Interactive Classroom

Glencoe McGraw-Hill

Pre-Algebra

Chapter 1
The Tools of Algebra

Click the mouse button or press the space bar to continue.

Chapter Menu

Lesson Menu

Main Ideas

- Use a four-step plan to solve problems.
- Choose an appropriate method of computation.

New Vocabulary

- conjecture
- inductive reasoning

Real-World EXAMPLE

1 **PIZZA** **The price of a large cheese pizza at Paul's Pizza Place is $9.25. You receive a $0.50 discount for each additional pizza ordered, up to 10. So, one pizza costs $9.25, two pizzas cost $8.75 each, three pizzas cost $8.25 each, and so on. If you need 8 pizzas for a party, what is the cost per pizza?**

Explore The problem gives the cost for the first pizza and the discount for each additional pizza ordered. We need to find the cost per pizza for an order of 8 pizzas.

Plan Use the information given to solve the problem. Look for a pattern in the costs. Extend the pattern to find the cost per pizza for an order of 8 pizzas.

Real-World EXAMPLE

1 **Solve** First, find the pattern.

1 pizza costs $9.25.

2 pizzas cost $9.25 – $0.50 or $8.75 each.

3 pizzas cost $8.75 – $0.50 or $8.25 each.

Now, extend the pattern.

4 pizzas cost $8.25 – $0.50 or $7.75 each.

5 pizzas cost $7.75 – $0.50 or $7.25 each.

6 pizzas cost $7.25 – $0.50 or $6.75 each.

7 pizzas cost $6.75 – $0.50 or $6.25 each.

8 pizzas cost $6.25 – $0.50 or $5.75 each.

Real-World EXAMPLE

1 **Answer:** The cost per pizza for an order of 8 pizzas would be $5.75.

Examine It costs $9.25 for one pizza with a discount of $0.50 for each additional pizza ordered. For an order of 8 pizzas, the cost per pizza would be $9.25 – (7 × $0.50) or $9.25 – $3.50 = $5.75.

CHECK Your Progress

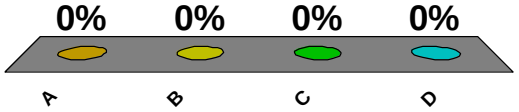
1 **MOVIE RENTAL** The cost of renting movies at Mike's Marvelous Movie House is advertised as $5 for the first movie and $3.50 for each additional movie. Find the cost of renting 6 movies.

A. $21.00

B. $26.00

C. $22.50

D. $20.50



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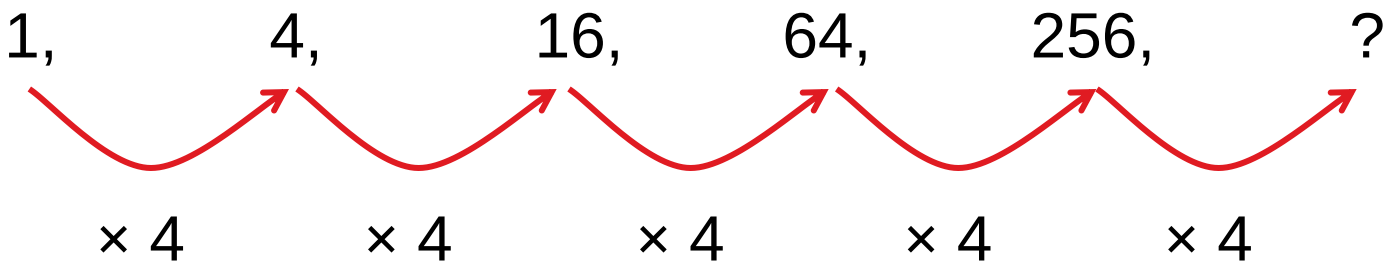
EXAMPLE 2 Use Inductive Reasoning to Solve Problems

A. Find the next term in 1, 4, 16, 64, 256, ….



Answer: Assuming the pattern continues, the next term is 256 × 4 or 1024.

EXAMPLE Use Inductive Reasoning to Solve Problems

2 B. Draw the next figure in the pattern.

Answer:

The shaded point on the triangle moves in the following pattern: right, top, bottom, left, right. Assuming the pattern continues, the shaded point will be located on the top in the next figure.

CHECK Your Progress

2 A. Find the next term in 48, 43, 38, 33, 28, …

A. 21

B. 22

C. 23

D. 24

0%

A B C D

CheckPoint

CHECK Your Progress

2 **B.** Draw the next figure in the pattern.

A. 

B. 

C. 

D. 

0%

A B C D

Real-World EXAMPLE

3 **PLANETS** The chart shows the distance of selected planets from the Sun. About how much farther is it from Earth to the Sun than from Mercury to the Sun?

Planet	Distance from Sun (millions of miles)
Mercury	36.0
Venus	67.24
Earth	92.9
Mars	141.71

Real-World EXAMPLE

3 **Explore** You know the distance from Earth to the Sun and the distance from Mercury to the Sun. You need to find about how much farther it is from Earth to the Sun than from Mercury to the Sun.

Plan The question uses the word *about*, so an exact answer is not needed. We can solve the problem using estimation. Estimate each distance and then subtract.

Solve Distance from Earth to the Sun: $92.9 \rightarrow 93$
Distance from Mercury to the Sun: $36.0 \rightarrow 36$

Real-World EXAMPLE

3 $93 - 36 = 57$ Subtract 36 from 93.

Answer: So, Earth is about 57 million miles farther from the Sun than Mercury is from the Sun.

Examine Since $36 + 57 = 93$, the answer makes sense.

CHECK Your Progress

3 **SCHOOL ENROLLMENT** East Elementary School has 792 students enrolled. West Elementary School has 518 students enrolled. About how many more students does East Elementary have than West Elementary?

A. 270

B. 220

C. 200

D. 150

0%

A B C D

End of the Lesson

Click the mouse button to return to the Chapter Menu.

Lesson Menu

Main Ideas

- Use the order of operations to evaluate expressions.
- Translate verbal phrases into numerical expressions.

New Vocabulary

- numerical expression
- evaluate
- order of operations

CONCEPT SUMMARY — Order of Operations

Step 1 Evaluate the expressions inside grouping symbols.

Step 2 Multiply and/or divide in order from left to right.

Step 3 Add and/or subtract in order from left to right.

EXAMPLE 1 Evaluate Expressions

A. Find the value of $24 \div 8 \times 3$.

$24 \div 8 \times 3 = 3 \times 3$ Divide 24 by 8.

$= 9$ Multiply 3 and 3.

Answer: 9

EXAMPLE 1 Evaluate Expressions

B. Find the value of $5(4 + 6) – 7 \bullet 7$.

$5(4+6)-7\bullet 7 = 5(10)-7\bullet 7$ Evaluate (4 + 6).

$= 50-7\bullet 7$ 5(10) means 5 × 10.

$= 50-49$ 7 ● 7 means 7 times 7.

$= 1$ Subtract 49 from 50.

Answer: 1

EXAMPLE 1 Evaluate Expressions

C. Find the value of 3[(18 – 6) + 2(4)].

$3[(18-6)+2(4)] = 3[12+2(4)]$ Evaluate (18 – 6).

$= 3(12+8)$ Multiply 2 and 4.

$= 3(20)$ Add 12 and 8.

$= 60$ Multiply 3 and 20.

Answer: 60

EXAMPLE 1 Evaluate Expressions

D. Find the value of $\frac{49+31}{19-14}$.

$$\frac{49+31}{19-14} = (49+31) \div (19-14)$$

Rewrite as a division expression.

$$= 80 \div 5$$

Evaluate (49 + 31) and (19 – 14).

$$= 16$$

Divide 80 by 5.

Answer: 16

CHECK Your Progress

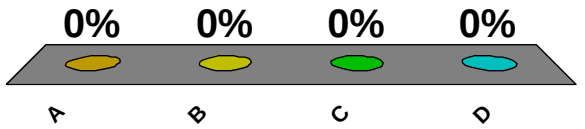
1 **A. Find the value of 63 ÷ 7 + 2.**

A. 7

B. 10

C. 8

D. 11



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CHECK Your Progress

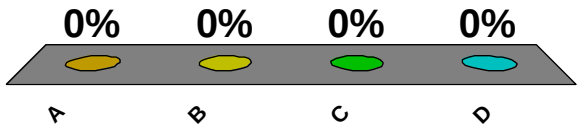
1 **B.** Find the value of $3(12 - 10) + 14 \div 2$.

A. 13

B. 20

C. 33

D. 10



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CHECK Your Progress

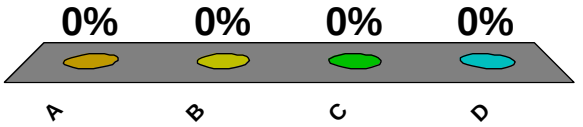
1 **C. Find the value of 4[(3 + 8) – 2(4)].**

A. 16

B. 12

C. 144

D. 36



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CHECK Your Progress

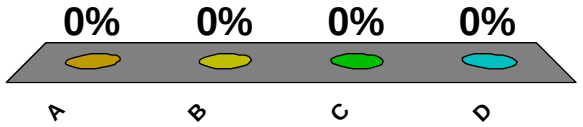
1 **D. Find the value of** $\frac{21-3}{4(2)+1}$.

