New York State Testing Program

Mathematics Test
Book 1

Grade **8**

March 9–13, 2009

21319

1 Which expression is equivalent to $14a - 4a + 5a - 3a$?

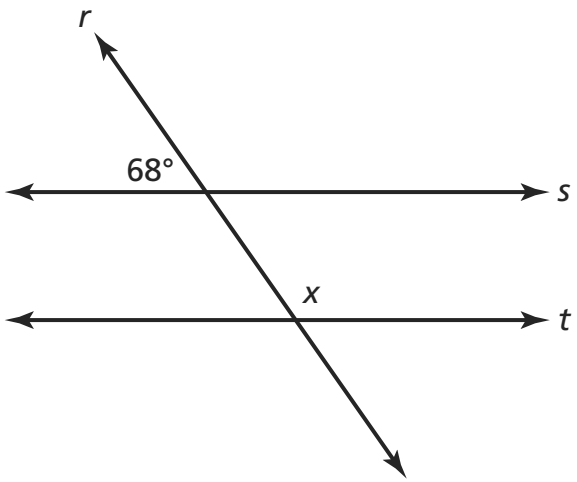
A $2a$

B $8a$

C $12a$

D $20a$

2 In the diagram below, line s is parallel to line t, and line r is a transversal.



[not drawn to scale]

What is the measure of $\angle x$?

A 158°

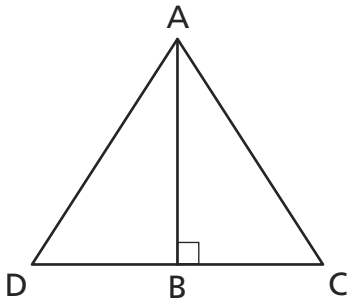
B 112°

C 68°

D 22°

Go On

3 Which line segment represents the hypotenuse on right triangle ABC?



[not drawn to scale]

A $\overline{AB}$

B $\overline{AC}$

C $\overline{AD}$

D $\overline{BC}$

4 Simplify the expression below.

$$10^3 \times 10^{-7}$$

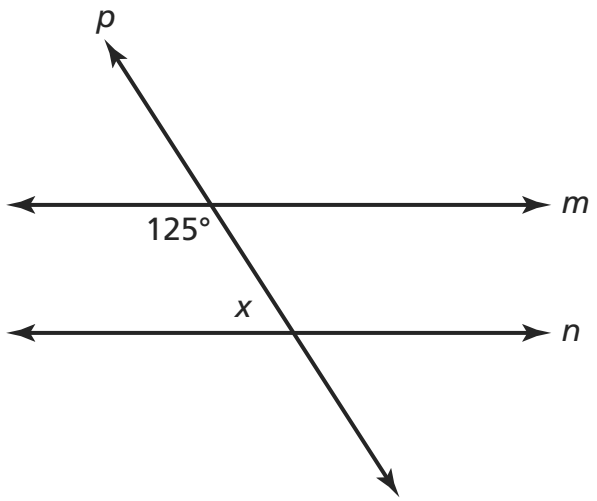
A 10^4

B 10^{10}

C 10^{-4}

D 10^{-21}

5 In the diagram below, line *m* and line *n* are parallel, and line *p* is a transversal.



[not drawn to scale]

What is the measure of $\angle x$?

A 35°

B 55°

C 125°

D 215°

6 Solve the equation below for *x*.

$$2(6 + 2x) = 8x$$

A $x = 1$

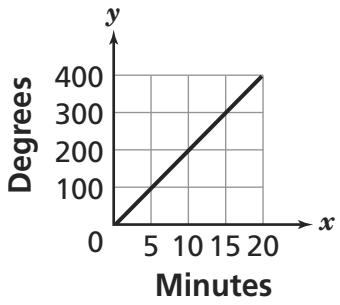
B $x = 2$

C $x = 3$

D $x = 6$

Go On

7 John drew the graph below to represent a situation.



Which statement could describe the situation John graphed?

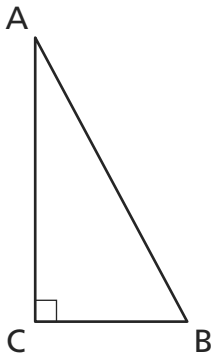
A The temperature of a frozen pizza cooking in an oven increases 5 degrees every minute.

B The temperature of a frozen pizza cooking in an oven increases 10 degrees every minute.

C The temperature of a frozen pizza cooking in an oven increases 15 degrees every minute.

D The temperature of a frozen pizza cooking in an oven increases 20 degrees every minute.

8 In triangle ABC below, $\angle ACB$ is a right angle. If the length of $\overline{AC}$ is 8 centimeters and the length of $\overline{AB}$ is 10 centimeters, what is the length, in centimeters, of $\overline{BC}$?



