



# New York State Testing Program

# Grade 8

## March 13–17, 2006 Mathematics Book 1

47953



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35 Minutes

### TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Be sure to read carefully all the directions in the test book.
- You may use your tools to help you solve any problem on the test.
- Read each question carefully and think about the answer before choosing your response.



This picture means that you will use your ruler.



This picture means that you will use your protractor.

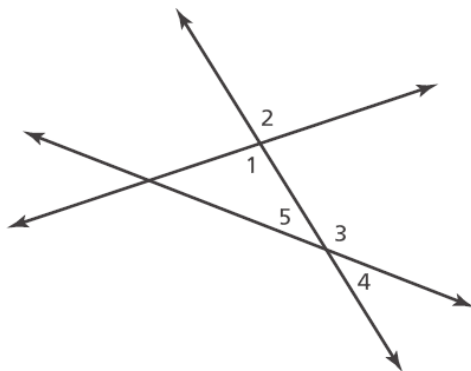
**Sample A** What is the greatest common factor of 12, 18, and 24? **A 2 B 3 C 6 D 12**

**Sample B** Simplify the expression below.  
 $7x + 4 - 3x + 3$  **F  $10x + 1$  G  $10x + 7$  H  $4x + 1$  J  $4x + 7$**

# STOP

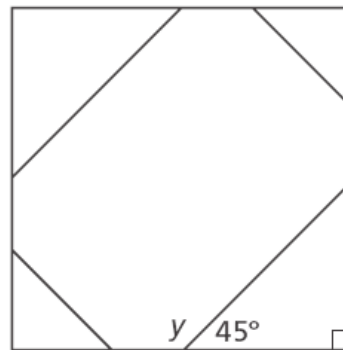
**1** What is the greatest common factor of  $48x^2$  and  $72x^3$ ? **A  $12x^2$  B  $12x^3$  C  $24x^2$  D  $24x^3$**

**2** In the diagram below, which angle is congruent to  $\angle 5$ ?



- F**  $\angle 1$   
**G**  $\angle 2$   
**H**  $\angle 3$   
**J**  $\angle 4$

**3** Luther makes a table in his shop class. A diagram of the top of the table is shown below.



What is the measure of  $\angle y$ ?

- A**  $45^\circ$   
**B**  $55^\circ$   
**C**  $135^\circ$   
**D**  $145^\circ$

**4** A pair of sandals is on sale for 20% off the original price. If the original price is \$16.00, what is the sale price? **F \$3.20 G \$12.00 H \$12.80 J \$19.20**

**5** Multiply the expression below. **A  $-3x^2 - 4$  C  $-3x^2 - 12x$**   
 $-3x(x - 4)$  **B  $-3x^2 - 7$  D  $-3x^2 + 12x$**

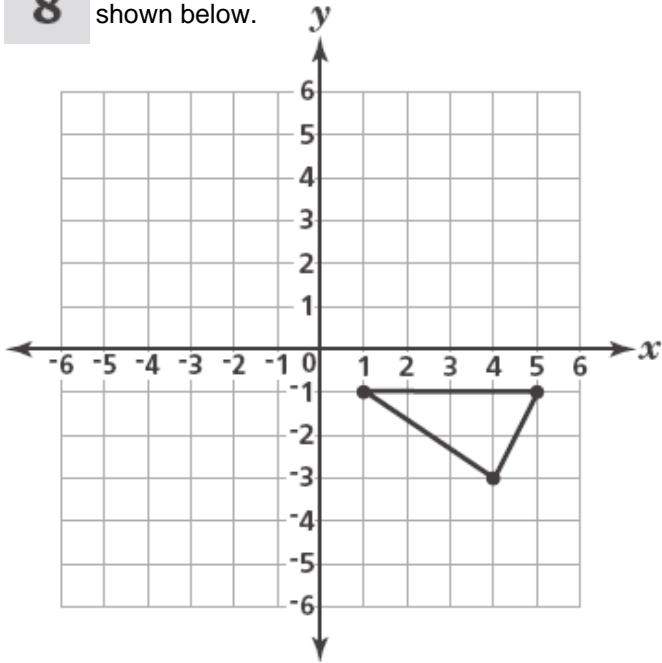
**6** Simplify the expression below. **F 12 G  $12x$  H  $12x^2$  J  $12(x + x)$**   
 $3x + 9x$

