New York State Testing Program

Mathematics Test
Book 1

Grade **8**

May 5–7, 2010

21656

1 Simplify the expression below.

$$12ab + 8ab + 5ab$$

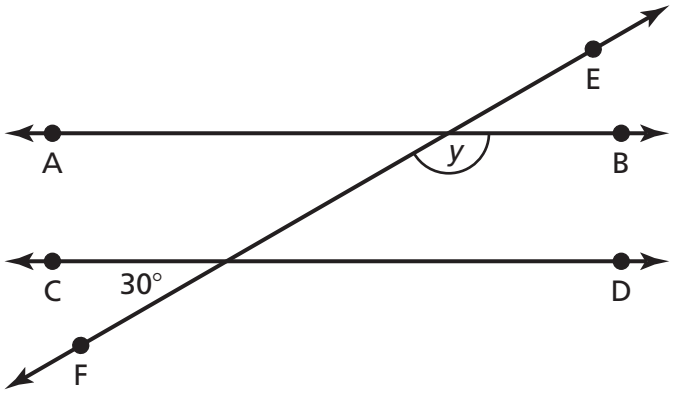
A $3ab$

B $25ab$

C $25(3ab)$

D $25 + ab$

2 In the diagram below, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, and $\overleftrightarrow{EF}$ intersects both lines.



[not drawn to scale]

What is the measure of $\angle y$?

A 30°

B 60°

C 120°

D 150°

Go On

3 Which situation is **best** represented by the expression $2c - 5$?

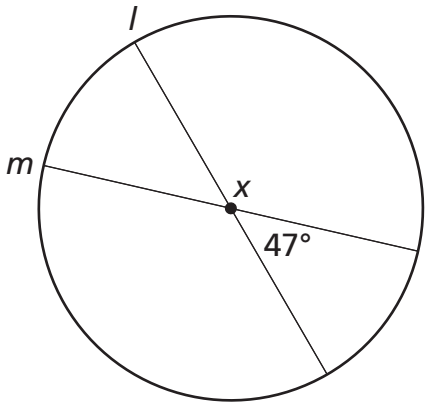
A Alicia walked 2 miles fewer than 5 times the number of miles, *c*, Courtney walked.

B Alicia walked 5 miles fewer than 2 times the number of miles, *c*, Courtney walked.

C Alicia walked 2 more than 5 times the number of miles, *c*, Courtney walked.

D Alicia walked 5 more than 2 times the number of miles, *c*, Courtney walked.

4 In the diagram below, line segment *l* and line segment *m* intersect at the center of the circle. What is the measure of $\angle x$?



[not drawn to scale]

A 120°

B 133°

C 137°

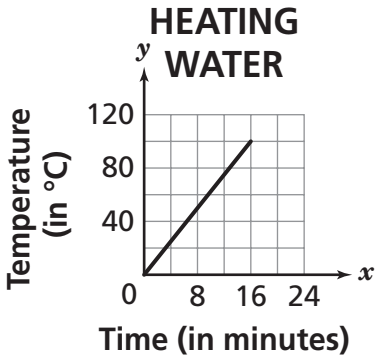
D 143°

■ SECURE MATERIAL ■
Do not reproduce. Do not discuss contents until end of designated makeup schedule.

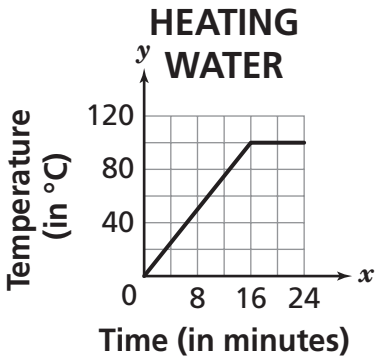
5 In Mr. Jenkin's science class, the students heated a beaker of water on a burner. When the experiment began, the temperature of the water was 20°C. After 8 minutes, the temperature was 60°C. Sixteen minutes after the start of the experiment, the temperature was 100°C and remained at 100°C for the next 8 minutes.

Which graph shows the change in temperature of the water in the beaker, *y,* over time in minutes, *x*?

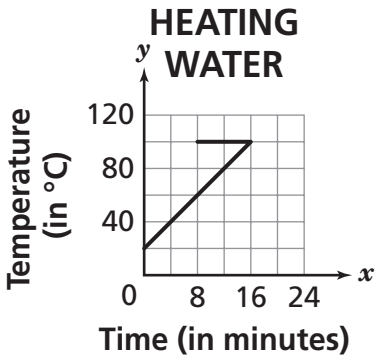
A



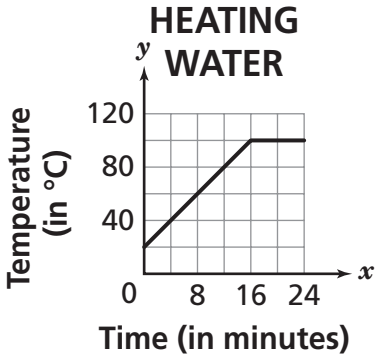
C



B

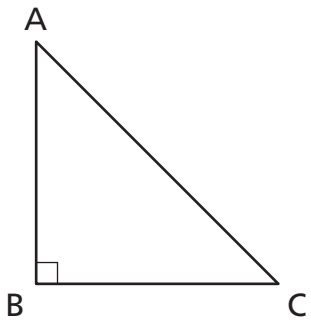


D



Go On

6 Which term **best** describes $\overline{AC}$ in the right triangle shown below?



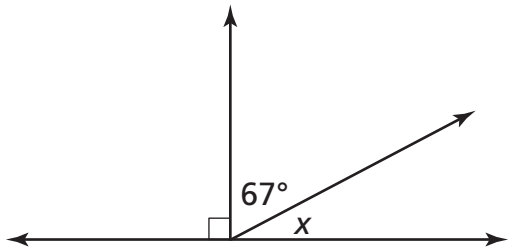
A leg

B base

C altitude

D hypotenuse

7 What is the measure of $\angle x$ in the diagram shown below?



[not drawn to scale]

