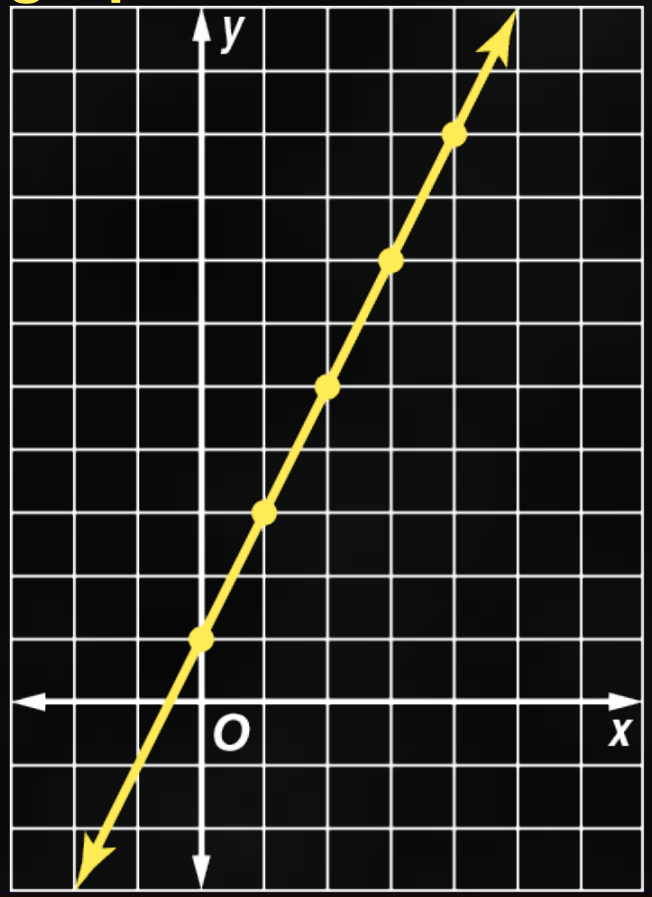
If $x = 3$, then $y = 3(3) - 2$ or 7.

Answer: $y = 3x - 2$ correctly describes this relation. Since the relation is also a function, we can write the equation in function notation as $f(x) = 3x - 2$.