**7** Simplify the expression to the right. **A  $\frac{24x^2y}{6xy^3}$  B  $18x^3y^4$  C  $4xy^2$  D  $\frac{4x}{y^2}$**  **E  $\frac{18x^2}{y^2}$**

**Go On**

8

Gary drew a triangle on the coordinate grid shown below.



If Gary reflects the triangle in the  $y$ -axis, what will be the new coordinates of the vertices of the triangle?

- F  $(-1, -1), (4, -3), (-5, 1)$     G  $(-1, -1), (-4, -3), (-5, -1)$   
 H  $(-1, 1), (-4, 3), (5, -1)$     J  $(1, 1), (4, 3), (5, 1)$

13

Jordan has \$608 in his savings account. He withdraws 15% of the money to pay for school clothes. Which is the **best** estimate for the amount of money Jordan withdraws?

- A \$40    B \$90    C \$400    D \$510

15

The cost of one burrito,  $b$ , and one taco,  $a$ , is less than the cost of two burritos. Which inequality represents this relationship?

- A  $b + a < 2b$     B  $b + a < b^2$   
 C  $2b < b + a$     D  $b^2 < b + a$

16

Mr. Patel filled a swimming pool with water. When he started, the pool already contained 1,500 gallons of water. The table below shows the number of gallons of water in the pool after filling it for  $h$  hours.

FILLING THE POOL	
Gal. of Water in pool (g)	# of hrs. (h)
1,500	0
2,100	1
2,700	2
3,300	3
3,900	4

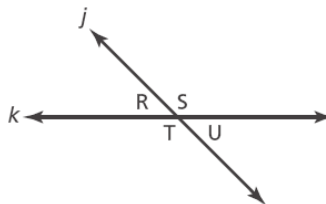
Which equation can be used to determine the number of gallons,  $g$ , of water in the pool after  $h$  hours?

- F  $g = 600h$   
 G  $g = 1,500h$   
 H  $g = 1,500 + 600h$   
 J  $g = 1,500h + 600$

17

Line  $j$  and line  $k$  intersect, as shown below. Which pairs of angles are congruent?

- A  $\angle S$  and  $\angle R$ ;  $\angle T$  and  $\angle U$   
 B  $\angle R$  and  $\angle T$ ;  $\angle U$  and  $\angle S$   
 C  $\angle T$  and  $\angle S$ ;  $\angle U$  and  $\angle R$   
 D  $\angle U$  and  $\angle T$ ;  $\angle T$  and  $\angle S$



9

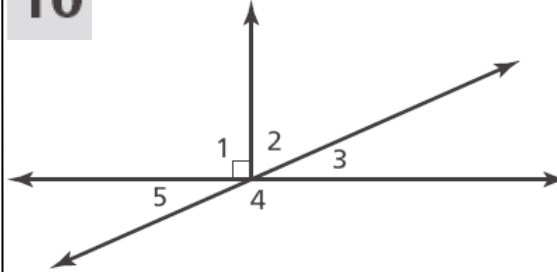
Simplify the expression below.

$$(3x^2 - 2x - 1) + (-2x^2 + 4)$$

- A  $x^2 + 3$     C  $x^2 - 2x + 3$   
 B  $5x^2 + 3$     D  $5x^2 - 2x + 3$

10

In the diagram below, which angles are complementary?