A 23°

B 33°

C 113°

D 157°

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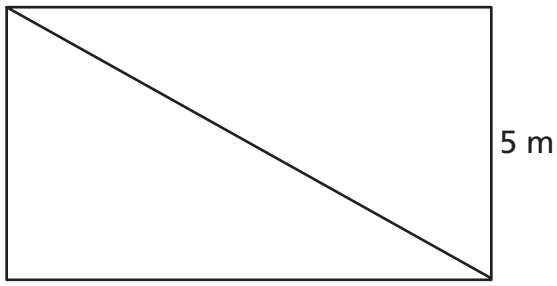
8 Mr. Sanders used a diagonal board to divide a rectangular garden into two equal sections as shown in the diagram below.



[not drawn to scale]

What is the length of the diagonal?

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

A 12 meters

B 13 meters

C 14 meters

D 15 meters

9 Solve the equation below for x.

$$9(x - 5) = 4x - 5$$

A 8

B 10

C –8

D –10

Go On

10 If $P = a^2 + a - 1$ and $R = -a - 1$, which expression represents $P + R$?

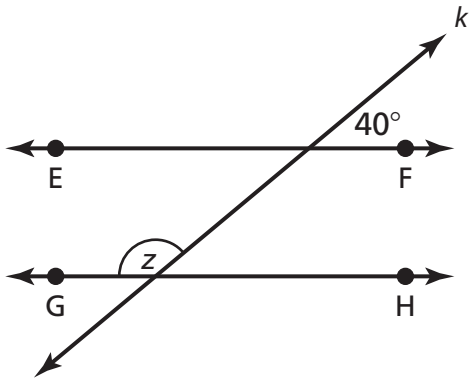
A $a^2 + 2$

B $a^2 - 2$

C $a^2 + 2a$

D $a^2 + 2a - 2$

11 In the diagram below, $\overleftrightarrow{EF} \parallel \overleftrightarrow{GH}$, and line k intersects both lines.



[not drawn to scale]

What is the measure of $\angle z$?

A 40°

B 50°

C 130°

D 140°

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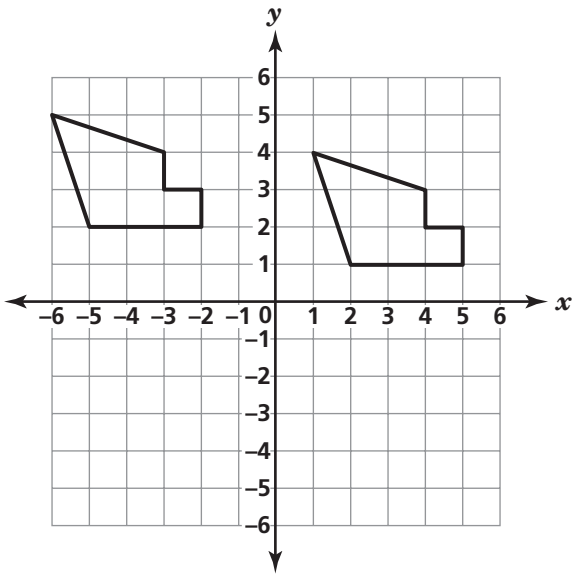
12 Which term **best** describes the transformation shown below?



A dilation

B rotation

C reflection

D translation

13 Jerome surveyed 643 skateboarders and found that 209 of them preferred wood skateboards to plastic or aluminum skateboards. Based on the number of people surveyed, what is the **most reasonable estimation** of the percent of skateboarders who preferred wood skateboards?

A 10%

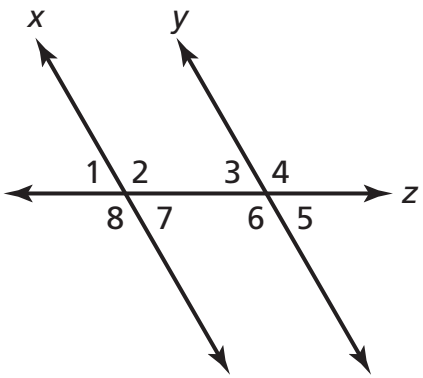
B 30%

C 40%

D 50%

Go On

14 In the diagram below, line *x* is parallel to line *y,* and line *z* is a transversal.



[not drawn to scale]

Which angles are alternate interior angles?

A $\angle 1$ and $\angle 7$

B $\angle 3$ and $\angle 7$

C $\angle 2$ and $\angle 3$

D $\angle 4$ and $\angle 8$

15 Kevin reflects square ABCD on a coordinate plane over the *y*-axis to create image A'B'C'D'. Which property changed when he created image A'B'C'D'?