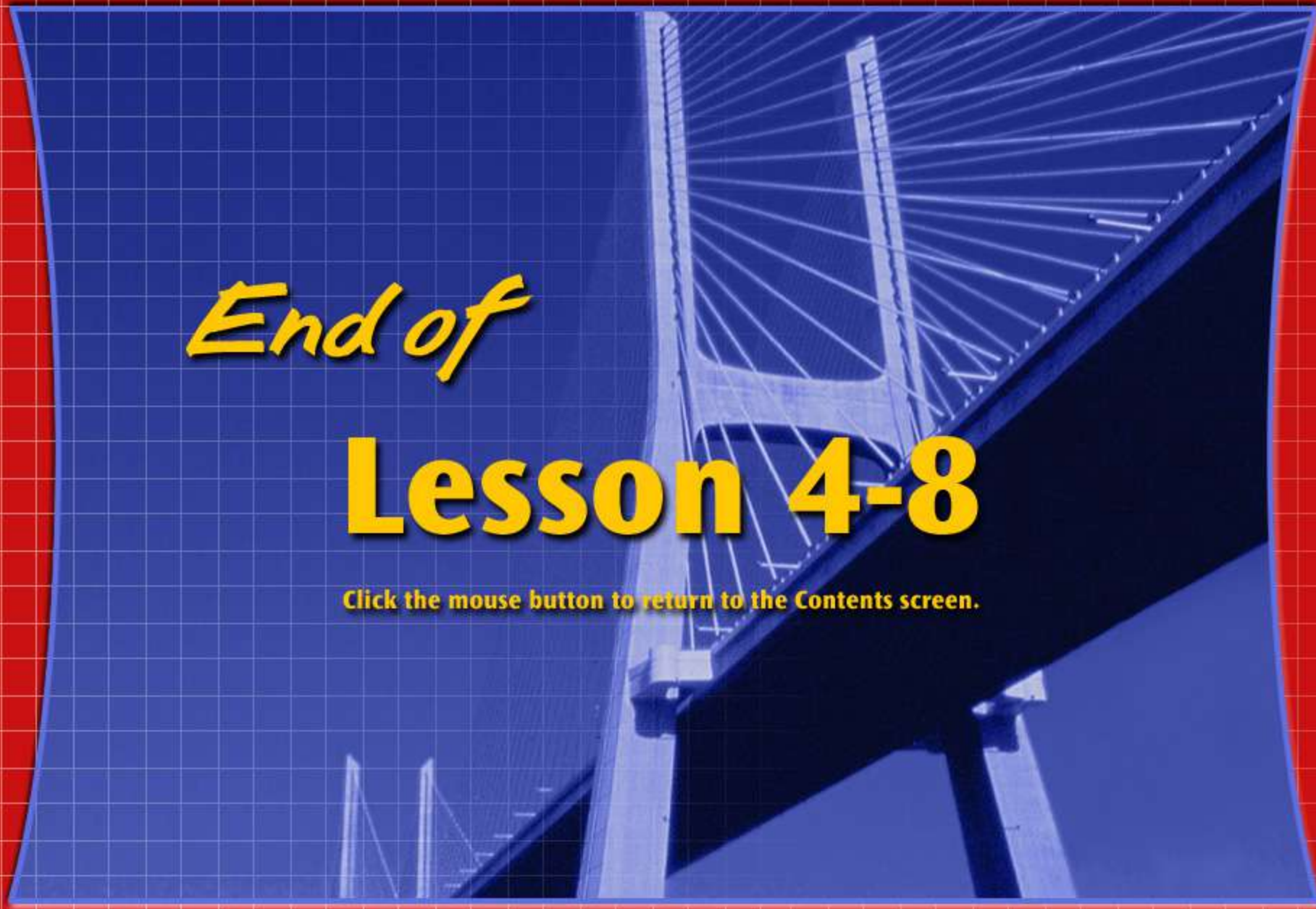
End of slide

Your Turn

Write an equation in function notation for the relation graphed below.



Answer: $f(x) = 2x + 1$


End of
Lesson 4-8
Click the mouse button to return to the Contents screen.

Extra Examples

Explore online information about the information introduced in this chapter.

Click on the **Connect** button to launch your browser and go to the *Algebra 1* Web site. At this site, you will find extra examples for each lesson in the Student Edition of your textbook. When you finish exploring, exit the browser program to return to this presentation. If you experience difficulty connecting to the Web site, manually launch your Web browser and go to **www.algebra1.com/extra_examples**.

5-Minute Check (over Chapter 3)

Transparency 4-1

1. Translate *three times a number decreased by eight is negative thirteen* into an equation.
2. Solve $-24 + b = -13$.
3. Solve $c = \frac{a + 2b}{-5r}$ for b.
4. A stamp collector bought a rare stamp for $16, and sold it a year later for $20.50. Find the percent of change. Round to the nearest whole percent.
5. **Standardized Test Practice** One train traveling at 60 miles per hour and another at 80 miles per hour leave the same location going in opposite directions. In how many hours will these trains be 420 miles apart?

   A 3 hours
   B 4 hours
   C 6 hours
   D 7 hours

Click the mouse button or press the Space Bar to display the answers.