- F  $\angle 3$  and  $\angle 1$   
 G  $\angle 3$  and  $\angle 2$   
 H  $\angle 3$  and  $\angle 4$   
 J  $\angle 3$  and  $\angle 5$

11

Renee must solve the equation  $4x + 12 = 6x$ . If she subtracts  $4x$  from the left side of the equation, what should Renee write on the right side of the equation?

- A 2    B  $2x$     C 10    D  $10x$

12

Mark's cats eat 72 ounces of food in one week. How many pounds of food do Mark's cats eat in one week?

$$1 \text{ pound} = 16 \text{ ounces}$$

- F  $\frac{1}{4}$     G  $3\frac{1}{2}$     H  $4\frac{1}{2}$     J  $7\frac{1}{4}$

14



Use your ruler to help you solve this problem.

Roberta and her family drove from Tucson to the Grand Canyon. The scale map below shows the route they took and distance they drove.

**About** how many miles did Roberta and her family drive from Tucson to Phoenix?

- F 75    G 100  
 H 125    J 150

SCALE
1 inch = 100 miles



- 18** Omar wants to solve the equation  $3x - 2 = 10$ . Which steps could Omar follow to find the solution?  
**F** Add 2 to both sides. Then divide both sides by 3. **G** Divide both sides by 3. Then add 2 to both sides.  
**H** Subtract 2 from both sides. Then divide both sides by 3. **J** Multiply both sides by 3. Then subtract 2 from both sides.

- 19** Janine's dog weighs three pounds less than twice the weight of Wanda's dog,  $d$ . Which expression represents the weight of Janine's dog?  
**A**  $2 + d - 3$  **B**  $3 + d - 2$  **C**  $2d - 3$  **D**  $3 - 2d$

- 22** The sum of a number and its square is less than or equal to negative three.

- Which inequality represents this relationship?  
**F**  $n(n^2) < -3$  **H**  $n + n^2 < -3$   
**G**  $n(n^2) \leq -3$  **J**  $n + n^2 \leq -3$

- 23** The table below shows a relationship between  $x$  and  $y$ .

$x$	2	5	6	9
$y$	6	9	10	13

Which equation shows the relationship between  $x$  and  $y$ ?

- A**  $y = 3x$  **B**  $x = 3y$  **C**  $y = x + 4$  **D**  $x = y + 4$

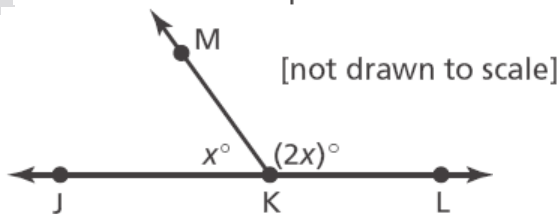
- 24** Katie converts the outside temperature from degrees Fahrenheit,  $F$ , to degrees Celsius,  $C$ . She uses the formula below to convert the temperature.

$$(F - 32)\frac{5}{9} = C$$

If the outside temperature is 50 degrees Fahrenheit, what is the outside temperature in degrees Celsius?

- F** 2 **G** 5 **H** 9 **J** 10

- 25** In the diagram below,  $\overleftrightarrow{JK}$  intersects  $\overleftrightarrow{KM}$  at point  $K$ .



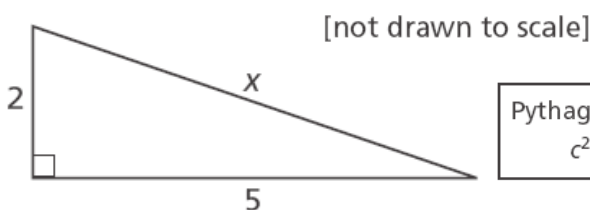
What is the measure of  $\angle JKM$ ?

- A**  $30^\circ$  **B**  $60^\circ$  **C**  $120^\circ$  **D**  $180^\circ$

- 26** Carol wants to earn at least \$150.00 for her charity while running a race. She will earn \$20.00 for participating plus \$7.00 for each mile she runs. If  $m$  represents the number of miles she runs, which inequality represents the money Carol wants to earn?