A the measure of $\angle ABC$

B the area of square ABCD

C the position of figure ABCD

D the perimeter of square ABCD

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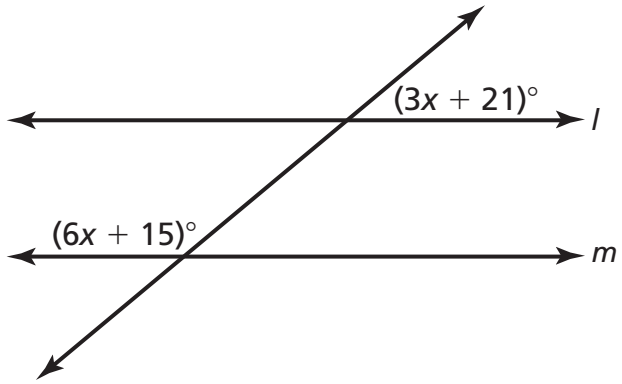
16 In the diagram below, line *l* and line *m* are parallel.



[not drawn to scale]

Which equation could be used to solve for x?

A $6x + 3x = 15 + 21$

B $6x + 15 = 3x + 21$

C $6x + 15 + 3x + 21 = 90$

D $6x + 15 + 3x + 21 = 180$

17 Simplify the expression below.

$$(x^2y^3)(x^4y^2)$$

A x^6y^5

B x^8y^6

C $2x^8y^6$

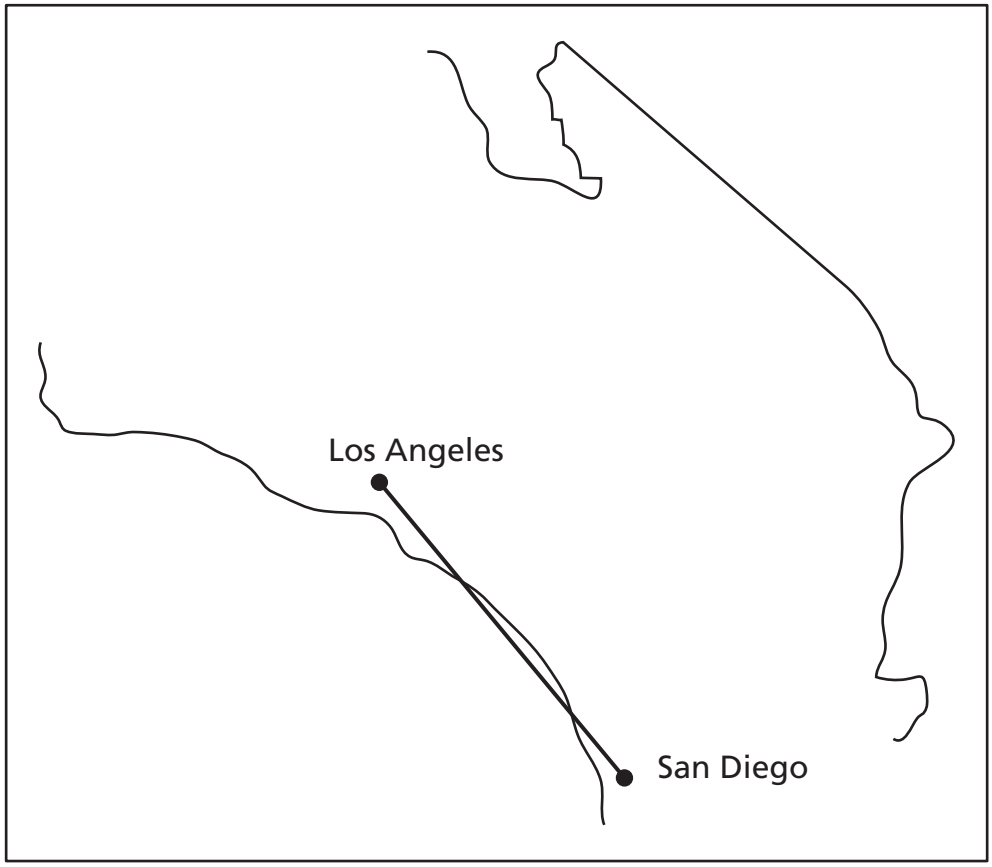
D $2x^6y^5$

Go On

18 Use your ruler to help you solve this problem.

Sonia draws a line between Los Angeles and San Diego on the map below to find the shortest distance between the two cities.

SCALE
1 inch = 50 miles



Based on the scale, what is the distance, in miles, between the two cities?

A 25

B 50

C 100

D 150

■ SECURE MATERIAL ■
Do not reproduce. Do not discuss contents until end of designated makeup schedule.

19 Which expression is a trinomial?

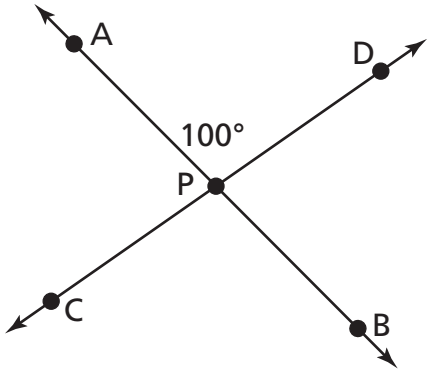
A $4x^3$

B $7x + 12$

C $3x^3 + 3x^2$

D $5x^3 + 3x^2 - 11$

20 In the diagram below, $\overleftrightarrow{AB}$ intersects $\overleftrightarrow{DC}$ at point P.



[not drawn to scale]

What is the measure of $\angle CPB$ in the figure?