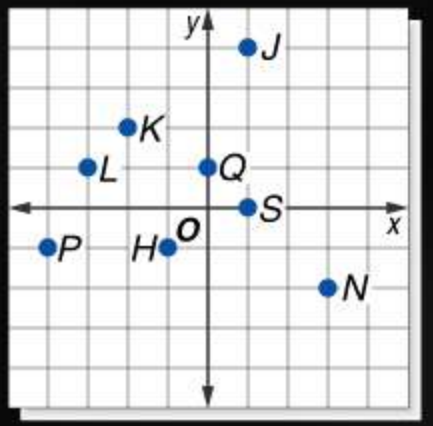
5-Minute Check (over Chapter 3)

Transparency 4-1

1. Translate *three times a number decreased by eight is negative thirteen* into an equation. $3n - 8 = -13$
2. Solve $-24 + b = -13$. $b = 11$
3. Solve $c = \frac{a + 2b}{-5r}$ for b. $\frac{5rc + a}{-2}$
4. A stamp collector bought a rare stamp for \$16, and sold it a year later for \$20.50. Find the percent of change. Round to the nearest whole percent. 28% increase
5. **Standardized Test Practice** One train traveling at 60 miles per hour and another at 80 miles per hour leave the same location going in opposite directions. In how many hours will these trains be 420 miles apart?

   A 3 hours
   B 4 hours
   C 6 hours
   D 7 hours

Use the points on the coordinate grid for Questions 1–5.



1. Write the ordered pair for point *N*.

2. Name the quadrant in which the point *P* is located.

3. Name a point located on the *y*-axis.

4. Name two points that have the same *x*-coordinate.

5. Write the ordered pair that describes a point 4 units down and 1 unit to the left of point *K*.

6. **Standardized Test Practice** Which point lies in quadrant IV?

A (3, −2)

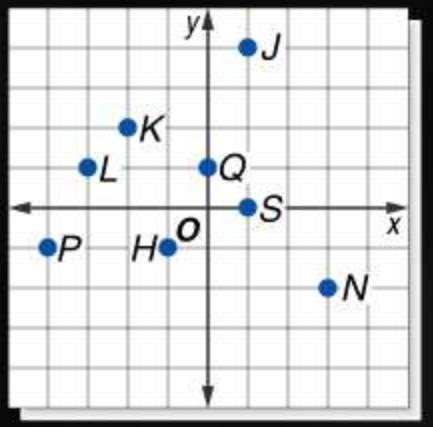
B (0, −4)

C (−3, 1)

D (−2, −2)

Click the mouse button or press the Space Bar to display the answers.

Use the points on the coordinate grid for Questions 1–5.

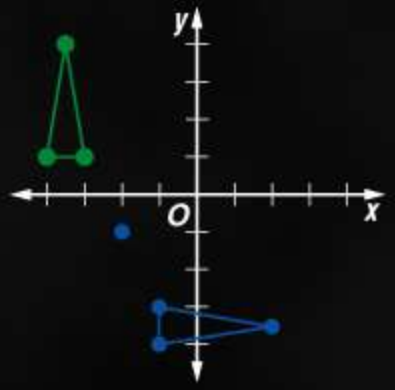


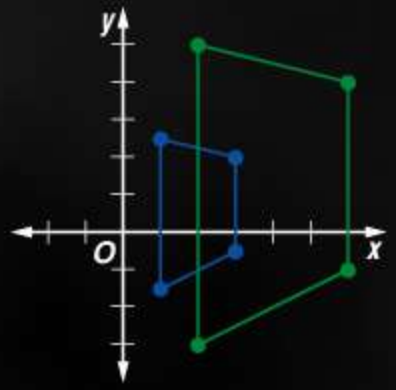
1. Write the ordered pair for point *N*.
   (3, −2)
2. Name the quadrant in which the point *P* is located.
   III
3. Name a point located on the *y*-axis.
   Q
4. Name two points that have the same *x*-coordinate.
   J and *S*
5. Write the ordered pair that describes a point 4 units down and 1 unit to the left of point *K*.
   (−3, −2)
6. **Standardized Test Practice** Which point lies in quadrant IV?

   A (3, −2) B (0, −4)

   C (−3, 1) D (−2, −2)

Identify each transformation as a *reflection*, *translation*, *dilation*, or *rotation*.

1. 

2. 

Find the coordinates of the vertices of each figure after the given transformation is performed.