- F**  $7m + 20 \leq 150$  **G**  $7m + 20 \geq 150$  **H**  $20m + 7 \leq 150$  **J**  $20m + 7 \geq 150$

- 27** What is the length of side  $x$  in the triangle below?



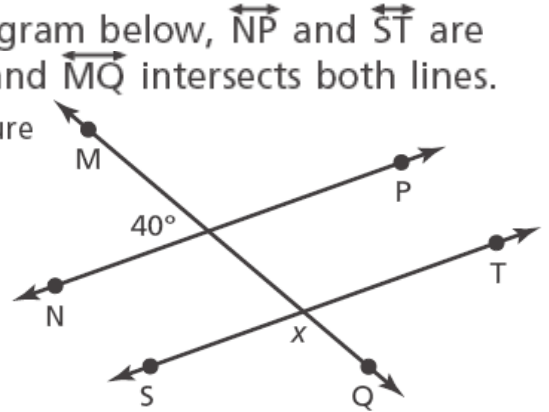
Pythagorean theorem:  
 $c^2 = a^2 + b^2$

- A** 7 **C** 29  
**B**  $\sqrt{7}$  **D**  $\sqrt{29}$

- 20** In the diagram below,  $\overleftrightarrow{NP}$  and  $\overleftrightarrow{ST}$  are parallel, and  $\overleftrightarrow{MQ}$  intersects both lines.

What is the measure of  $\angle x$ ?

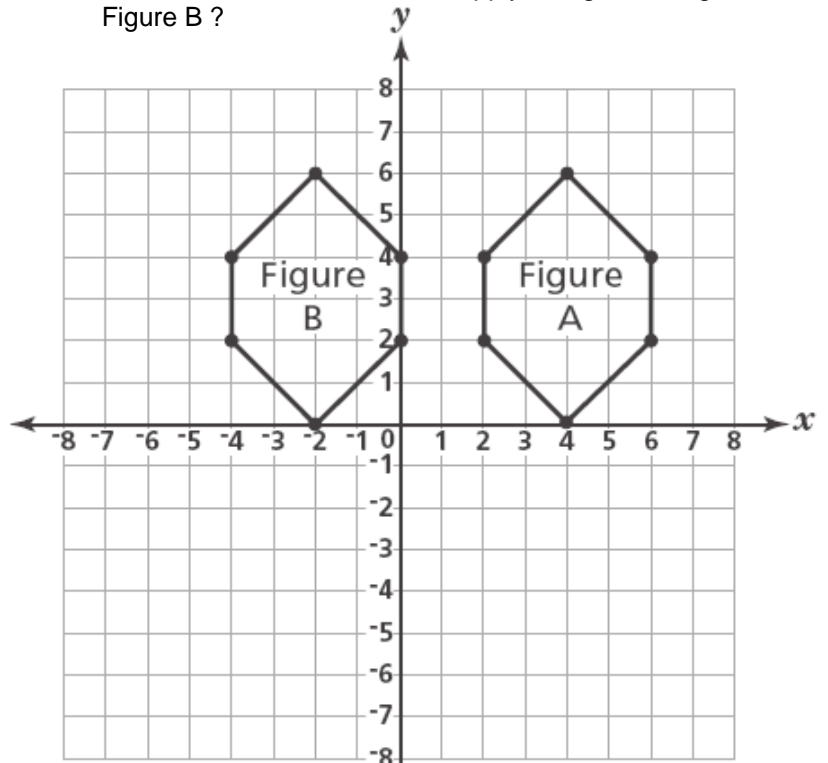
- F**  $40^\circ$   
**G**  $90^\circ$   
**H**  $140^\circ$   
**J**  $180^\circ$



[not drawn to scale]

- 21** Ana drew two figures on the coordinate grid shown below.

Which transformation did Ana apply to Figure A to get Figure B?