A 80°

B 90°

C 100°

D 105°

21 Which is the name of the expression shown below?

$$2x^2y - 5x + 3$$

A term

B equation

C coefficient

D polynomial

22 What is the greatest common factor (GCF) of $12x$ and $(3x^2 + 6x)$?

A 3

B $3x$

C $x + 2$

D $3x(x + 2)$

23 The distance between two cities on a map is 2 inches. The map was drawn using the scale shown below.

1 inch = 344 miles

What is the actual distance, in miles, between the two cities?

A 86

B 344

C 688

D 1,032

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24 Tony joined a book club. He received 8 free books when he joined. The table below shows the total number of books, n, he had each month, t, since joining the club.

TONY'S BOOKS

Month (t)	Total Number of Books (n)
0	8
1	11
2	14
3	17
4	20

Which equation can be used to find the total number of books, n, Tony will have from the book club after t months?

A $n = 8t$

B $n = 3t$

C $n = 8t + 3$

D $n = 3t + 8$

25 Which inequality represents the statement below?

One more than 2 times n is greater than 21.

A $2n > 21$

B $n + 3 > 21$

C $2n + 21 > 1$

D $2n + 1 > 21$

Go On

26 Simplify the expression below.

$$\frac{4x^3 + 8x^2 - 10x}{2x}$$

A $2x^2 + 4x - 5$

B $2x^2 + 4x - 10$

C $8x^3 + 4x^2 - 5$

D $8x^4 + 16x^3 - 10x^2$

27 Sarah went on a one-day bus tour from Las Vegas to the Grand Canyon. The cost of the bus ticket was $80. She also paid 15% of the cost of the ticket as a tip to the bus driver. What was the amount of the tip that Sarah paid the bus driver?

A $5

B $12

C $15

D $19

STOP

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28 Rowan raised $640 in a charity walk last year. This year he raised 15% **more** than he raised last year. How much money did Rowan raise this year?

Show your work.

Answer $ _____

Go On

29 Complete the table below with the missing values for *y*.

x	*y*
–1	1
0	4
1	7
2	10
3	
4	

Based on the data in the table, write the equation that represents the relationship between *x* and *y*.

Answer $y =$ _____

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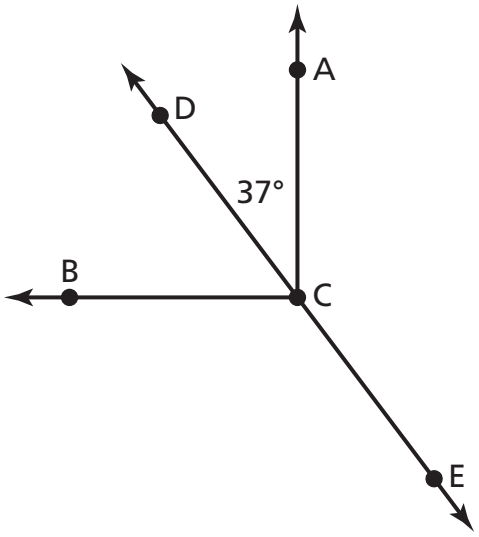
30 In the diagram below, right angle ACB is intersected by $\overleftrightarrow{DE}$.



[not drawn to scale]

What are the measures of ∠DCB and ∠ACE?

Show your work.

Answer ∠DCB = _____ degrees

∠ACE = _____ degrees

Go On

31 Bob has a container with a capacity of 12 quarts. He wants to express this capacity in gallons. Write a proportion to find the number of gallons of water Bob's container can hold.

4 quarts = 1 gallon

Proportion _____

Solve the proportion.

Show your work.

Answer _____ gallons

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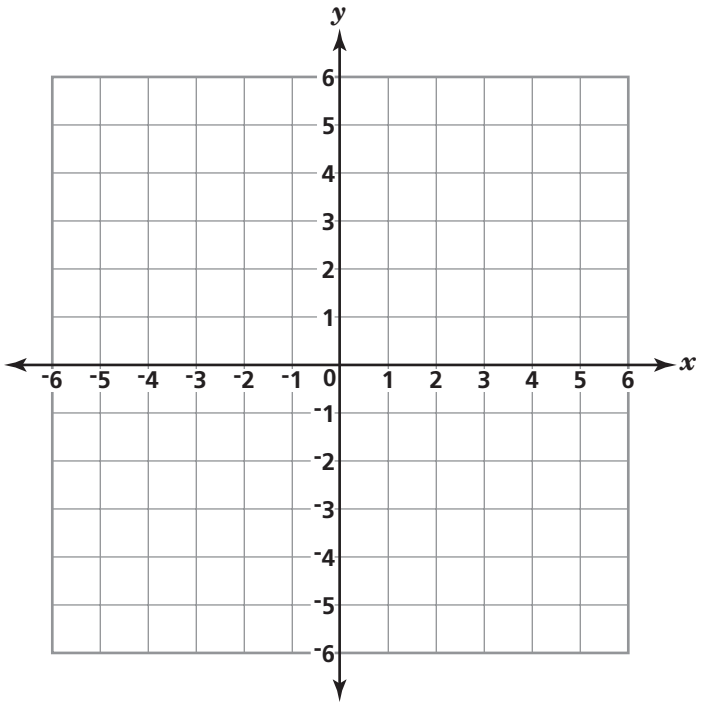
32 Erika is assigned to graph the line of the equation $y = 2x - 3$.