A. 3

B. $1\frac{8}{9}$

C. 2

D. $1\frac{1}{2}$



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EXAMPLE 2 Translate Phrases into Expressions

A. Write a numerical expression for the verbal phrase.

Phrase	the quotient of eighteen and six
Key Word	quotient
Expression	18 ÷ 6

Answer: 18 ÷ 6

EXAMPLE Translate Phrases into Expressions

2 B. Write a numerical expression for the verbal phrase.

Phrase	the sum of nine and five
Key Word	sum
Expression	9 + 5

Answer: 9 + 5

CHECK Your Progress

2 **A. Write a numerical expression for the verbal phrase *the product of three and five.***

A. 3 + 5

B. 3 – 5

C. 3 × 5

D. 3 ÷ 5

0%

A B C D

CheckPoint

CHECK Your Progress

2 **B. Write a numerical expression for the verbal phrase *the difference of seventeen and six.***

A. 17 + 6

B. 17 – 6

C. 17 × 6

D. 17 ÷ 6

0%

A B C D

CheckPoint

Real-World EXAMPLE

3 **EARNINGS** **Madison earns an allowance of $5 per week. She also earns $4 per hour babysitting, and usually baby-sits 6 hours each week. Write and evaluate an expression for the total amount of money she earns in one week.**

Words	$5 allowance per week	plus	$4 per hour spent baby-sitting.
Expression	5	+	4 × 6

Real-World EXAMPLE

3 $5 + 4 \times 6 = 5 + 24$ Multiply.

$= 29$ Add.

Answer: Madison earns $29 in one week.

CHECK Your Progress

3 **SHOPPING** The Good Price Grocery Store advertises a special on 2-liter bottles of soft drinks. The first bottle purchased is $1.50 and each bottle after that is $1.20. Write and evaluate an expression for the total cost when 8 bottles are purchased.

A. 1.50 + 8(1.20) = 11.10 0%

B. 1.50 + 7(1.20) = 9.90

C. 2 + 1.50 + 1.20 + 8 = 12.70

D. 1.20 + 7(1.50) = 11.70

A B C D

CheckPoint

End of the Lesson

Click the mouse button to return to the Chapter Menu.

Lesson Menu

Main Ideas

- Evaluate expressions containing variables.
- Translate verbal phrases into algebraic expressions.

New Vocabulary

- algebra
- variable
- algebraic expression
- defining a variable

EXAMPLE Evaluate Expressions

1 Evaluate $x - y + 6$ if $x = 27$ and $y = 12$.

$x - y + 6 = 27 - 12 + 6$ Replace x with 27 and y with 12.

$= 15 + 6$ Subtract 12 from 27.

$= 21$ Add 15 and 6.

Answer: 21

CHECK Your Progress

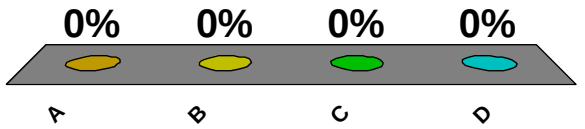
1 Evaluate $12 + a - b$ if $a = 7$ and $b = 11$.

A. 30

B. 16

C. 8

D. 20



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EXAMPLE 2 Evaluate Expressions

A. Evaluate $6y - 4x$ if $x = 3$, $y = 4$, and $z = 7$.

$6y - 4x = 6(4) - 4(3)$ Replace y with 4 and x with 3.

$= 24 - 12$ Multiply.

$= 12$ Subtract.

Answer: 12

EXAMPLE 2 Evaluate Expressions

B. Evaluate $\frac{(z - x)}{y}$ if $x = 3$, $y = 4$, and $z = 7$.

$$\frac{(z - x)}{y} = (z - x) \div y$$ Rewrite as a division expression.

$$= (7 - 3) \div 4$$ Replace z with 7, x with 3, and y with 4.

$$= 4 \div 4$$ Subtract.

$$= 1$$ Divide.

Answer: 1

EXAMPLE 2 Evaluate Expressions

C. Evaluate $5z + (x + 4y) - 15$ if $x = 3$, $y = 4$, and $z = 7$

$5z + (x + 4y) - 15 = 5(7) + (3 + 4 \bullet 4) - 15$ Replace z with 7, x with 3, and y with 4.

$= 5(7) + (3 + 16) - 15$ Multiply 4 and 4.

$= 5(7) + 19 - 15$ Add 3 and 16.

EXAMPLE Evaluate Expressions

2

$= 35 + 19 - 15$	Multiply 5 and 7.
$= 54 - 15$	Add 35 and 19.
$= 39$	Subtract 15 from 54.

Answer: 39

CHECK Your Progress

2 **A.** Evaluate $5p - 3m$ if $m = 9$, $n = 4$, and $p = 6$.

A. 3

B. 13

0%

C. 22

D. 28

A B C D

CheckPoint

CHECK Your Progress

2 B. Evaluate $\frac{mn}{p}$ if $m = 9$, $n = 4$, and $p = 6$.

A. 4

B. $2\frac{1}{6}$

C. $5\frac{1}{3}$

D. 6

0%

A B C D

CHECK Your Progress

2 **C. Evaluate $p + (8n - 3m)$ if $m = 9$, $n = 4$, and $p = 6$.**

A. 23

B. 15

C. 14

D. 11

0%

A B C D

CheckPoint

EXAMPLE 3 Translate Verbal Phrases into Expressions

A. Translate the phrase *35 more than the number of tickets sold* into an algebraic expression.

Words 35 more than the number of tickets sold.

Variable Let t represent the number of tickets sold.

	35	more than	the number of tickets sold
Expression	35	+	t

Answer: The expression is $35 + t$.

EXAMPLE 3 Translate Verbal Phrases into Expressions

B. Translate the phrase *the difference of six times a number and ten* into an algebraic expression.

Words the difference of six times a number and ten.

Variable Let n represent the number.

the difference of six times a number and ten

Expression $6n - 10$

Answer: The expression is $6n - 10$.

CHECK Your Progress

3 **A. Translate the phrase *eight less than the number of cookies baked* into an algebraic expression.**

A. $c - 8$

0%

B. $8 - c$

C. $-8 - c$

D. $-c - 8$

A B C D

CHECK Your Progress

3 **B.** Translate the phrase *the sum of twelve and five times a number* into an algebraic expression.

A. $12(5 + n)$

0%

B. $12 + 5 + n$

C. $12 + 5n$

D. $17n$

A B C D

Real-World EXAMPLE

4 **A. THEATER** **East Middle School sold tickets for a school play. The price of an adult ticket was $3, and the price of a student ticket was $1. Write an expression that represents the total amount of money collected.**

Words $3 for an adult ticket and $1 for a student ticket.

Variable Let a = number of adult tickets and s = number of student tickets.

$3 for an adult ticket and $1 for a student ticket

Expression $3a + 1s$

Real-World EXAMPLE

Answer: The expression $3a + 1s$ can be used to find the total amount of money collected.

Real-World EXAMPLE

4 **B. THEATER** **East Middle School sold tickets for a school play. The price of an adult ticket was $3 and the price of a student ticket was $1. Suppose 70 adult tickets and 85 student tickets were sold. How much money was collected?**

$3a + 1s = 3(70) + 1(85)$ Replace a with 70 and s with 85.

$= 210 + 85$ Multiply.

$= 295$ Add.

Answer: The amount of money collected was $295.

CHECK Your Progress

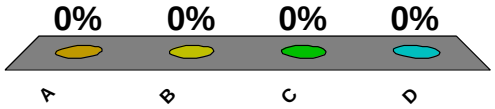
4 **A. RETAIL** The Read It Bookstore is advertising a sale. The price of hardback books is $9.50 and the price of paperback books is $4.50. Write an expression that can be used to find the total amount of money spent at the bookstore.

A. $9.5 + 4.5$

B. $(9.5 + 4.5)hp$

C. $h + p$

D. $9.5h + 4.5p$



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CHECK Your Progress

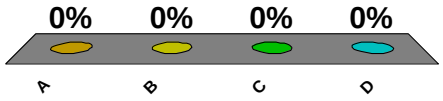
4 **B. RETAIL** The Read It Bookstore is advertising a sale. The price of hardback books is $9.50 and the price of paperback books is $4.50. Suppose Emily buys 5 hardback books and 4 paperback books. Find the total amount she spent at the book sale.

A. $85.50

B. $65.50

C. $60.50

D. $126.00



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End of the Lesson

Click the mouse button to return to the Chapter Menu.

Lesson Menu

Main Ideas

- Identify and use properties of addition and multiplication.
- Use properties of addition and multiplication to simplify algebraic expressions.

New Vocabulary

- properties
- counterexample
- simplify
- deductive reasoning

KEY CONCEPT — Commutative Property of Addition

Words The order in which numbers are added does not change the sum.

Symbols For any numbers a and b, $a + b = b + a$.

Example
$$2 + 3 = 3 + 2$$
$$5 = 5$$

KEY CONCEPT — Commutative Property of Multiplication

Words The order in which numbers are multiplied does not change the product.

Symbols For any numbers a and b, $a \cdot b = b \cdot a$.

Example
$$2 \cdot 3 = 3 \cdot 2$$
$$6 = 6$$

KEY CONCEPT — Associative Property of Addition

Words The way in which numbers are grouped when added does not change the sum.

Symbols For any numbers a, b, and c, $(a + b) + c = a + (b + c)$.