- A** rotated  $90^\circ$  **B** dilated by 6  
**C** reflected in the  $y$ -axis **D** translated 6 units to the left

**STOP**

35 Minutes

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- Be sure to read carefully all the directions in the test book.
  - You may use your tools to help you solve any problem on the test.
  - Read each question carefully and think about the answer before writing your response.
  - Be sure to show your work when asked. You may receive partial credit if you have shown your work.
  - Use your calculator to help you solve the problems on this part of the test.




This picture means that you will use your ruler.

This picture means that you will use your protractor.

## Mathematics Reference Sheet

### FORMULAS

Pythagorean Theorem



$$c^2 = a^2 + b^2$$

Simple Interest

$$I = prt$$

Distance Formula

$$d = rt$$

### CONVERSIONS

Temperature Conversions

$$F = \frac{9}{5}C + 32$$

$$C = \frac{5}{9}(F - 32)$$

Measurement Conversions

$$1 \text{ mile} = 5,280 \text{ feet}$$

$$1 \text{ yard} = 3 \text{ feet}$$

**28** Tai went to a shopping mall. He spent \$25.75 on a shirt, \$15.49 on a hat, and \$9.95 on a poster, before tax. Tax was 8.25% on all purchases. What was the total cost of Tai's purchases, including tax?

Show your work. Answer \$ \_\_\_\_\_

**29** In the diagram below, lines  $n$  and  $m$  are parallel. **Part A** What is the measure, in degrees, of  $\angle 1$ ?

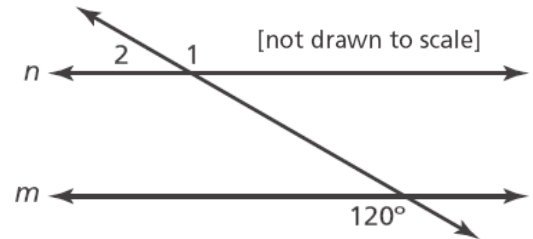
Answer \_\_\_\_\_ degrees

On the lines below, explain how you determined the measure of  $\angle 1$ . (5 lines)

**Part B** What is the measure, in degrees, of  $\angle 2$ ?

Answer \_\_\_\_\_ degrees

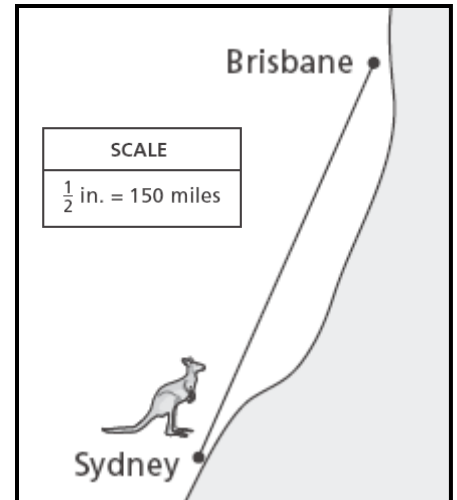
On the lines below, explain how you determined the measure of  $\angle 2$ . (5 lines)



**30** Use your ruler to help you solve this problem.

A kangaroo named Skippy travels from Sydney to Brisbane. Based on the scale drawing (map) to the right, what is the distance, in miles, Skippy travels?

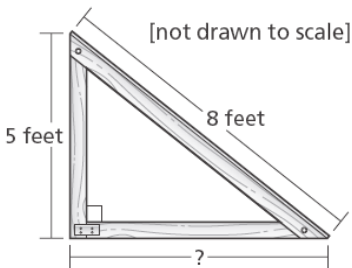
Show your work. Answer \_\_\_\_\_ miles



**31** Solve for  $x$  in the equation to the right.  $2(3x - 4) - 7 = 3x + 1 + x$   
Show your work. Answer \_\_\_\_\_

On the lines below, explain how to use the distributive property to help you solve this equation. (5 lines)

**32** Tyrone is building a skateboard ramp with a piece of plywood that is 8 feet long. He wants the height of the ramp to be 5 feet.