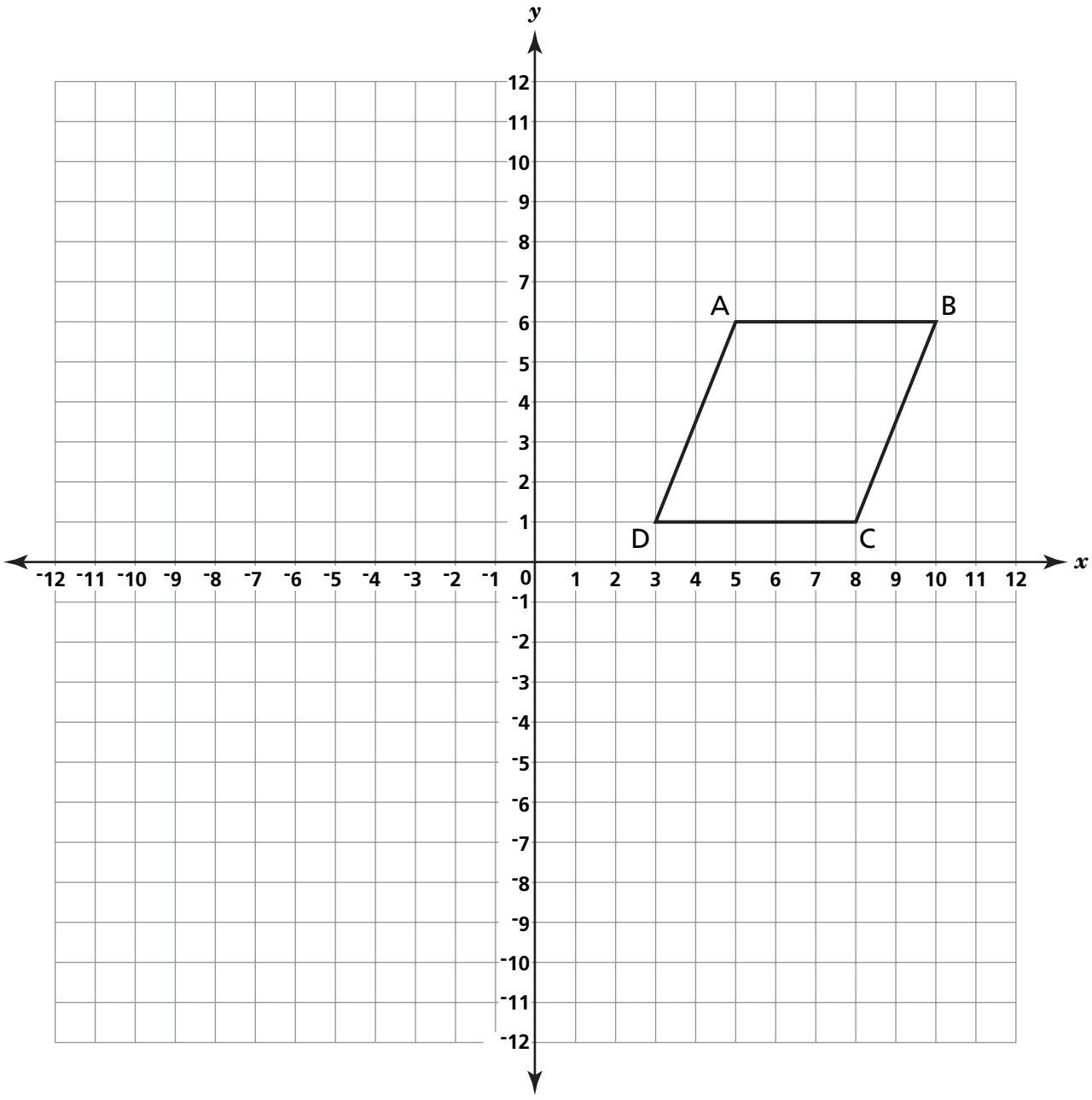
Use Erika's equation to complete the table below for the given values of x.

x	y
−1	
1	
3	

Using the information from the table, graph the line of the equation $y = 2x - 3$ on the coordinate plane below. Be sure to plot all points from the table and draw a line connecting the points.



33 On the coordinate plane below, draw the image of quadrilateral ABCD reflected over the *x*-axis. Label the image A′B′C′D′.



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On the lines below, explain how you determined the location of A′.

STOP

34 Solve the equation below for x.

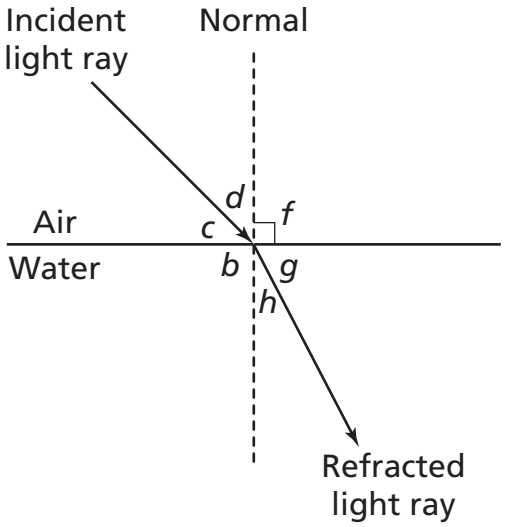
$$20x + 5x - 20 = 21x + 4$$

Show your work.