Example

$$(5 + 8) + 2 = 5 + (8 + 2)$$
$$13 + 2 = 5 + 10$$
$$15 = 15$$

KEY CONCEPT — Associative Property of Multiplication

Words The way in which numbers are grouped when multiplied does not change the product.

Symbols For any numbers a, b, and c, $(a \cdot b) \cdot c = a \cdot (b \cdot c)$.

Example

$$(4 \cdot 6) \cdot 3 = 4 \cdot (6 \cdot 3)$$
$$24 \cdot 3 = 4 \cdot 18$$
$$72 = 72$$

KEY CONCEPT — Properties of Numbers

Property	Words	Symbols	Examples
Additive Identity	When 0 is added to any number, the sum is the number.	For any number a, $a + 0 = 0 + a = a$.	$5 + 0 = 5$ $0 + 9 = 9$
Multiplicative Identity	When any number is multiplied by 1, the product is the number.	For any number a, $a \cdot 1 = 1 \cdot a = a$.	$7 \cdot 1 = 7$ $1 \cdot 6 = 6$
Multiplicative Property of Zero	When any number is multiplied by 0, the product is 0.	For any number a, $a \cdot 0 = 0 \cdot a = 0$.	$4 \cdot 0 = 0$ $0 \cdot 2 = 0$

EXAMPLE Identify Properties

1 A. Name the property shown by the statement.

$$3 \bullet 10 \bullet 2 = 3 \bullet 2 \bullet 10$$

Answer: The order of the numbers changed. This is the Commutative Property of Multiplication.

EXAMPLE Identify Properties

1 B. Name the property shown by the statement.

$(2 + 5) + m = 2 + (5 + m)$

Answer: The grouping of the numbers and variables changed. This is the Associative Property of Addition.

CHECK Your Progress

1 **A. Name the property shown by the statement.**

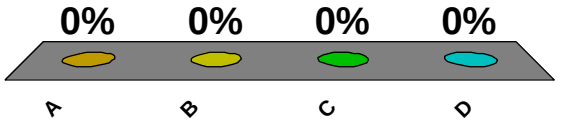
$(4 \bullet 6) \bullet 2 = 4 \bullet (6 \bullet 2)$

A. Commutative Property of Multiplication

B. Associative Property of Multiplication

C. Multiplicative Identity

D. Multiplicative Property of Zero



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CHECK Your Progress

1 **B. Name the property shown by the statement.**

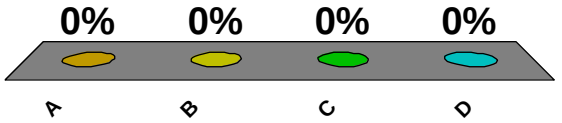
$12 + 9 = 9 + 12$

A. Commutative Property of Addition

B. Associative Property of Addition

C. Additive Identity

D. Distributive Property



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EXAMPLE Mental Math

2 **Find (18 • 20) • 5 mentally.**

Group 20 and 5 together because 20 • 5 = 100. It is easy to multiply by 100 mentally.

(18 • 20) • 5 = 18 •(20 • 5)	Associative Property of Multiplication
= 18 • 100	Multiply 20 and 5 mentally.
= 1800	Multiply 18 and 100 mentally.

Answer: 1800

CHECK Your Progress

2 Find 4 • 8 • 25 mentally.

A. 200

B. 600

C. 800

D. 1250

0%

A B C D

CheckPoint

EXAMPLE Find a Counterexample

3 **State whether the following conjecture is true or false. If false, provide a counterexample.**

Division of whole numbers is commutative

Write two division expressions using the Commutative Property, and then check to see whether they are equal.

$12 \div 6 \stackrel{?}{=} 6 \div 12$ State the conjecture.

$2 \neq 0.5$ Divide.

We found a counterexample. That is, $12 \div 6 \neq 6 \div 12$. So, division is not commutative.

Answer: The conjecture is false.

CHECK Your Progress

3 State whether the following conjecture is true or false. If false, provide a counterexample.
Subtraction of whole number is commutative

A. true

B. false, $7 - 4 = 7 - 4$

C. false, $7 - 4 \neq 4 - 7$

D. false, $(7 - 4) - 2 \neq 7 - (4 - 2)$

0%

A B C D

EXAMPLE 4 Simplify Algebraic Expressions

A. Simplify $5 \bullet (3 \bullet r)$.

$5 \bullet (3 \bullet r) = (5 \bullet 3)r$ Associative Property of Multiplication

$= 15r$ Substitution Property of Equality; $5 \bullet 3 = 15$

Answer: $15r$

EXAMPLE Simplify Algebraic Expressions

4 B. Simplify 12 + (*x* + 18).

$12 + (x + 18) = 12 + (18 + x)$ Commutative Property of Addition

$= (12 + 18) + x$ Associative Property of Addition

$= 30 + x$ Substitution Property of Equality; 12 + 18 = 30

Answer: 30 + *x*

CHECK Your Progress

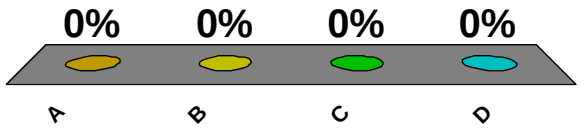
4 **A.** Simplify 7 + (12 + *m*).

A. 19 + *m*

B. 19*m*

C. 5 + *m*

D. 12*m* + 7



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CHECK Your Progress

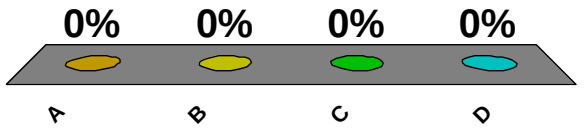
4 **B.** Simplify (6 • a) • 4

A. 10*a*

B. 24 + *a*

C. 2*a*

D. 24*a*



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End of the Lesson

Click the mouse button to return to the Chapter Menu.

Lesson Menu

Main Ideas

- Identify and solve open sentences.
- Translate verbal sentences into equations.

New Vocabulary

- equation
- open sentence
- solution
- solving the equation

EXAMPLE Solve an Equation

1 Find the solution of $44 + p = 53$. Is it 11, 9, or 7?

Replace p with each value.

Value for p	$44 + p = 53$	True or False?
11	$44 + 11 \stackrel{?}{=} 53$	false
9	$44 + 9 \stackrel{?}{=} 53$	true ✓
7	$44 + 7 \stackrel{?}{=} 53$	false

Answer: Therefore, the solution of $44 + p$ is 9.

CHECK Your Progress

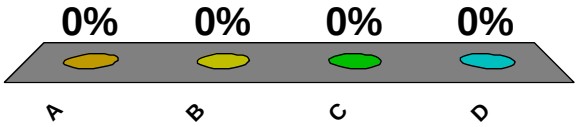
1 Find the solution of $24 - a = 9$. Is it 11, 13, or 15?

A. 11

B. 13

C. 15

D. none of the above



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Standardized Test EXAMPLE

2 **Which value is the solution of $4x - 1 = 11$?**

A 5

B 4

C 3

D 2

Read the Test Item

The *solution* is the value that makes the equation true.

Solve the Test Item

Test each value.

Standardized Test EXAMPLE

2 **Answer Choice A:** Substitute 5 for x.

$$4x - 1 = 11$$

$$4(5) - 1 \stackrel{?}{=} 11 \qquad \text{Replace } x \text{ with } 5.$$

$$19 \neq 11$$

Standardized Test EXAMPLE

2 **Answer Choice B:** Substitute 4 for x.

$$4x - 1 = 11$$

$$4(4) - 1 \stackrel{?}{=} 11 \qquad \text{Replace } x \text{ with } 4.$$

$$15 \neq 11$$

Standardized Test EXAMPLE

2 **Answer Choice C:** Substitute 3 for x.

$$4x - 1 = 11$$

$$4(3) - 1 \stackrel{?}{=} 11 \qquad \text{Replace } x \text{ with } 3.$$

$$11 = 11 \ \checkmark$$

Standardized Test EXAMPLE

2 **Answer Choice D**: Substitute 2 for x.

$$4x - 1 = 11$$

$$4(2) - 1 \stackrel{?}{=} 11 \qquad \text{Replace } x \text{ with } 2.$$

$$7 \neq 11$$

Answer: Since 3 makes the equation true, the answer is C.

CHECK Your Progress

2 Which value is the solution of $3 + 6w = 15$?

A. 1

B. 2

C. 3

D. 4

0%

A B C D

CheckPoint

EXAMPLE Translate Sentences into Equations

3 **The quotient of a number and four is nine. Find the number.**

Words The quotient of a number and four is nine.

Variable Let n = the number.

Equation $\frac{n}{4} = 9$

Answer: 36

CHECK Your Progress

3 Solve $\frac{m}{3} = 7$.

A. –10

B. 4

C. 10

D. 21

0%

A B C D

Real-World EXAMPLE

4 **A. MAPLE SYRUP** It takes about 45 gallons of tree sap to make about 1 gallon of maple syrup. The table shows the relationship between the number of gallons of tree sap and the number of gallons of maple syrup. Given t, the number of gallons of tree sap used, write an equation to find m, the number of gallons of maple syrup.

Gallons of Tree Sap, t	Gallons of Maple Syrup, m
45	1
90	2
135	3
180	4

Real-World EXAMPLE

4 **Words** Number of gallons of tree sap is 45 times the number of gallons of maple syrup.