To make a strong ramp, the base must form a right angle with the back of the ramp. What will be the length of the base rounded to the nearest tenth of a foot?

Show your work. Answer \_\_\_\_\_ feet

**33** Complete the function table below with the missing values for  $y$ . Based on the function table, write a function rule that shows the relationship between  $x$  and  $y$ .

Answer \_\_\_\_\_

$x$	$y$
1	3
2	7
3	11
4	15
5	
6	

# STOP

70 Minutes

**34** The table below shows the prices of three different-sized packages containing the same type of candy.

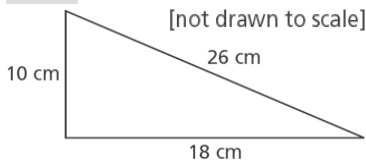
Package	Weight (in ounces)	Package Price	Candy Price (per ounce)
A	8	\$1.60	
B	10	\$1.80	
C	12	\$2.04	

Complete the table to determine which package has the lowest candy price, per ounce.

Show your work.

Answer \_\_\_\_\_

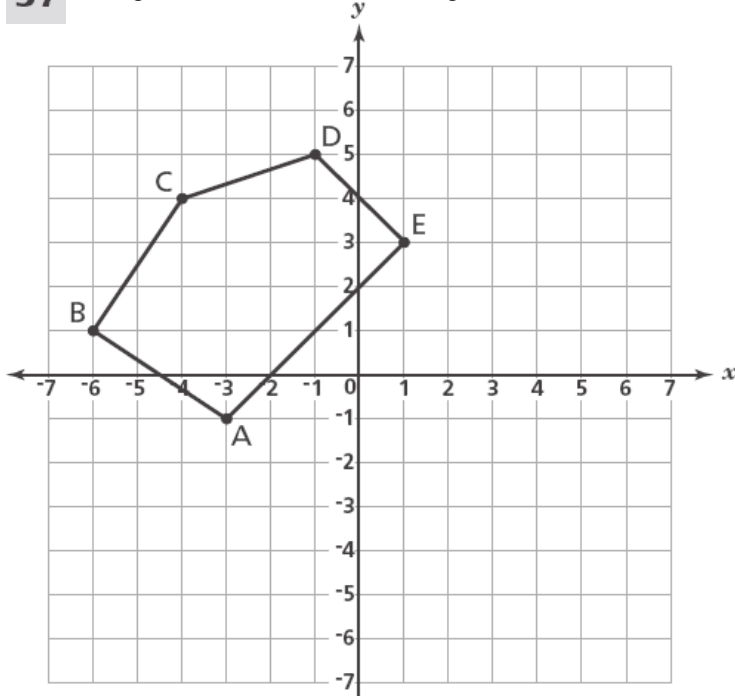
**35** Pat drew the triangle below.



Is Pat's triangle a right triangle? Use the Pythagorean theorem to prove whether his triangle is a right triangle.

On the lines below, explain why your answer is correct. (5 lines)

**37** Pentagon ABCDE is drawn on the grid below.



On the grid, draw a translation of pentagon ABCDE five units down.

Be sure to

- draw the translated shape
- label the translated pentagon A'B'C'D'E'

What are the coordinates for point A'? **Answer** (\_\_\_\_, \_\_\_\_)

**42** Carlotta conducted an experiment on the growth rate of bacteria. The table below shows her results.

Number of Hours ( $h$ )	Number of Bacteria ( $b$ )
0	20
1	56
2	92
3	128

Write a function rule for the number of bacteria,  $b$ , after  $h$  hours.

**Answer** \_\_\_\_\_

What will the number of bacteria be after 5 hours?

**Show your work.** **Answer** \_\_\_\_\_ bacteria

**44** Heather saw the sign below advertising a sale at The Dress Place.

**The Dress Place**

All items 10% to 50% off

She has been saving money to buy a dress that regularly costs \$80.00. Heather's friend Sarah tells her she needs to have between \$40.00 and \$60.00 to buy the dress at the sale price.