Answer $x =$ _____

Go On

35 John reviewed the diagram below to study the angle of refraction of light as it passes through the air into the water.



[not drawn to scale]

What angles are complementary?

Answer ∠ _____ and ∠ _____

∠ _____ and ∠ _____

■ SECURE MATERIAL ■
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36 Simplify the expression below, using the laws of exponents.

$$(5^4 \times 5^7) \div 5^8$$

Show your work.

Answer _____

37 What is the sum of $(x^2 - 3x + 2)$ and $(5x^2 - 3x - 8)$?

Show your work.

Answer _____

Go On

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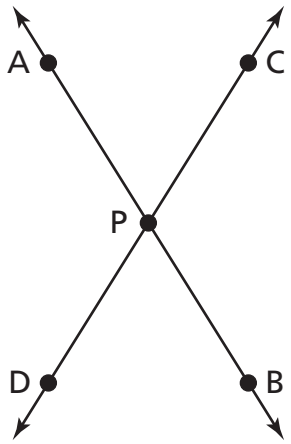
38 In the diagram below, line AB and line CD intersect at point P.



[not drawn to scale]

Name the angle that is always congruent to $\angle APC$.

Answer _____

On the lines below, explain why the two angles are congruent.

■ **SECURE MATERIAL** ■
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39 Ms. Lembright ordered the types of muffins below for a class party.

- 12 blueberry muffins for $7.20
- 8 chocolate muffins for $4.40
- 6 raisin muffins for $4.50

What type of muffin costs the **least**?

Show your work.

Answer _____ muffin

Go On

40 Michael drew a triangle with the sides measuring 12.5 centimeters, 30 centimeters, and 32.5 centimeters. Using the Pythagorean theorem, determine if Michael's triangle is a right triangle. On the lines below, explain how you determined your answer.

41 What is the product of $-8x^2y$ and $-2xy^3$? Use the law of exponents to find the product.

Show your work.

Answer _____

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42 Scott bought a watch for 48 U.S. dollars. What is the cost of the watch in Swiss francs? Use the conversion formula below.

1 U.S. dollar = 1.02 Swiss francs

Show your work.

Answer _____ Swiss francs

Scott would like to buy a battery for 10 U.S. dollars. He has 10.20 Swiss francs remaining after buying the watch. On the lines below, determine whether Scott has enough money to buy the battery. Explain how you determined your answer.