[not drawn to scale]

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

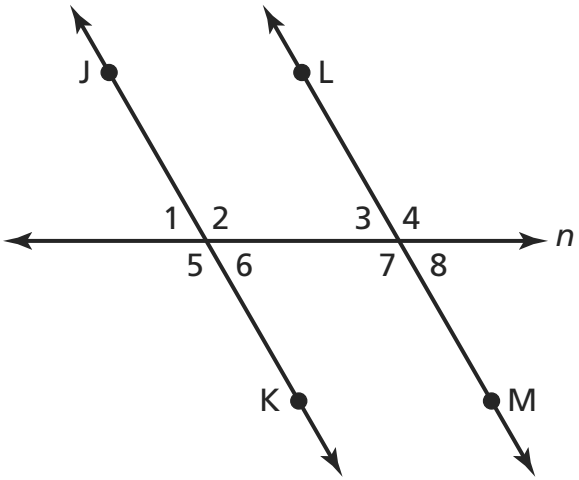
A 2

B 4

C 5

D 6

9 In the diagram below, $\overleftrightarrow{JK}$ is parallel to $\overleftrightarrow{LM}$, and line n is a transversal.



[not drawn to scale]

Which two angles must be congruent to $\angle 4$ in the diagram?

A $\angle 1$ and $\angle 2$

B $\angle 1$ and $\angle 6$

C $\angle 2$ and $\angle 7$

D $\angle 6$ and $\angle 7$

10 Simplify the expression below.

$$3xy(9xy + 14x)$$

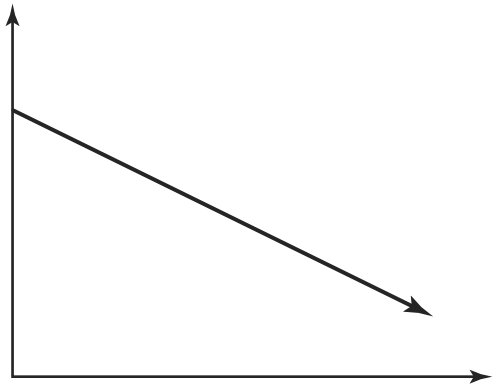
A $27xy + 42x$

B $9xy + 42x^2y$

C $27x^2y^2 + 14x$

D $27x^2y^2 + 42x^2y$

11 Which situation is best represented by the graph below?



A the height of a child from age ten to fifteen

B the volume of a balloon as it is being filled with air

C the amount of gasoline in a car's tank during a five-hour trip

D the volume of water in a swimming pool as it is being filled

12 The cost of Cynthia's dinner is $15.20. She leaves a tip that is 15% of the cost of the dinner. What is the **best** estimate for the amount of the tip?

A $1.00

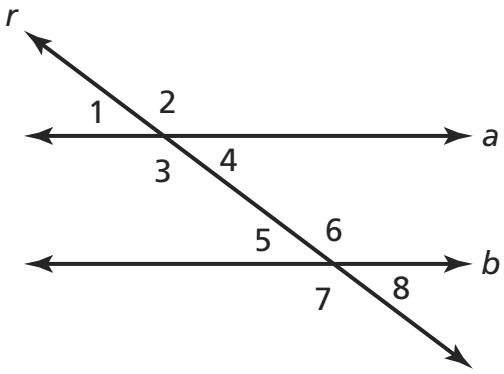
B $2.00

C $3.00

D $4.00

Go On

13 In the diagram below, line *a* is parallel to line *b*, and line *r* is a transversal. Which pair of angles must have the same measure?



[not drawn to scale]

A $\angle 1$ and $\angle 6$

B $\angle 1$ and $\angle 7$

C $\angle 2$ and $\angle 7$

D $\angle 3$ and $\angle 5$

14 Which verbal expression is the same as $\frac{n}{2} + 6$?

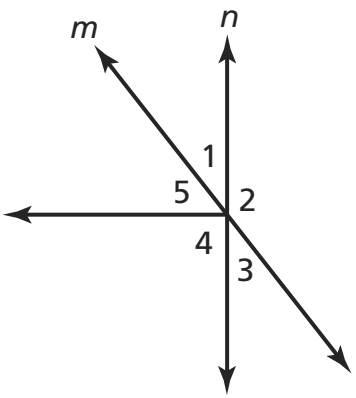
A two more than half of six

B six more than half of a number

C the sum of a number and two plus six

D six more than the product of a number and two

15 In the diagram below, line m intersects line n. Which pair of angles must be congruent?



[not drawn to scale]

A $\angle 1$ and $\angle 3$

B $\angle 1$ and $\angle 5$

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

D $\angle 3$ and $\angle 5$

16 What is $3m^3 + 6m^2$ divided by $3m$?

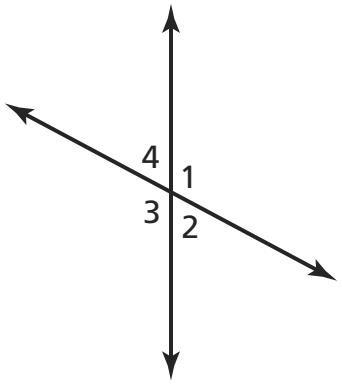
A $m^2 + 6m^2$

B $m^2 + 2m$

C $3m^2 + 6m$

D $m^3 + 2m^2$

17 The measure of $\angle 1$ in the diagram below is 113°.



[not drawn to scale]

What is the measure of $\angle 4$?