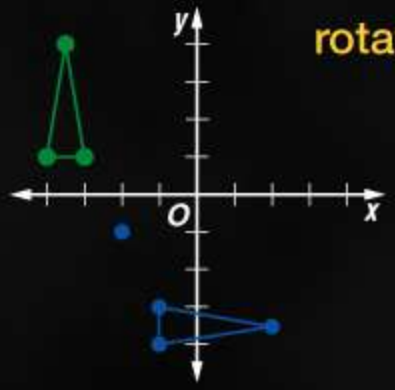
3. trapezoid *EFGH* with *E*(2, 0), *F*(4, −2), *G*(4, 4), and *H*(2, 4) reflected over the *x*-axis

4. triangle *MNP* with *M*(1, 1), *N*(3, 2), and *P*(2, 4) translated 3 units down and 5 units to the left

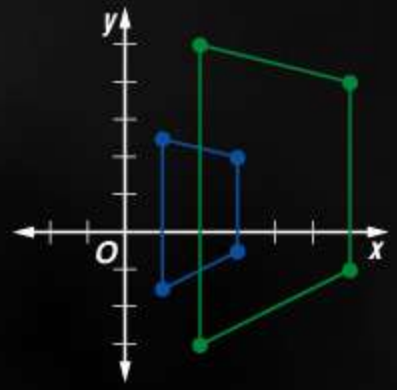
5. **Standardized Test Practice** A vertex of a triangle is found at point (x, y). Which ordered pair shows the coordinates of this vertex after a 90° rotation about the origin?

A $(-y, -x)$ B $(-x, -y)$ C (y, x) D $(-y, x)$

Identify each transformation as a *reflection*, *translation*, *dilation*, or *rotation*.

1. 

rotation

2. 

dilation

Find the coordinates of the vertices of each figure after the given transformation is performed.

3. trapezoid $EFGH$ with $E(2, 0)$, $F(4, -2)$, $G(4, 4)$, and $H(2, 4)$ reflected over the x-axis $E'(2, 0)$, $F'(4, 2)$, $G'(4, -4)$, $H'(2, -4)$

4. triangle MNP with $M(1, 1)$, $N(3, 2)$, and $P(2, 4)$ translated 3 units down and 5 units to the left $M'(-4, -2)$, $N'(-2, -1)$, $P'(-3, 1)$

5. **Standardized Test Practice** A vertex of a triangle is found at point (x, y). Which ordered pair shows the coordinates of this vertex after a 90° rotation about the origin?

A $(-y, -x)$ B $(-x, -y)$ C (y, x) D $(-y, x)$

5-Minute Check (over Lesson 4–3)

Transparency 4-4

1. Express the relation {(−1, 0), (2, −4), (−3, 1), (4, −3)} as a table, a graph, and a mapping. Then determine the domain and range.

2. Write the inverse of the relation. {(5, −2), (0, 3), (2, 1), (−4, 3)}

3. Jason, a waiter, expressed his customers' bills and the tips they left him as the relation {(10, 2), (8, 1.5), (4, 1.25)}. Express the relation as a table.

4. **Standardized Test Practice** Determine the domain and range for the relation {(3, −1), (2, 3), (4, 0), (−1, −2)}.

Click the mouse button or press the Space Bar to display the answers.

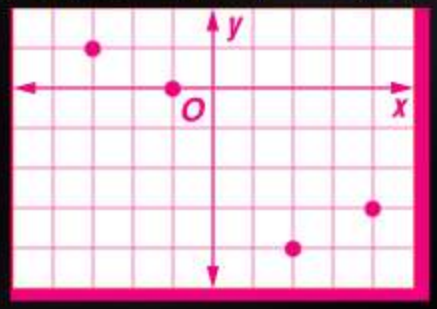
5-Minute Check (over Lesson 4–3)

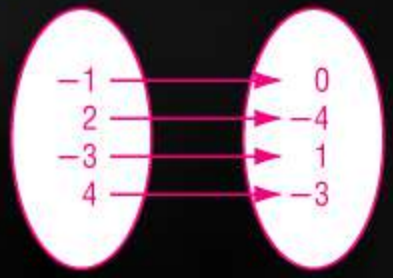
Transparency 4-4

1. Express the relation {(−1, 0), (2, −4), (−3, 1), (4, −3)} as a table, a graph, and a mapping. Then determine the domain and range.