_____

_____

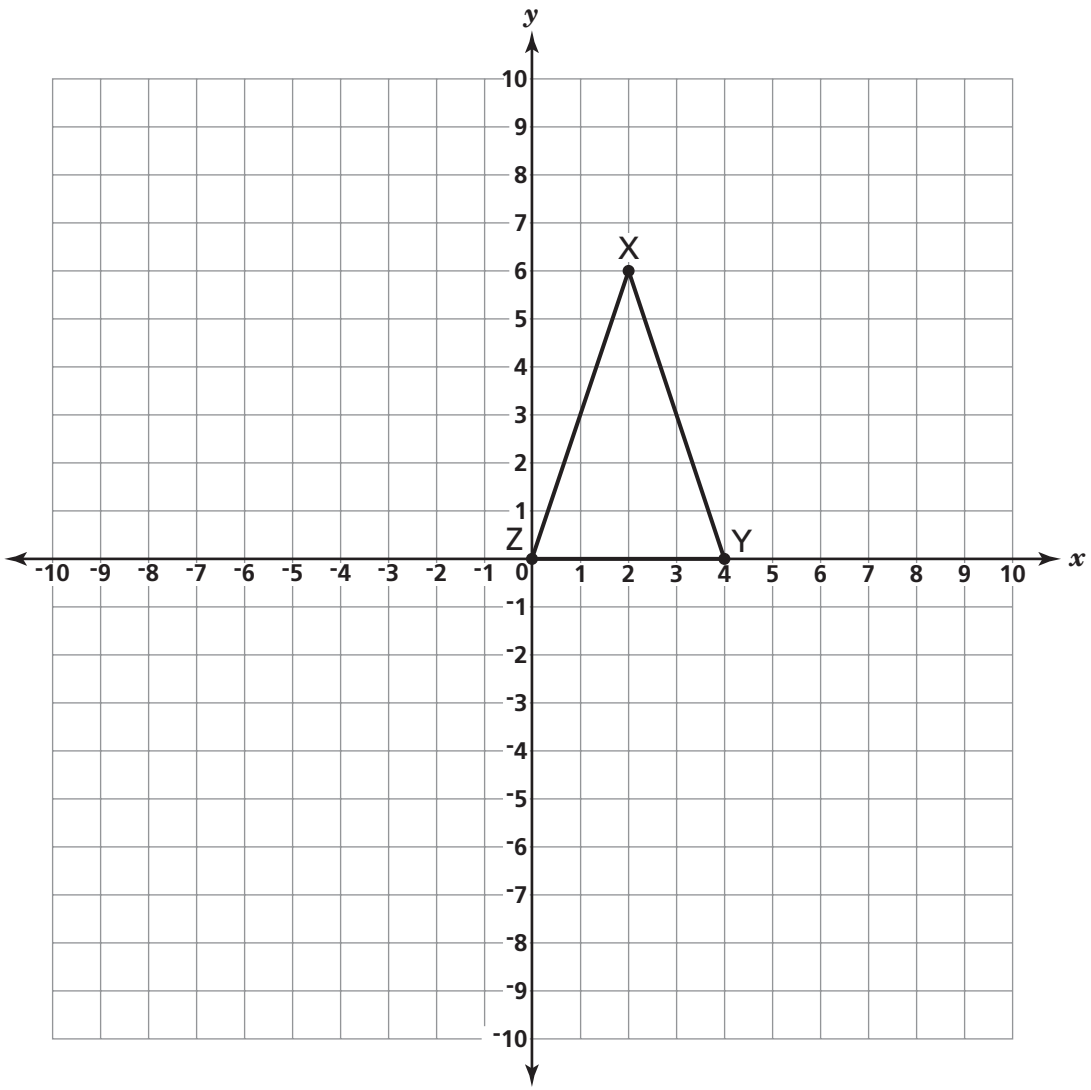
_____

_____

_____

Go On

43 Triangle XYZ is plotted on the grid below.



Part A

On the grid, draw the image of triangle XYZ after a clockwise rotation of 180° about the origin. Label the new triangle X′Y′Z′.

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Part B

On the lines below, explain how you determined the location of point Y′.

44 Ken used the function rule below to create a number pattern.

$$y = 2x + 2$$

Complete the table below using Ken's function rule.

x	y
–4	
–2	
0	
1	
3	

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Do not reproduce. Do not discuss contents
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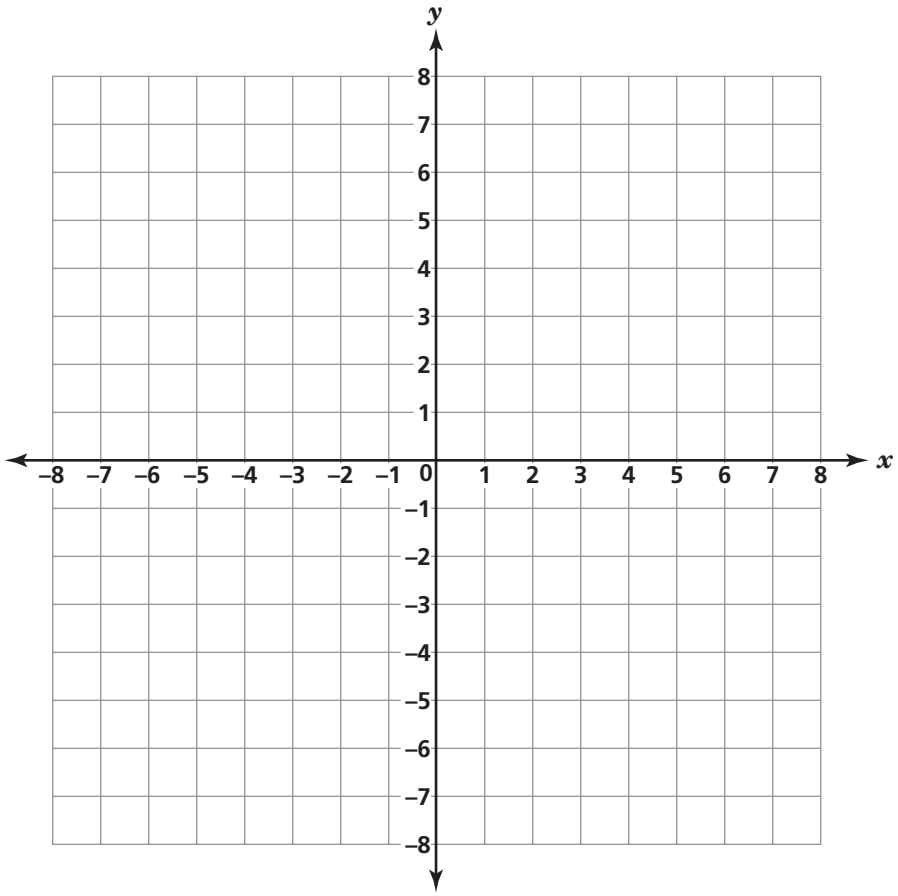
On the coordinate plane below, plot the values of x and y and connect the points with a line.



Go On

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45 **Estimate** 805 • 11 ÷ 22.

Estimation _____

Calculate the value of 805 • 11 ÷ 22.

Show your work.

Answer _____

On the lines below, explain why your estimation is reasonable.