A 67°

B 77°

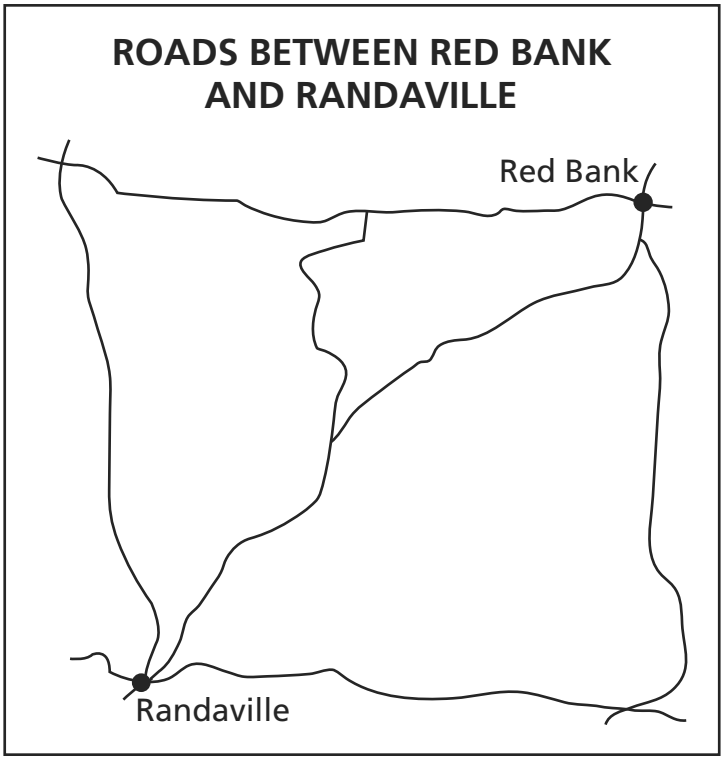
C 113°

D 203°

18 Use your ruler to help you solve this problem.

What is the **best estimation** of the most direct route between Red Bank and Randaville?

SCALE
1 cm = 10 km



A 7 kilometers

B 9 kilometers

C 70 kilometers

D 90 kilometers

19 Alisa pays $0.50 per hour to park her car at the museum. Which graph correctly shows the relationship between the hours, x, Alisa's car is parked and the total parking cost in dollars, y?

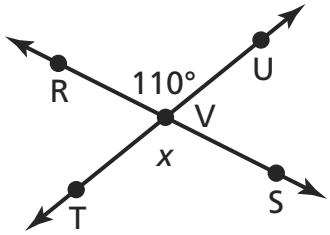
A

C

B

D

20 In the diagram below, $\overleftrightarrow{RS}$ intersects $\overleftrightarrow{TU}$ at point V, and the measure of $\angle RVU$ is 110°.



[not drawn to scale]

What is the measure of $\angle x$?

A 20°

B 70°

C 110°

D 200°

21 Simplify the expression below.

$$\frac{3x^6 + 9x^4 - 6x^2}{3x^2}$$

A $x^4 + 3x^2 - 2$

B $x^4 + 6x^2 + 3$

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

D $x^3 + 6x^2 + 3x$

Go On

22 The scale on a road map is shown below.

SCALE
1 cm = 75 mi

Sam measures the distance on the map between Rockland and Newbury as 5 centimeters. What is the actual distance, in miles, between Rockland and Newbury?

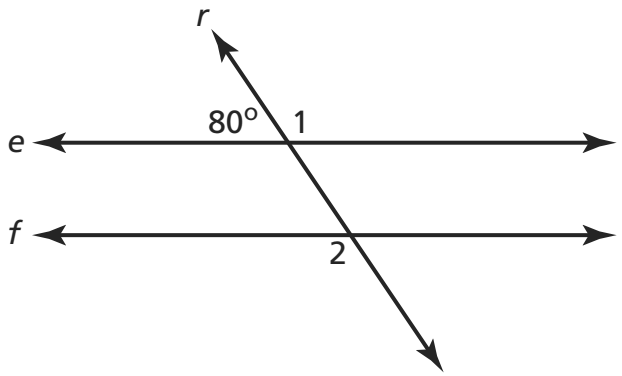
A 15

B 80

C 375

D 575

23 In the diagram below, line *e* and line *f* are parallel, and line *r* is a transversal.



[not drawn to scale]

What is the sum of the measures of $\angle 1$ and $\angle 2$?