1. D = {−3, −1, 2, 4}; R = {−4, −3, 0, 1}

x	y
−1	0
2	−4
−3	1
4	−3





2. Write the inverse of the relation. {(5, −2), (0, 3), (2, 1), (−4, 3)}

{(−2, 5), (3, 0), (1, 2), (3, −4)}

3. Jason, a waiter, expressed his customers' bills and the tips they left him as the relation {(10, 2), (8, 1.5), (4, 1.25)}. Express the relation as a table.

bills	tips
$10	$2
$8	$1.50
$4	$1.25

4. **Standardized Test Practice** Determine the domain and range for the relation {(3, −1), (2, 3), (4, 0), (−1, −2)}.

D = {−1, 2, 3, 4}; R = {−2, −1, 0, 3)

Find the solution set for each equation, given the replacement set.

1. $y = 3x + 2$; $\{(-2, 5), (2, 8), (-3, -7), (3, 4)\}$
2. $2x + 3y = 7$; $\{(2, 1), (-2, 11), (-4, 5), (8, 3)\}$

Solve each equation if the domain is $\{-2, 0, 1\}$.

3. $y = 3 + 2x$
4. $y = 4 - 3x$
5. The equation $y = 2.54x$ is used to convert x inches to y centimeters. How many centimeters are in 1 foot?
6. **Standardized Test Practice** For $y = 4x - 2$, what values in the domain will produce the values $\{26, 0, 18, -2\}$ in the range?

A $\{7, 4, 0, -10\}$

B $\left\{7, \frac{1}{2}, 5, 0\right\}$

C $\{15, 4, 5, 0\}$

D $\left\{15, \frac{1}{2}, 0, -10\right\}$

Find the solution set for each equation, given the replacement set.

1. $y = 3x + 2$; $\{(-2, 5), (2, 8), (-3, -7), (3, 4)\}$ $\{(2, 8), (-3, -7)\}$
2. $2x + 3y = 7$; $\{(2, 1), (-2, 11), (-4, 5), (8, 3)\}$ $\{(2, 1), (-4, 5)\}$

Solve each equation if the domain is $\{-2, 0, 1\}$.

3. $y = 3 + 2x$ $\{(-2, -1), (0, 3), (1, 5)\}$
4. $y = 4 - 3x$ $\{(-2, 10), (0, 4), (1, 1)\}$
5. The equation $y = 2.54x$ is used to convert x inches to y centimeters. How many centimeters are in 1 foot?
   30.48 cm
6. **Standardized Test Practice** For $y = 4x - 2$, what values in the domain will produce the values $\{26, 0, 18, -2\}$ in the range?

   A $\{7, 4, 0, -10\}$ B $\left\{7, \frac{1}{2}, 5, 0\right\}$

   C $\{15, 4, 5, 0\}$ D $\left\{15, \frac{1}{2}, 0, -10\right\}$

Determine whether each equation is a linear equation. If so, write the equation in standard form.

1. $2x + y = -9$

2. $3x - xy + 7 = 0$

3. $\frac{x}{5} = 1 + \frac{y}{10}$

4. Graph $y = -3x + 3$.

5. Jake's Window Service uses the equation $c = 5w + 15.25$ to calculate the total charge c based on the number of windows w that are washed. What will be the charge for washing 15 windows?

6. **Standardized Test Practice** Which of the following is *not* a linear equation?

A. $y = 5$

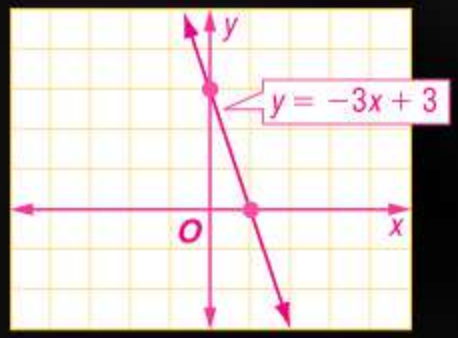
B. $xy = 1$

C. $\frac{x}{2} + y = 0$

D. $y = 1 - x$

Determine whether each equation is a linear equation. If so, write the equation in standard form.