Variable Let t = number of gallons of tree sap. Let m = number of gallons of maple syrup.

Equation $t = 45m$

Answer: $t = 45m$

Real-World EXAMPLE

4 B. How many gallons of tree sap are needed to make 5 gallons of maple syrup?

$t = 45m$	Write the equation.
$t = 45(5)$	Replace m with 5.
$t = 225$	Multiply.

Answer: 225 gallons

CHECK Your Progress

4 **PETS** The light in a salt water aquarium should provide about 5 watts per gallon of water to allow for photosynthesis. Given g gallons of water, write an equation to find w the number of watts required. Then find the number of watts required for a 55-gallon aquarium.

A. $g = 5w$; 11 watts

B. $g = 5w$; 275 watts

C. $w = 5g$; 11 watts

D. $w = 5g$; 275 watts

0%

A B C D

CheckPoint

End of the Lesson

Click the mouse button to return to the Chapter Menu.

Lesson Menu

Main Ideas

- Use ordered pairs to locate points.
- Use tables and graphs to represent relations.

New Vocabulary

- coordinate system
- *y*-axis
- coordinate plane
- origin
- *x*-axis
- ordered pair
- *x*-coordinate
- *y*-coordinate
- graph
- relation
- domain
- range

EXAMPLE Graph Ordered Pairs

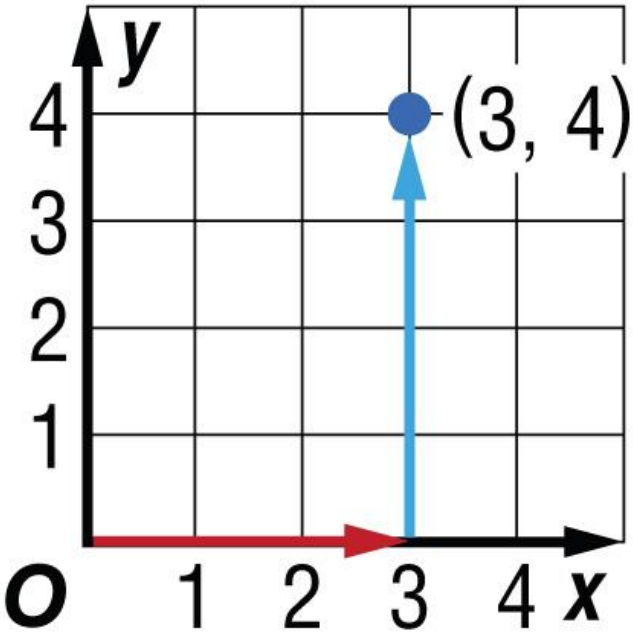
1 A. Graph the ordered pair (3, 4) on a coordinate system.

Step 1 Start at the origin.

Step 2 Since the *x*-coordinate is 3, move 3 units to the right.

Step 3 Since the *y*-coordinate is 4, move 4 units up. Draw a dot.

Answer:



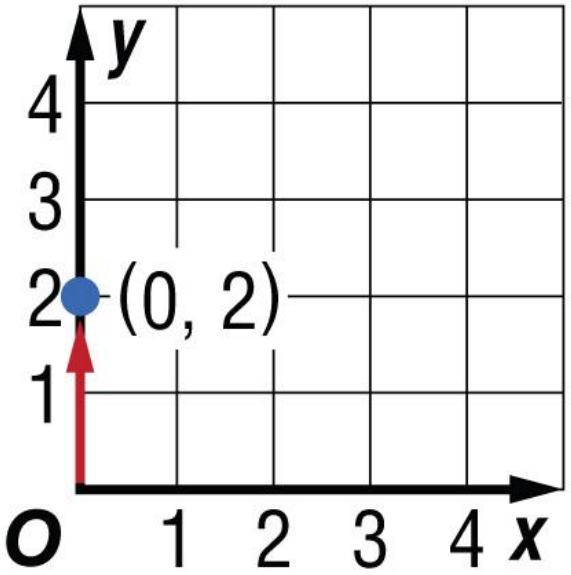
EXAMPLE 1 Graph Ordered Pairs

B. Graph the ordered pair (0, 2) on a coordinate system.

Step 1 Start at the origin.

Step 2 Since the x-coordinate is 0, you will not need to move to the right.

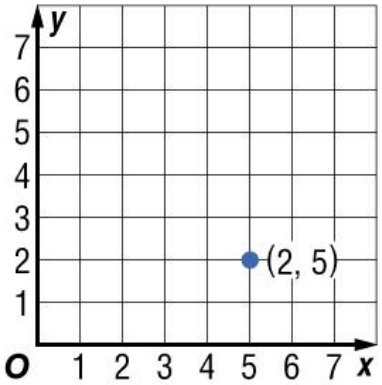
Step 3 Since the y-coordinate is 2, move 2 units up. Draw a dot.



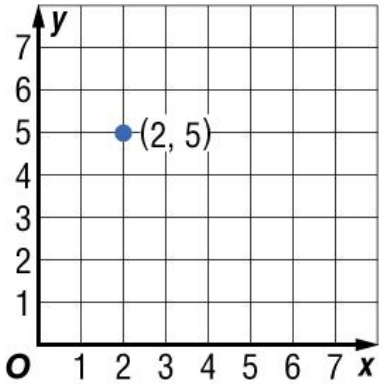
CHECK Your Progress

1 **A. Graph the ordered pair (2, 5) on a coordinate system.**

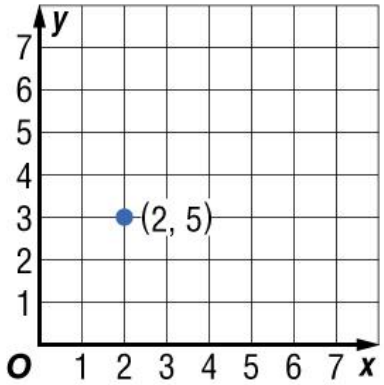
A.



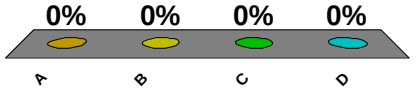
B.



C.



D. none of the above

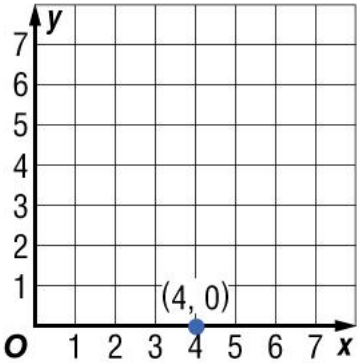


CheckPoint

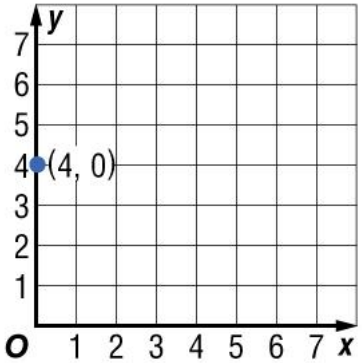
CHECK Your Progress

1 **B. Graph the ordered pair (4, 0) on a coordinate system.**

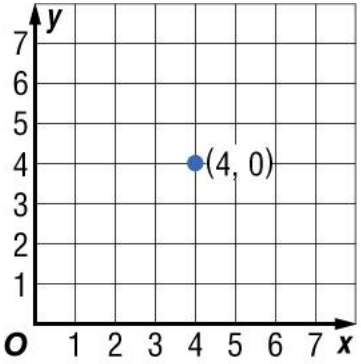
A.



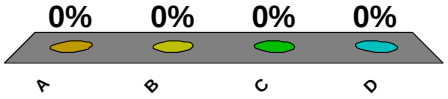
B.



C.



D. none of the above



CheckPoint

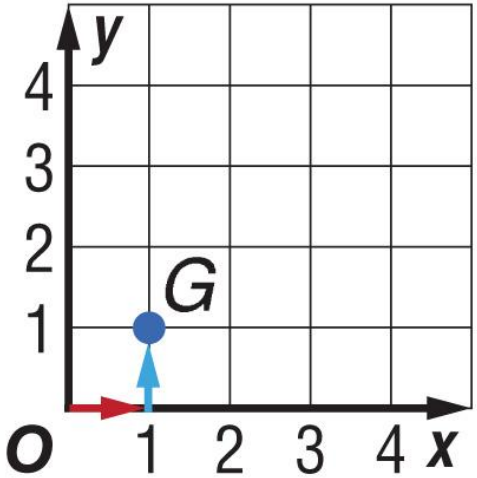
EXAMPLE 2 Identify Ordered Pairs

A. Write the ordered pair that names point *G*.

Step 1 Start at the origin.

Step 2 Move right on the *x*-axis to find the *x*-coordinate of point *G*, which is 1.

Step 3 Move up the *y*-axis to find the *y*-coordinate, which is 1.



Answer: The ordered pair for *G* is (1, 1).