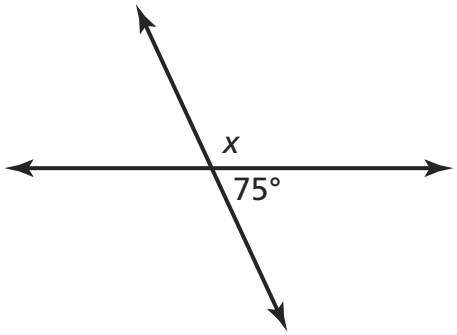
A 100°

B 160°

C 180°

D 200°

24 In the diagram below, what is the measure of $\angle x$?



[not drawn to scale]

A 15°

B 75°

C 105°

D 165°

25 The scale on a map of Audrey's home state indicates that 1 centimeter is equivalent to 30 miles. On this map, the distance between Davenport and Vansburg is 12 centimeters. What is the actual distance between Davenport and Vansburg?

A 90 miles

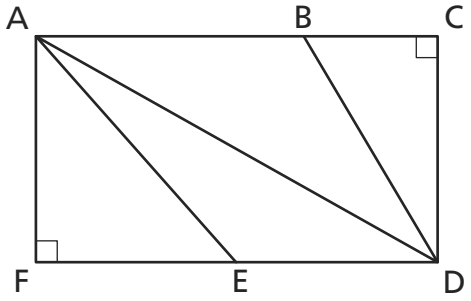
B 180 miles

C 360 miles

D 720 miles

Go On

26 In the rectangle below, which angle is the **right angle** of a right triangle?



[not drawn to scale]

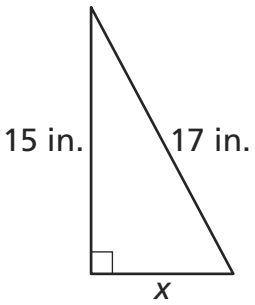
A ∠BCD

B ∠AED

C ∠CDA

D ∠FAD

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



[not drawn to scale]

A 2 inches

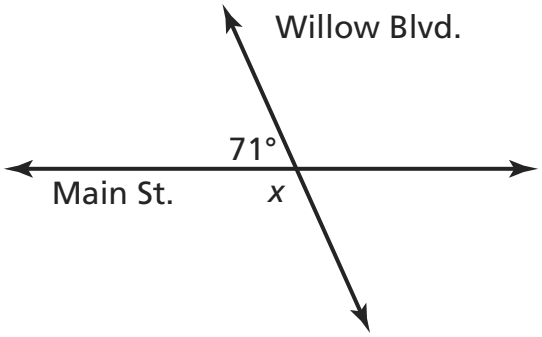
B 8 inches

C 23 inches

D 32 inches

STOP

28 Willow Boulevard intersects Main Street at a 71° angle, as shown in the diagram below.



[not drawn to scale]

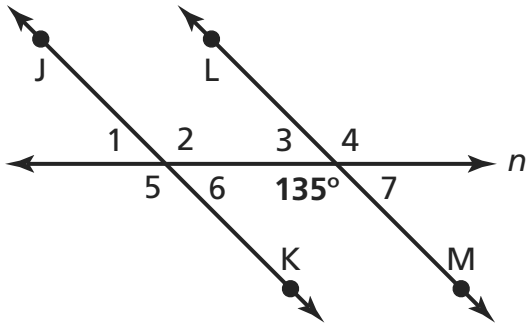
What is the measure of $\angle x$?

Show your work.

Answer _____ degrees

Go On

29 In the diagram below, $\overleftrightarrow{JK}$ and $\overleftrightarrow{LM}$ are parallel, and line *n* is a transversal.



[not drawn to scale]

What is the measure of $\angle 1$?

Answer _____ degrees

On the lines below, explain how you determined your answer.

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

x	*y*
–4	14
–3	11
–2	8
–1	5
0	
1	

On the line below, write a function rule that shows the relationship between *x* and *y* in the table.

Answer _____

Go On

31 Mustafa buys a book that costs $12.50. If the sales tax is 8%, what is the total cost of the book?

Show your work.

Answer $ _____

32 Solve the equation below for p.

$$3(p + 6) = 5p + 4$$

Show your work.