1. $2x + y = -9$ yes; $2x + y = -9$
2. $3x - xy + 7 = 0$ no
3. $\frac{x}{5} = 1 + \frac{y}{10}$ yes; $2x - y = 10$
4. Graph $y = -3x + 3$.

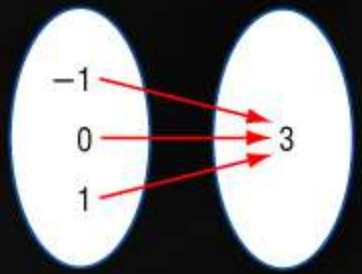


5. Jake's Window Service uses the equation $c = 5w + 15.25$ to calculate the total charge c based on the number of windows w that are washed. What will be the charge for washing 15 windows? $90.25
6. **Standardized Test Practice** Which of the following is *not* a linear equation?

A. $y = 5$
B. $xy = 1$
C. $\frac{x}{2} + y = 0$
D. $y = 1 - x$

Determine whether each relation is a function.

1.



2.

x	y
16	−8
12	−6
0	0
−4	2
−10	5

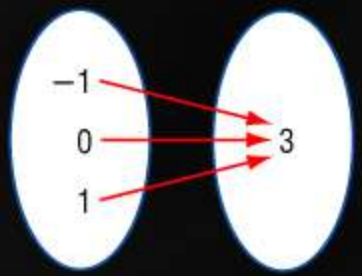
3. {(7, 0), (0, 7) (−7, 0), (0, −7)}

4. $y = 6$

5. If $g(x) = -2x - 2$, find $g(-2x)$.

6. **Standardized Test Practice** If $f(x) = \frac{1}{2}x + 6$, what is $f(50)$?

Determine whether each relation is a function.

1. 

yes

2.

x	y
16	−8
12	−6
0	0
−4	2
−10	5

yes

3. {(7, 0), (0, 7) (−7, 0), (0, −7)} no

4. $y = 6$ yes

5. If $g(x) = -2x - 2$, find $g(-2x)$.
$g(-2x) = 4x - 2$

6. **Standardized Test Practice** If $f(x) = \frac{1}{2}x + 6$, what is $f(50)$? 31

Determine whether each sequence is an arithmetic sequence. If it is, state the common difference.

1. $-21, -17, -12, -6, 1, \ldots$
2. $1.1, 2.2, 3.3, 4.4, \ldots$
3. Find the next three terms of the arithmetic sequence $3.5, 2, 0.5, -1.0, \ldots$
4. Find the nth term of the sequence described by $a_1 = -2, d = 4, n = 7$.
5. Write an equation for the nth term of the sequence $19, 17, 15, 13, \ldots$
6. **Standardized Test Practice** A sequence is formed by writing the perimeter of squares. The side of the first square measures 1 unit. If the measure of the side of the square is increased by 1 unit for each new term in the sequence, what is the common difference between terms?

A 16 B 4 C 2 D 1

Determine whether each sequence is an arithmetic sequence. If it is, state the common difference.

1. $-21, -17, -12, -6, 1, \ldots$ no
2. $1.1, 2.2, 3.3, 4.4, \ldots$ yes; 1.1
3. Find the next three terms of the arithmetic sequence $3.5, 2, 0.5, -1.0, \ldots$ $-2.5, -4.0, -5.5$
4. Find the nth term of the sequence described by $a_1 = -2, d = 4, n = 7$. 22
5. Write an equation for the nth term of the sequence $19, 17, 15, 13, \ldots$ $a_n = -2n + 21$
6. **Standardized Test Practice** A sequence is formed by writing the perimeter of squares. The side of the first square measures 1 unit. If the measure of the side of the square is increased by 1 unit for each new term in the sequence, what is the common difference between terms?