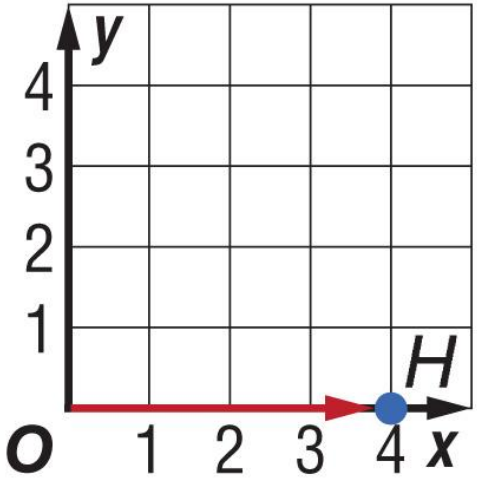
EXAMPLE 2 Identify Ordered Pairs

B. Write the ordered pair that names point *H*.

Step 1 Start at the origin.

Step 2 Move right on the *x*-axis to find the *x*-coordinate of point *H*, which is 4.

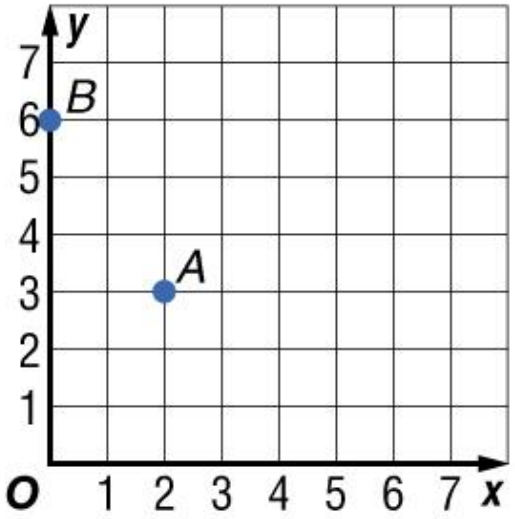
Step 3 Since the *y*-coordinate is zero, you will not need to move up.



Answer: The ordered pair for *H* is (4, 0).

CHECK Your Progress

2 **A. Write the ordered pair that names point *A*.**



A. (2, 5)

B. (3, 5)

C. (2, 3)

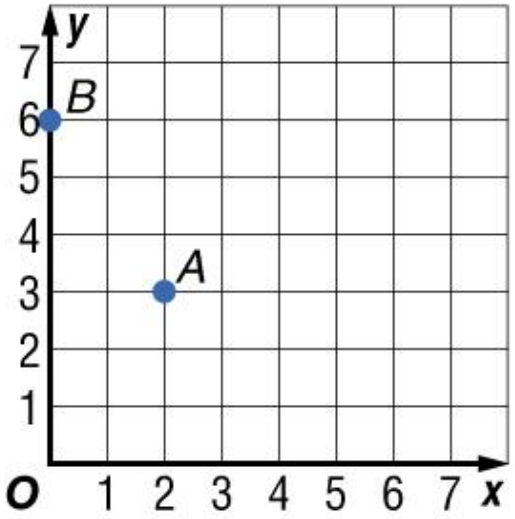
D. (3, 2)

0%

A B C D

CHECK Your Progress

2 **B. Write the ordered pair that names point *B*.**



A. (6, 6)

B. (0, 6)

C. (0, 0)

D. (6, 6)

0%

A B C D

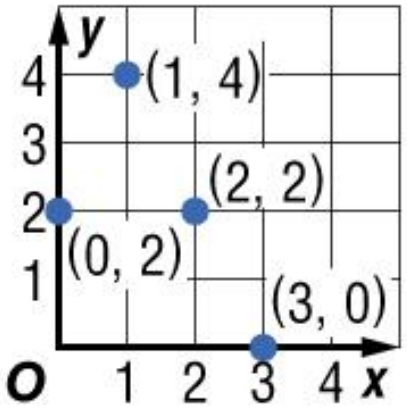
CheckPoint

EXAMPLE Relations as Tables and Graphs

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

Answer:

x	y
1	4
2	2
3	0
0	2



The domain is {0,1, 2, 3}.

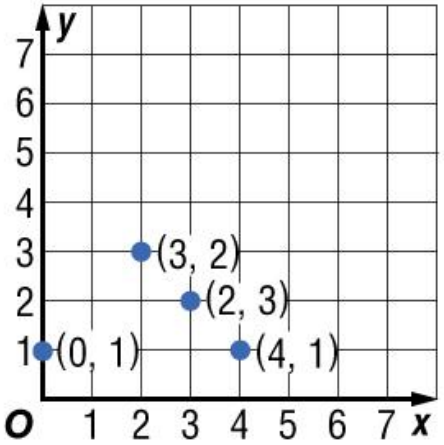
The range is {0, 2, 4}.

Concepts in MOtion
Animation:
Ordered Pairs and Relations
Click here to view!

CHECK Your Progress

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

x	y
4	1
3	2
0	1
2	3



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

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

C. D = {4, 3, 2},
R = {1, 2, 3}

D. D = {1, 2, 3},
R = {4, 3, 2}

0%

A B C D

CheckPoint

Real-World EXAMPLE

4 **EARNINGS** Austin earns $5 an hour doing yard work. Suppose x represents the number of hours Austin works.

A. Make a table of ordered pairs in which the x-coordinate represents the hours worked and y represents the amount of money Austin earns for 1, 2, 3, 4, and 5 hours of work.

Answer:

x	y	(x, y)
1	5	(1, 5)
2	10	(2, 10)
3	15	(3, 15)
4	20	(4, 20)
5	25	(5, 25)

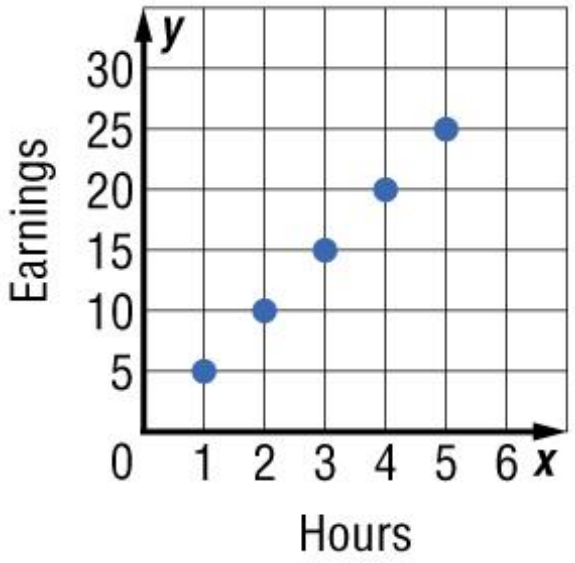
Real-World EXAMPLE

4 **EARNINGS** Austin earns $5 an hour doing yard work. Suppose x represents the number of hours Austin works.

B. Graph the ordered pairs.

x	y	(x, y)
1	5	(1, 5)
2	10	(2, 10)
3	15	(3, 15)
4	20	(4, 20)
5	25	(5, 25)

Answer:

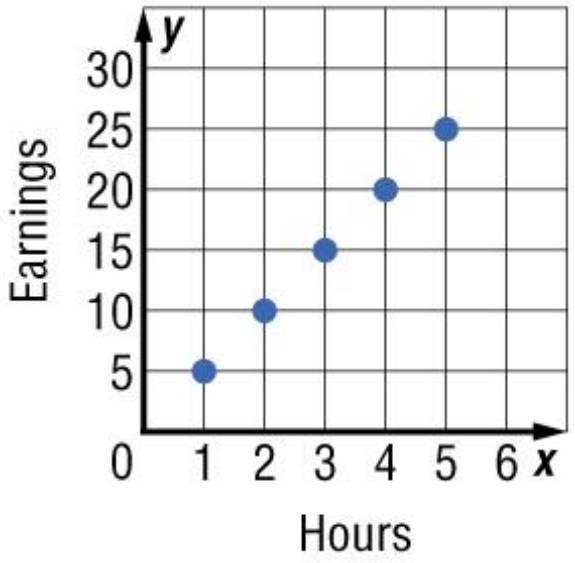


Real-World EXAMPLE

4 **EARNINGS** **Austin earns $5 an hour doing yard work. Suppose *x* represents the number of hours Austin works.**

C. Describe the graph.

Answer: The points appear to lie on a line.



CHECK Your Progress

4 **BAKING** Sue is following a recipe for cookies which requires 2 cups of sugar for each batch of cookies made. Suppose x represents the number of batches made.

A. Make a table of ordered pairs in which the x-coordinate represents the number of batches made and y represents the number of cups of sugar needed for 1, 2, 3, 4, and 5 batches made.

A.

x	y	(x, y)
1	3	(1, 3)
2	4	(2, 4)
3	5	(3, 5)
4	6	(4, 6)
5	7	(5, 7)

B.