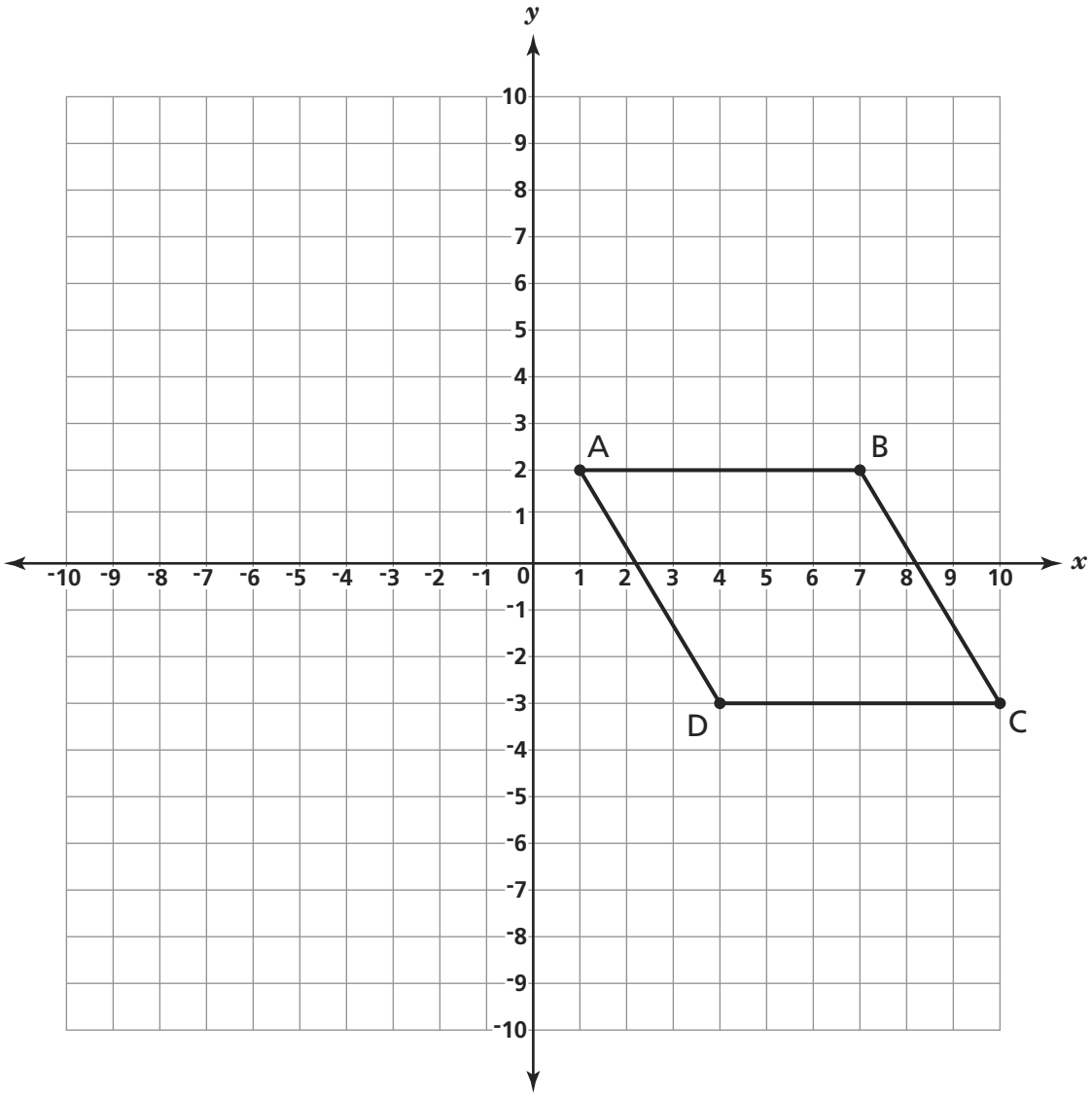
Answer $p =$ _____

Check your answer.

Show your work.

Go On

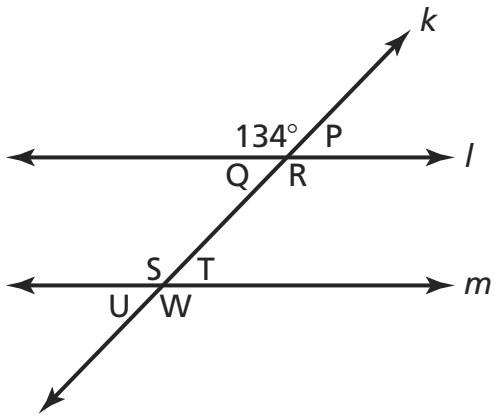
33 Alexis started making a design by drawing figure ABCD. The next figure in her design is the reflection of figure ABCD in the *y*-axis. On the coordinate plane below, draw the reflection of figure ABCD. Label the image A'B'C'D'.



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

STOP

34 In the diagram below, line *l* and line *m* are parallel, and line *k* is a transversal.



[not drawn to scale]

What is the measure of ∠U?

Answer _____ degrees

On the lines below, explain how you determined your answer.

_____

_____

_____

_____

_____

Go On

35 Complete the table below to create a pattern that shows a linear relationship between x and y.

x	y
1	
2	
3	
4	

Write an equation that can be used to represent the relationship between x and y in your table.