On the lines below, explain if Sarah's estimate is correct. (5 lines)

**45** Chelsea needs 16 ounces of milk for a recipe. She only has a 1/4-cup measuring cup.

How many times does she need to fill the 1/4-cup measuring cup to measure the 16 ounces of milk?

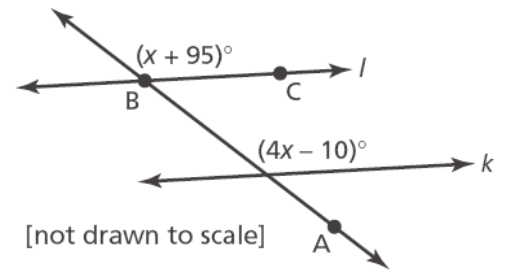
**Show your work.**

**1 cup = 8 fluid ounces** **Answer** \_\_\_\_\_ times

**STOP**

**36**

In the diagram to the right, lines  $l$  and  $k$  are parallel.



**Part A** What is the value of  $x$ ?

**Show your work.** **Answer** \_\_\_\_\_

**Part B** What is the measure, in degrees, of  $\angle ABC$ ?

**Answer** \_\_\_\_\_ degrees

**38** Solve for  $y$  in the equation below.

**Show your work.**  $-2y + 11 = -6y + 35$

**Answer** \_\_\_\_\_

**39** Ben wants to buy a guitar. The regular price of the guitar is \$329.99. The sale price of the guitar is 25% off of the regular price.

**Part A** What is the sale price of the guitar?

**Show your work.** **Answer** \$ \_\_\_\_\_

**Part B** Ben must pay 7.25% sales tax in addition to the sale price of the guitar. What is the total amount Ben must pay for the guitar?

**Show your work.** **Answer** \$ \_\_\_\_\_

**40** Jenny's Gift Shop sells candles in a variety of packages. The cost per candle is the same in every package. A package of 8 candles costs \$12.96. Write a proportion that can be used to determine the cost of a package of 3 candles.

**Proportion** \_\_\_\_\_

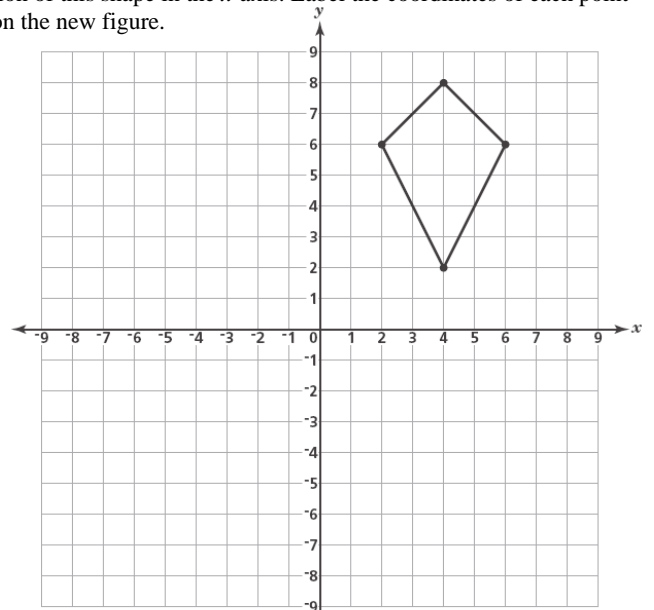
Solve your proportion to determine the cost of a package of 3 candles.

**Show your work.** **Answer** \$ \_\_\_\_\_

**41** Solve for  $x$  in the equation below. **Show your work.**

$8(2x - 3) = -16$  **Answer** \_\_\_\_\_

**43** Melissa drew the shape on the grid shown below. Draw the reflection of this shape in the  $x$ -axis. Label the coordinates of each point on the new figure.



On the lines below, explain how you determined the reflection of the shape. (5 lines)