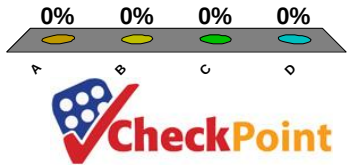
x	y	(x, y)
1	2	(1, 2)
2	2	(2, 2)
3	2	(3, 2)
4	2	(4, 2)
5	2	(5, 2)

C.

x	y	(x, y)
1	0	(1, 0)
2	2	(2, 2)
3	4	(3, 4)
4	6	(4, 6)
5	8	(5, 8)

D.

x	y	(x, y)
1	2	(1, 2)
2	4	(2, 4)
3	6	(3, 6)
4	8	(4, 8)
5	10	(5, 10)

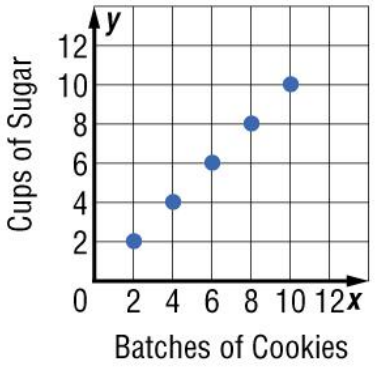


CHECK Your Progress

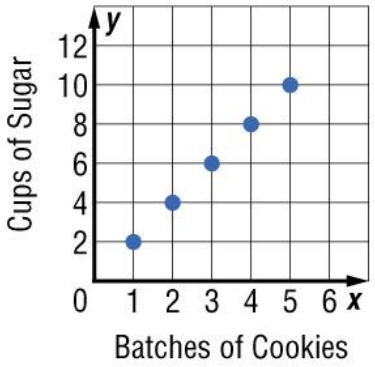
4 **BAKING** Sue is following a recipe for cookies which requires 2 cups of sugar for each batch of cookies made. Suppose x represents the number of batches made.

B. Graph the ordered pairs.

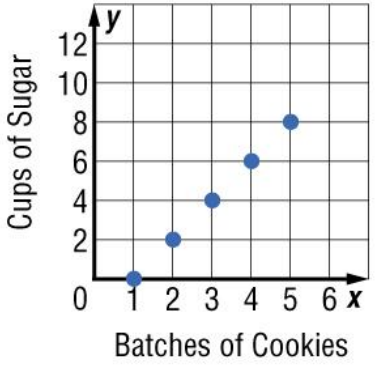
A.



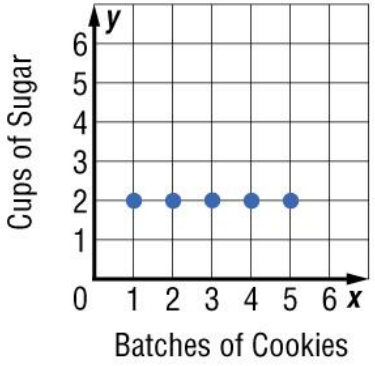
B.

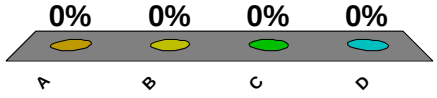


C.



D.



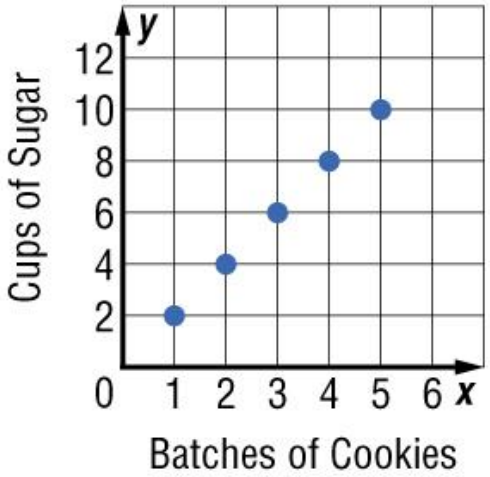


CheckPoint

CHECK Your Progress

4 **BAKING** Sue is following a recipe for cookies which requires 2 cups of sugar for each batch of cookies made. Suppose x represents the number of batches made.

C. Describe the graph.

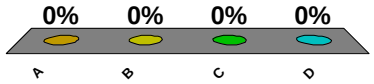


A. The points appear to fall in a line slanting upward to the right.

B. The points appear to fall randomly.

C. The points appear to fall in a line slanting downward to the right.

D. none of the above



End of the Lesson

Click the mouse button to return to the Chapter Menu.

Lesson Menu

Main Ideas

- Construct scatter plots.
- Analyze trends in scatter plots.

New Vocabulary

- scatter plot

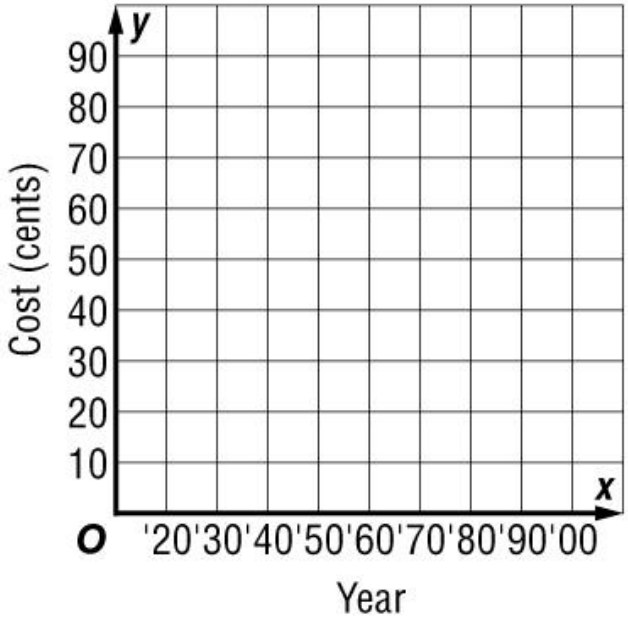
EXAMPLE Construct a Scatter Plot

1 **BREAD** The table shows the average cost of a loaf of bread from 1920–2000. Make a scatter plot of the data.

Year	1920	1930	1940
Cents	12	9	8

Year	1950	1960	1970
Cents	14	20	24

Year	1980	1990	2000
Cents	52	72	99



Let the horizontal axis, or *x*-axis, represent the year. Let the vertical axis, or *y*-axis, represent the cost.

EXAMPLE Construct a Scatter Plot

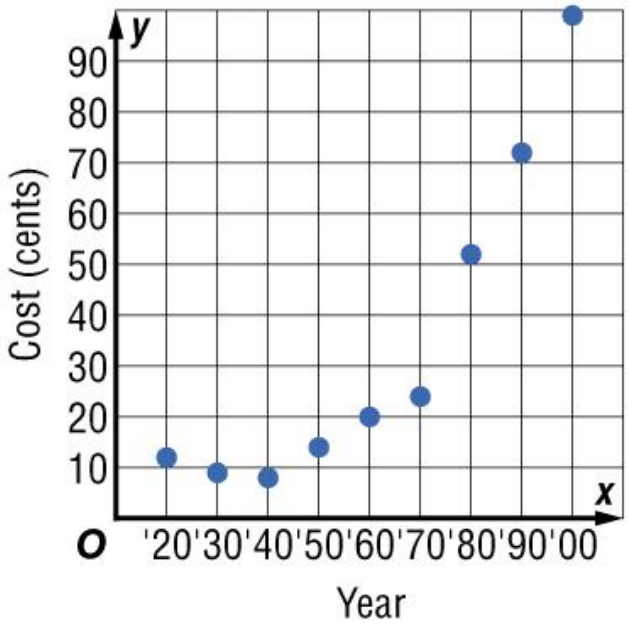
1 **BREAD** The table shows the average cost of a loaf of bread from 1920–2000. Make a scatter plot of the data.

Year	1920	1930	1940
Cents	12	9	8

Year	1950	1960	1970
Cents	14	20	24

Year	1980	1990	2000
Cents	52	72	99

Answer:



Then graph ordered pairs (years, cost).

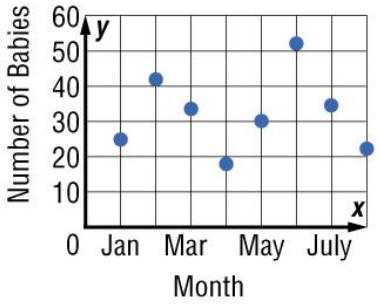
CHECK Your Progress

1 **BIRTH STATISTICS** The table shows the number of babies born at Central Hospital during the past eight months. Make a scatter plot of the data.

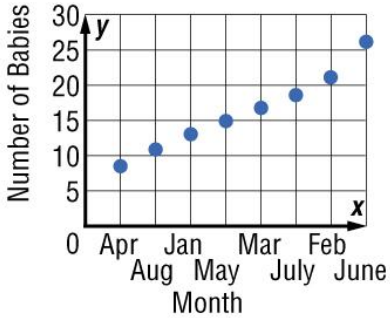
Month	Jan.	Feb.	Mar.	Apr.
Number of Babies	12	21	17	9

Month	May	June	July	Aug.
Number of Babies	15	26	18	11

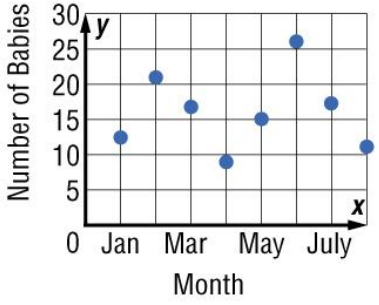
A.



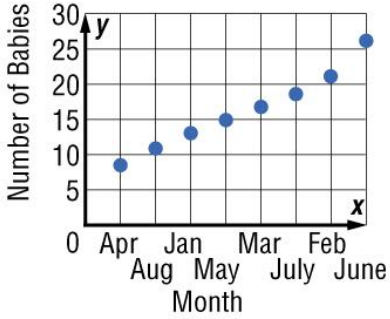
B.

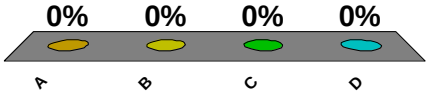


C.



D.