Equation _____

36 What is $28a^{11}b^{7}$ divided by $4a^{3}b$?

Show your work.

Answer _____

37 Jeff wants to buy a phone card for long-distance calls. He can buy a 200-minute card for $10.00 or a 300-minute card for $12.00. Which card is the better value?

Show your work.

Answer _____

38 Simplify the expression below.

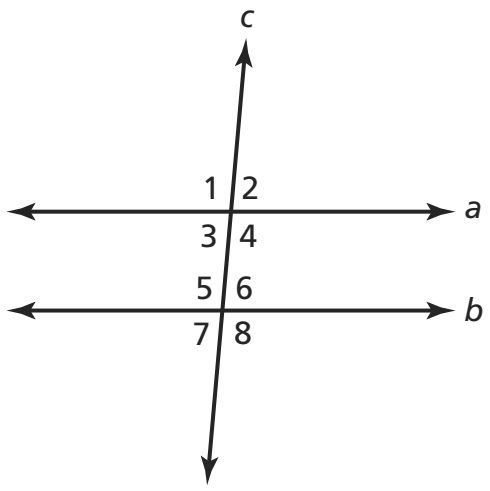
$$(3x^2 + 4x - 3) - (2x - 1)$$

Show your work.

Answer _____

Go On

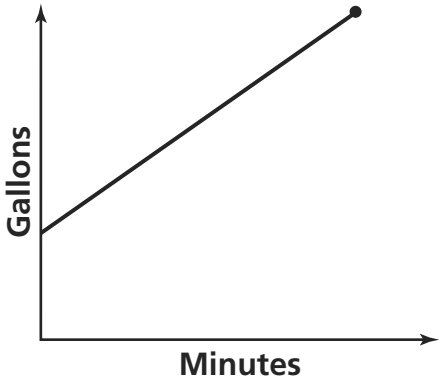
39 In the diagram below, line *a* and line *b* are parallel, line *c* is a transversal, and the measure of $\angle 1$ is 100°.



[not drawn to scale]

Is $\angle 3$ congruent to $\angle 1$? On the lines below, explain how you determined your answer. If it is not congruent, give the correct measure of $\angle 3$.

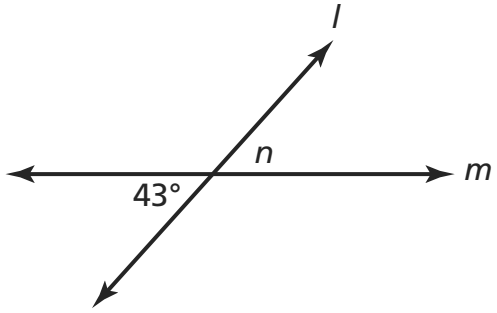
40 On the lines below, describe a situation that could be represented by the graph shown below.



On the lines below, explain the reason the graph does not pass through the origin in the situation you described.