_____

_____

_____

_____

_____

STOP

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2010 Mathematics Tests Standard and Performance Indicator Map with Answer Key
Grade 8

Question	Type	Points	Strand	Content Performance Indicator	Answer Key
Book 1					
1	Multiple Choice	1	Algebra	7.A02 Add and subtract monomials with exponents of one	B
2	Multiple Choice	1	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	D
3	Multiple Choice	1	Algebra	8.A02 Write verbal expressions that match given mathematical expressions	B
4	Multiple Choice	1	Geometry	8.G03 Calculate the missing angle in a supplementary or complementary pair	B
5	Multiple Choice	1	Algebra	8.A04 Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship	D
6	Multiple Choice	1	Geometry	7.G05 Identify the right angle, hypotenuse, and legs of a right triangle	D
7	Multiple Choice	1	Geometry	8.G03 Calculate the missing angle in a supplementary or complementary pair	A
8	Multiple Choice	1	Geometry	7.G08 Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle	B
9	Multiple Choice	1	Algebra	7.A04 Solve multi-step equations by combining like terms, using the distributive property, or moving variables to one side of the equation	A
10	Multiple Choice	1	Algebra	8.A07 Add and subtract polynomials (integer coefficients)	B
11	Multiple Choice	1	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	D
12	Multiple Choice	1	Geometry	8.G07 Describe and identify transformations in the plane, using proper function notation (rotations, reflections, translations, and dilations)	D
13	Multiple Choice	1	Number Sense and Operations	8.N05 Estimate a percent of quantity, given an application	B
14	Multiple Choice	1	Geometry	8.G04 Determine angle pair relationships when given two parallel lines cut by a transversal	B
15	Multiple Choice	1	Geometry	8.G12 Identify the properties preserved and not preserved under a reflection, rotation, translation, and dilation	C

2010 Mathematics Tests Standard and Performance Indicator Map with Answer Key
Grade 8 (continued)

Question	Type	Points	Strand	Content Performance Indicator	Answer Key
Book 1 (continued)					
16	Multiple Choice	1	Algebra	8.A12 Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines	D
17	Multiple Choice	1	Algebra	8.A06 Multiply and divide monomials	A
18	Multiple Choice	1	Measurement	7.M01 Calculate distance using a map scale	C
19	Multiple Choice	1	Algebra	7.A03 Identify a polynomial as an algebraic expression containing one or more terms	D
20	Multiple Choice	1	Geometry	8.G06 Calculate the missing angle measurements when given two intersecting lines and an angle	C
21	Multiple Choice	1	Algebra	7.A03 Identify a polynomial as an algebraic expression containing one or more terms	D
22	Multiple Choice	1	Algebra	8.A10 Factor algebraic expressions using the GCF	B
23	Multiple Choice	1	Measurement	7.M01 Calculate distance using a map scale	C
24	Multiple Choice	1	Algebra	7.A10 Write an equation to represent a function from a table of values	D
25	Multiple Choice	1	Algebra	8.A01 Translate verbal sentences into algebraic inequalities	D
26	Multiple Choice	1	Algebra	8.A09 Divide a polynomial by a monomial (integer coefficients) *Note: The degree of the denominator is less than or equal to the degree of the numerator for all variables.*	A
27	Multiple Choice	1	Number Sense and Operations	8.N04 Apply percents to: Tax; Percent increase/decrease; Simple interest; Sale price; Commission; Interest rates; Gratuities	B
Book 2					
28	Short Response	2	Number Sense and Operations	8.N04 Apply percents to: Tax; Percent increase/decrease; Simple interest; Sale price; Commission; Interest rates; Gratuities	n/a
29	Short Response	2	Algebra	7.A10 Write an equation to represent a function from a table of values	n/a
30	Short Response	2	Geometry	8.G03 Calculate the missing angle in a supplementary or complementary pair	n/a
31	Short Response	2	Measurement	8.M01 Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems *Note: Also allow Fahrenheit to Celsius and vice versa.*	n/a

2010 Mathematics Tests Standard and Performance Indicator Map with Answer Key
Grade 8 (continued)

Question	Type	Points	Strand	Content Performance Indicator	Answer Key
Book 2 (continued)					
32	Extended Response	3	Algebra	7.A08 Create algebraic patterns using charts/tables, graphs, equations, and expressions	n/a
33	Extended Response	3	Geometry	8.G09 Draw the image of a figure under a reflection over a given line	n/a
Book 3					
34	Short Response	2	Algebra	7.A04 Solve multi-step equations by combining like terms, using the distributive property, or moving variables to one side of the equation	n/a
35	Short Response	2	Geometry	8.G02 Identify pairs of supplementary and complementary angles	n/a
36	Short Response	2	Number Sense and Operations	8.N01 Develop and apply the laws of exponents for multiplication and division	n/a
37	Short Response	2	Algebra	8.A07 Add and subtract polynomials (integer coefficients)	n/a
38	Short Response	2	Geometry	8.G01 Identify pairs of vertical angles as congruent	n/a
39	Short Response	2	Measurement	7.M06 Compare unit prices	n/a
40	Short Response	2	Geometry	7.G09 Determine whether a given triangle is a right triangle by applying the Pythagorean Theorem and using a calculator	n/a
41	Short Response	2	Algebra	8.A06 Multiply and divide monomials	n/a
42	Extended Response	3	Measurement	7.M07 Convert money between different currencies with the use of an exchange rate table and a calculator	n/a
43	Extended Response	3	Geometry	8.G08 Draw the image of a figure under rotations of 90 and 180 degrees	n/a
44	Extended Response	3	Algebra	8.A16 Find a set of ordered pairs to satisfy a given linear numerical pattern (expressed algebraically); then plot the ordered pairs and draw the line	n/a
45	Extended Response	3	Number Sense and Operations	8.N06 Justify the reasonableness of answers using estimation	n/a