A 16 B 4 C 2 D 1

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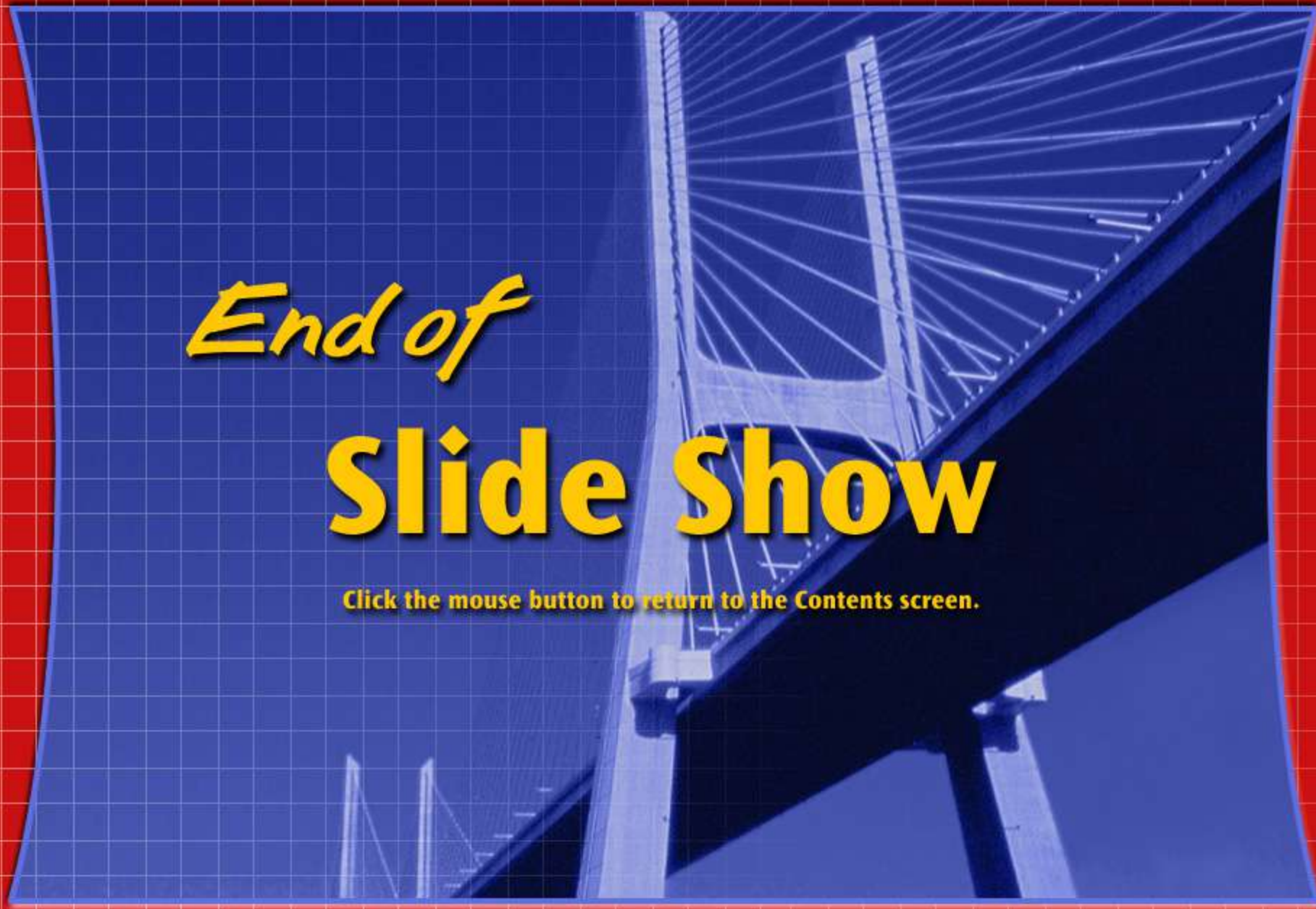
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