Go On

41 In the diagram below, lines *l* and *m* intersect. What is the measure of $\angle n$ in the diagram below?

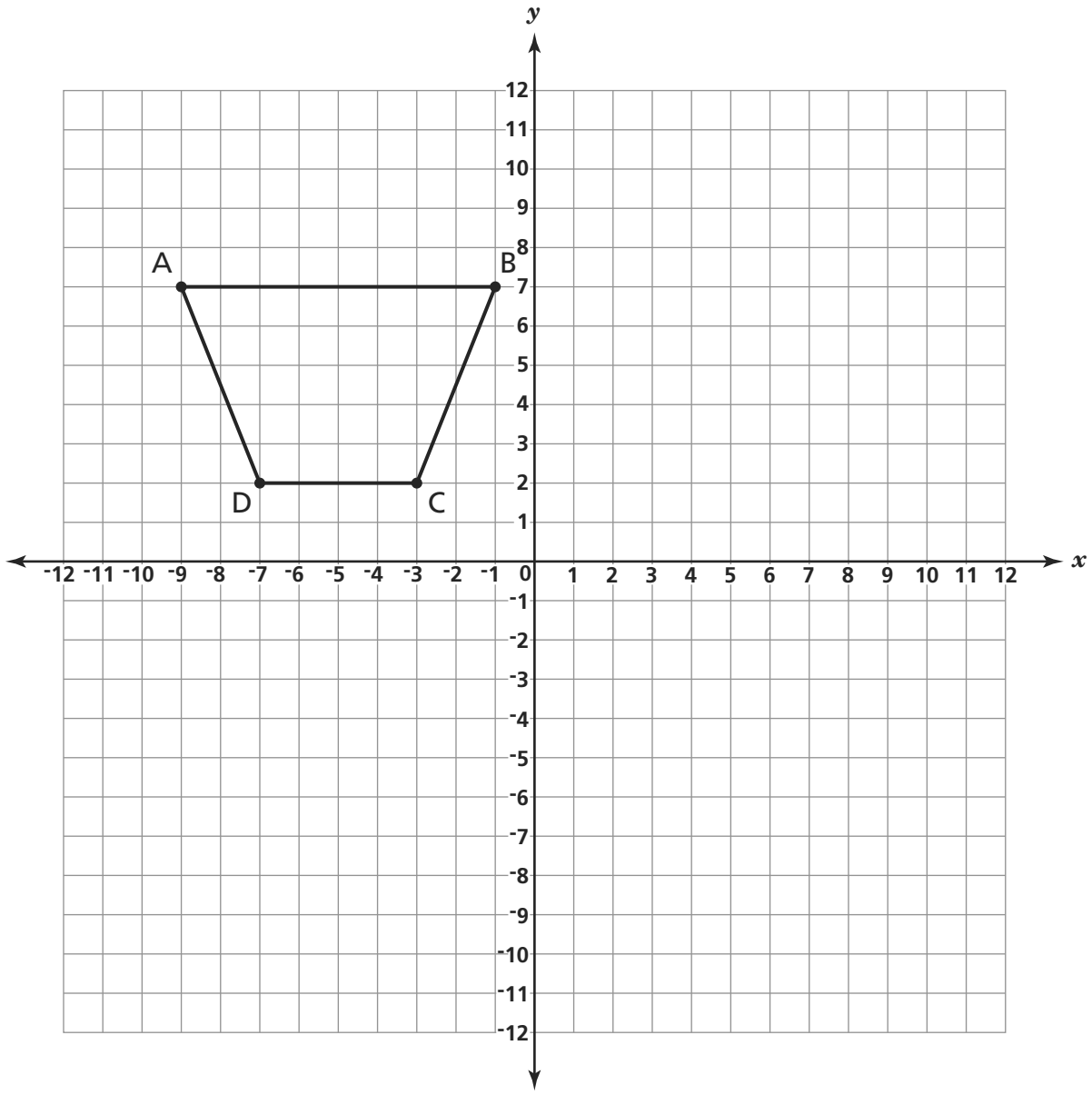


[not drawn to scale]

Answer _____ degrees

On the lines below, explain how you determined your answer.

42 Shawn drew figure ABCD. He plans to create figure A'B'C'D' by translating figure ABCD 6 units down and 4 units to the right. On the coordinate plane below, draw and label Shawn's figure A'B'C'D'.



Next Shawn plans to create figure A"B"C"D" by translating figure A'B'C'D' 2 units up and 8 units to the right. What will be the coordinates of point A"?

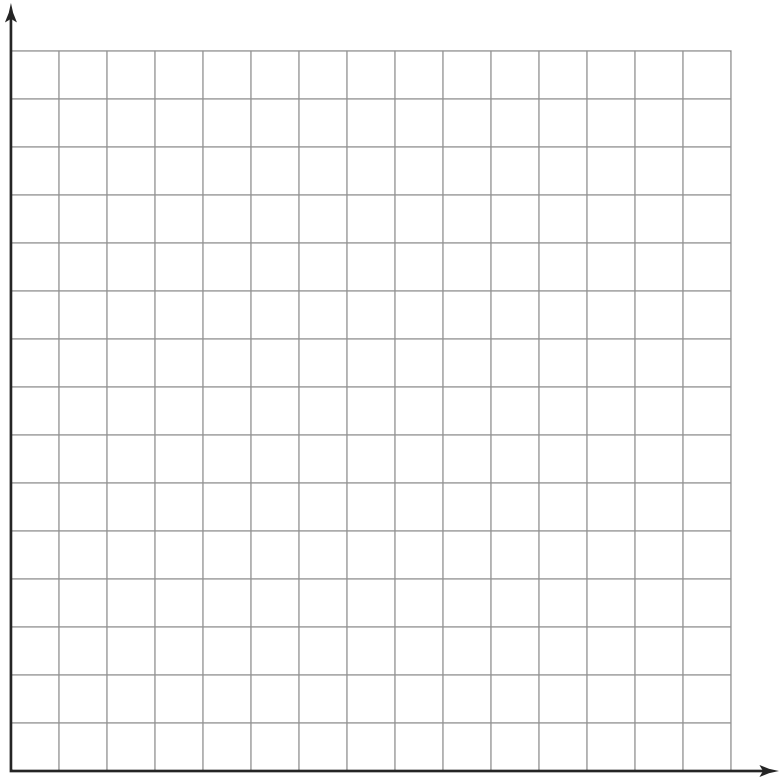
Answer _____

Go On

43 Melinda makes hats to give as gifts. She needs 2 days to complete each hat. On the grid below, create a line graph that shows the relationship between the number of days it takes Melinda to make hats and the number of hats she completes.