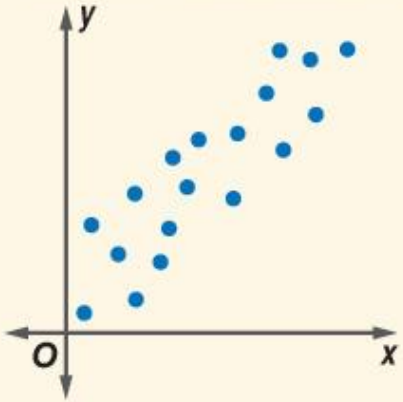




CheckPoint

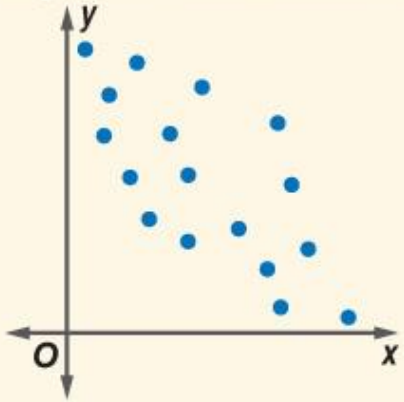
KEY CONCEPT Types of Relationships

Positive Relationship



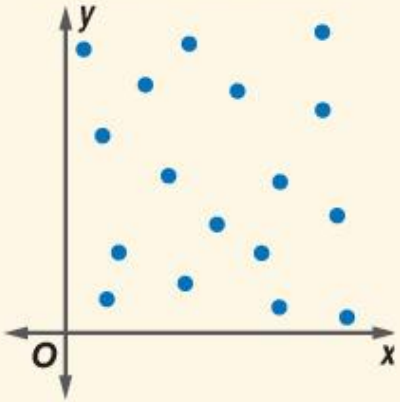
As x increases, y increases.

Negative Relationship



As x increases, y decreases.

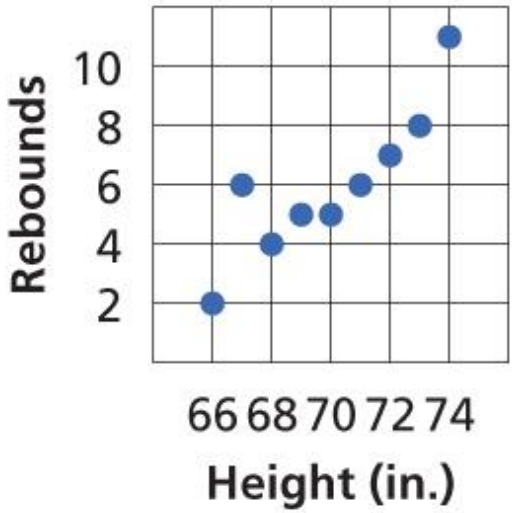
No Relationship



No obvious pattern.

EXAMPLE Interpret a Scatter Plot

2 **Determine whether a scatter plot of the height of basketball player and number of rebounds might show a *positive, negative,* or *no* relationship. Explain your answer.**



As the height increases, the number of rebounds increases.

Answer: positive relationship

CHECK Your Progress

2 Determine whether a scatter plot of the outside temperature and the heating bill might show a *positive, negative,* or *no* relationship. Explain your answer.

A. As the outside temperature decreases, the heating bill will increase. This is a negative relationship.

B. As the outside temperature decreases, the heating bill will increase. This is a positive relationship.

C. As the outside temperature increases, the heating bill will increase. This is a negative relationship.

D. Outside temperature and heating bill have no relationship.

0%

A B C D

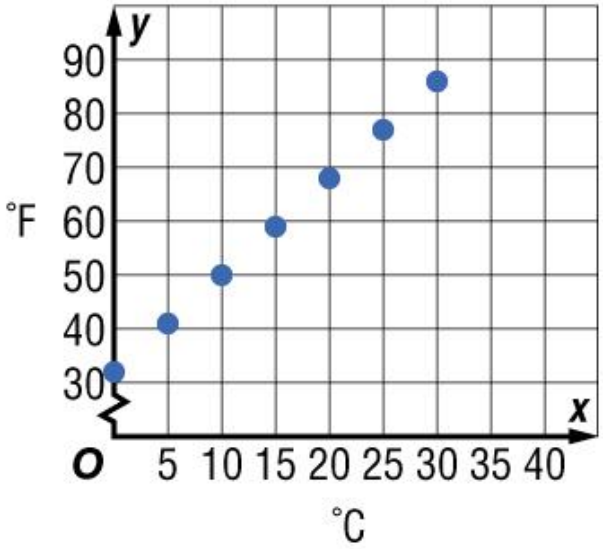
CheckPoint

Real-World EXAMPLE

3 **A. TEMPERATURE** **The table shows temperatures in degrees Celsius and the corresponding temperatures in degrees Fahrenheit. Make a scatter plot of the data.**

°F	32	41	50	59
°C	0	5	10	15

°F	68	77	86
°C	20	25	30

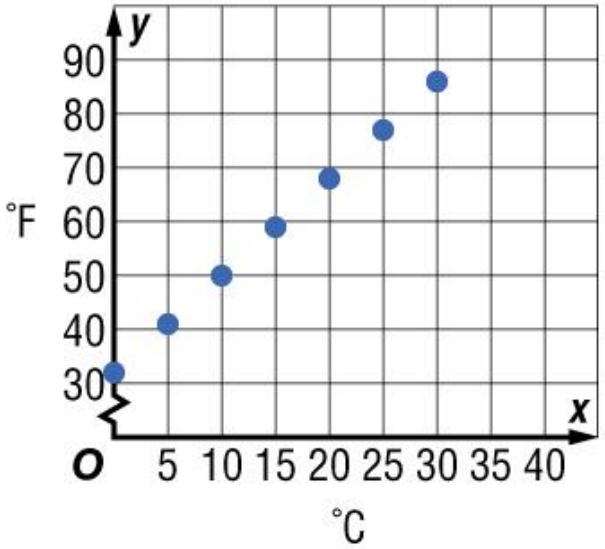


Let the vertical axis represent degrees Fahrenheit.

Graph the data.

Real-World EXAMPLE

3 **B. Does the scatter plot show a relationship between °C and °F? Explain.**

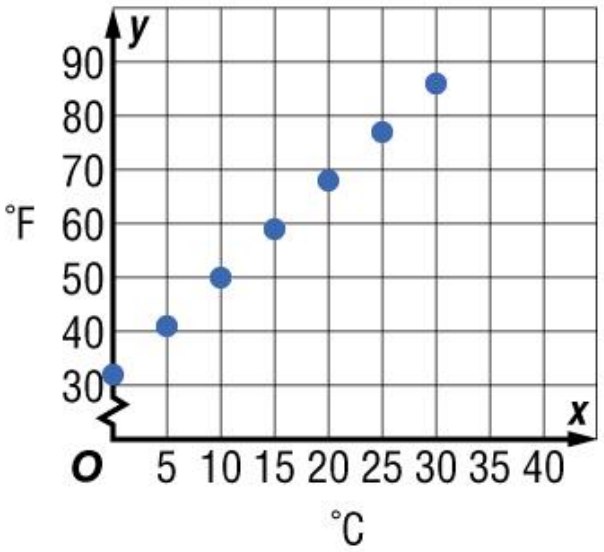


Answer: Yes, a positive relationship is shown. As °C increase, so do °F.

Real-World EXAMPLE

3 **C. Predict the Fahrenheit temperature for 35 °C.**

Answer: By looking at the pattern on the graph, we can predict that the Fahrenheit temperature corresponding to 35°C would be about 95 degrees.



CHECK Your Progress

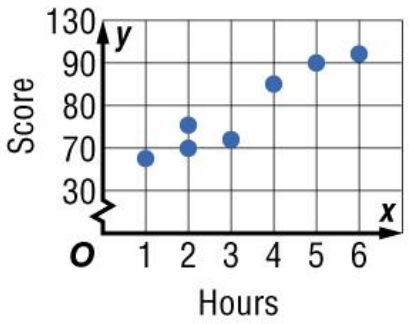
3 **A. STUDY SKILLS** The table shows hours spent studying for a test and the corresponding test score. Make a scatter plot of the data.

Hours	3	2	5	1
Score	72	75	90	68

Hours	4	2	6
Score	85	70	92

0%

A.