Be sure to

- title your graph
- label the axes
- graph all the data



How many hats will Melinda make in 14 days?

Answer _____ hats

44 Lenora is practicing simplifying expressions for her mathematics class.

Part A

Lenora simplified the expression $(2x^{-1}y^4)(5x^3y^2)$ as shown below.

$$(2x^{-1}y^4)(5x^3y^2) = 10x^{-3}y^8$$

Did Lenora simplify the expression correctly? On the lines below, explain how you determined your answer.

Part B

What answer will Lenora get if she correctly simplifies the expression below?

$$\frac{4x^3y^5}{2x^2y}$$

Answer _____

Go On

45 What is the solution of the equation below?

$$4(x + 5) = x + 8$$

Show your work.

Answer $x =$ _____

Check to see if your answer is correct.

Show your work.

STOP

2009 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	C
2	Multiple Choice	1	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	B
3	Multiple Choice	1	Geometry	7.G05 Identify the right angle, hypotenuse, and legs of a right triangle	B
4	Multiple Choice	1	Number Sense and Operations	8.N01 Develop and apply the laws of exponents for multiplication and division	C
5	Multiple Choice	1	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	B
6	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	C
7	Multiple Choice	1	Algebra	8.A03 Describe a situation involving relationships that matches a given graph	D
8	Multiple Choice	1	Geometry	7.G08 Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle	D
9	Multiple Choice	1	Geometry	8.G04 Determine angle pair relationships when given two parallel lines cut by a transversal	C
10	Multiple Choice	1	Algebra	8.A08 Multiply a binomial by a monomial or binomial (integer coefficients)	D
11	Multiple Choice	1	Algebra	8.A03 Describe a situation involving relationships that matches a given graph	C
12	Multiple Choice	1	Number Sense and Operations	8.N05 Estimate a percent of quantity, given an application	B
13	Multiple Choice	1	Geometry	8.G04 Determine angle pair relationships when given two parallel lines cut by a transversal	C
14	Multiple Choice	1	Algebra	8.A02 Write verbal expressions that match given mathematical expressions	B
15	Multiple Choice	1	Geometry	8.G01 Identify pairs of vertical angles as congruent	A

2009 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.A09 Divide a polynomial by a monomial (integer coefficients)	B
17	Multiple Choice	1	Geometry	8.G06 Calculate the missing angle measurements when given two intersecting lines and an angle	A
18	Multiple Choice	1	Measurement	7.M01 Calculate distance using a map scale	D
19	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
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	8.A09 Divide a polynomial by a monomial (integer coefficients)	A
22	Multiple Choice	1	Measurement	7.M01 Calculate distance using a map scale	C
23	Multiple Choice	1	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	D
24	Multiple Choice	1	Geometry	8.G03 Calculate the missing angle in a supplementary or complementary pair	C
25	Multiple Choice	1	Measurement	7.M01 Calculate distance using a map scale	C
26	Multiple Choice	1	Geometry	7.G05 Identify the right angle, hypotenuse, and legs of a right triangle	A
27	Multiple Choice	1	Geometry	7.G08 Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle	B
Book 2					
28	Short Response	2	Geometry	8.G06 Calculate the missing angle measurements when given two intersecting lines and an angle	n/a
29	Short Response	2	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	n/a
30	Short Response	2	Algebra	7.A10 Write an equation to represent a function from a table of values	n/a
31	Short Response	2	Number Sense and Operations	8.N04 Apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities	n/a
32	Extended Response	3	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
33	Extended Response	3	Geometry	8.G09 Draw the image of a figure under a reflection over a given line	n/a

2009 Mathematics Tests Standard and Performance Indicator Map with Answer Key
Grade 8 (continued)

Question	Type	Points	Strand	Content Performance Indicator	Answer Key
Book 3					
34	Short Response	2	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	n/a
35	Short Response	2	Algebra	7.A08 Create algebraic patterns using charts/tables, graphs, equations, and expressions	n/a
36	Short Response	2	Algebra	8.A06 Multiply and divide monomials	n/a
37	Short Response	2	Measurement	7.M06 Compare unit prices	n/a
38	Short Response	2	Algebra	8.A07 Add and subtract polynomials (integer coefficients)	n/a
39	Short Response	2	Geometry	8.G05 Calculate the missing angle measurements when given two parallel lines cut by a transversal	n/a
40	Short Response	2	Algebra	8.A03 Describe a situation involving relationships that matches a given graph	n/a
41	Short Response	2	Geometry	8.G01 Identify pairs of vertical angles as congruent	n/a
42	Extended Response	3	Geometry	8.G10 Draw the image of a figure under a translation	n/a
43	Extended Response	3	Algebra	8.A04 Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship	n/a
44	Extended Response	3	Number Sense and Operations	8.N01 Develop and apply the laws of exponents for multiplication and division	n/a
45	Extended Response	3	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