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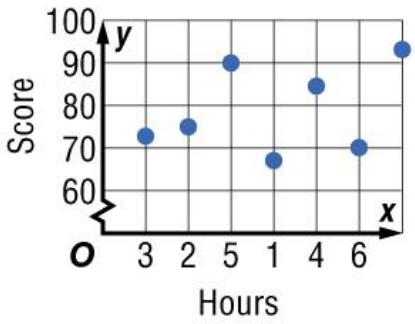

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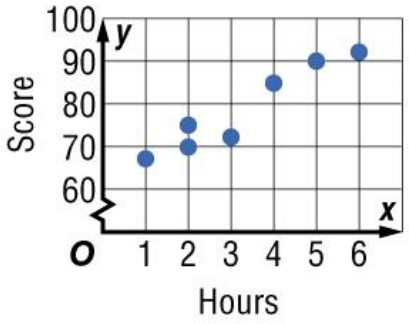

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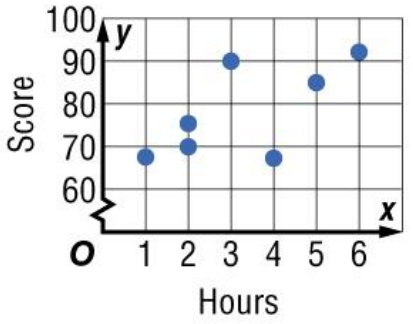


A B C D

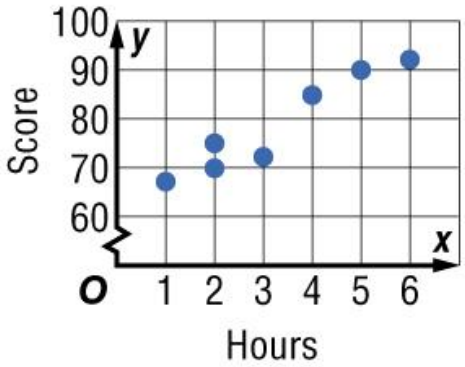
CheckPoint

CHECK Your Progress

3 **B. STUDY SKILLS** The table shows hours spent studying for a test and the corresponding test score. Does the scatter plot show a relationship between hours studied and a student's test score?

Hours	3	2	5	1
Score	72	75	90	68

Hours	4	2	6
Score	85	70	92



A. Yes, a positive relationship exists.

B. Yes, a negative relationship exists.

C. No, no relationship exists.

D. none of the above

0%

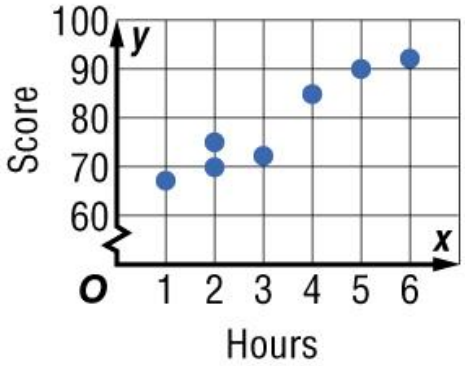
A B C D

CheckPoint

CHECK Your Progress

Hours	3	2	5	1
Score	72	75	90	68

Hours	4	2	6
Score	85	70	92



3 **C. STUDY SKILLS** The table shows hours spent studying for a test and the corresponding test score. Predict the test score for a student who spends 7 hours studying.

A. between 65 and 70

B. between 75 and 80

C. between 95 and 100

D. between 105 and 110

0%

A B C D

CheckPoint

End of the Lesson

Click the mouse button to return to the Chapter Menu.

Chapter Resources Menu

Concepts in Motion

Lesson 1-1

Lesson 1-2 (over Lesson 1-1)

Lesson 1-3 (over Lesson 1-2)

Lesson 1-4 (over Lesson 1-3)

Lesson 1-5 (over Lesson 1-4)

Lesson 1-6 (over Lesson 1-5)

Lesson 1-7 (over Lesson 1-6)

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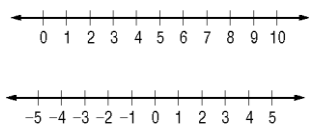
Image Bank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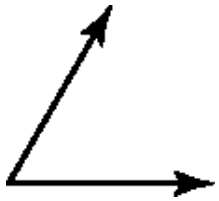

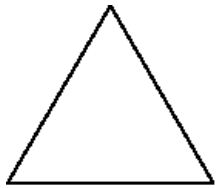

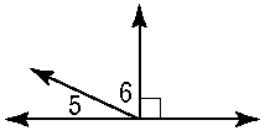
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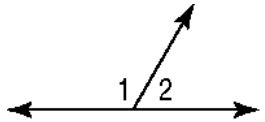
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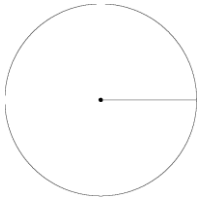

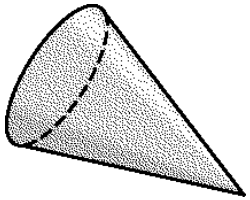

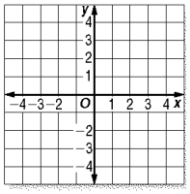
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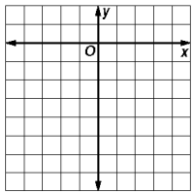
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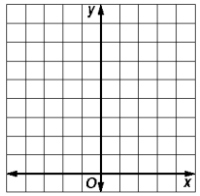
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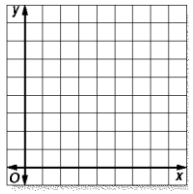
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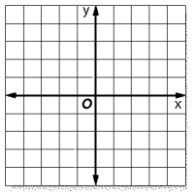
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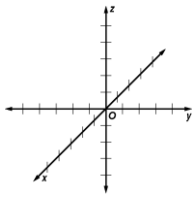
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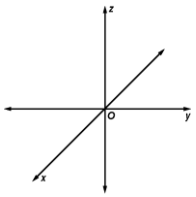
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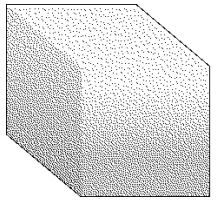

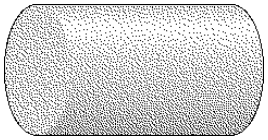

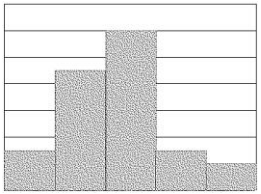

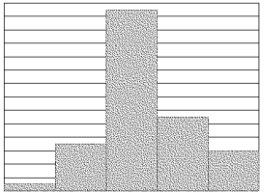

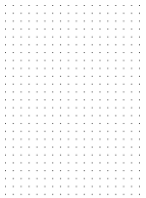

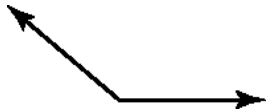

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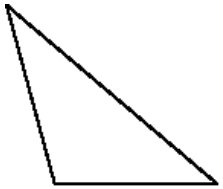

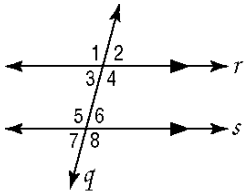

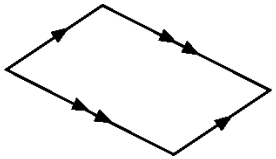

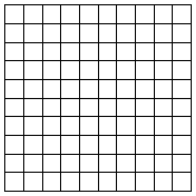

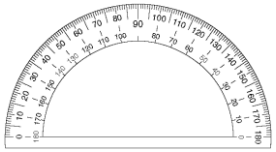

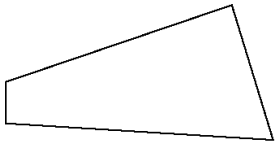

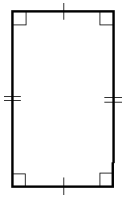

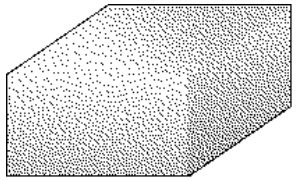

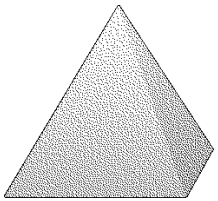

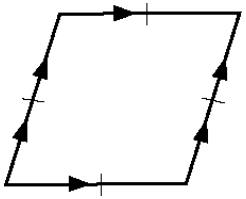

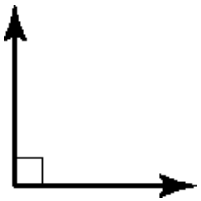

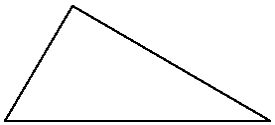

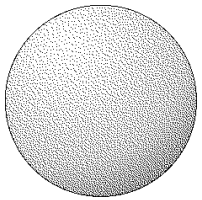

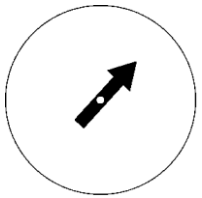

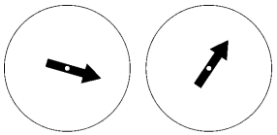

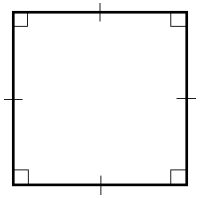

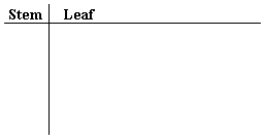

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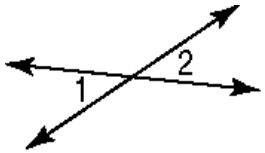
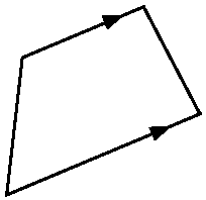
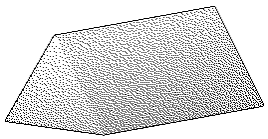
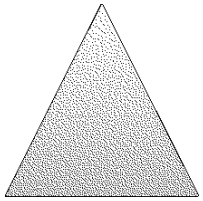
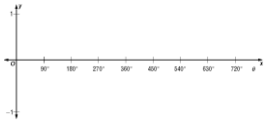
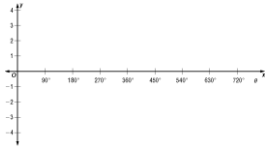


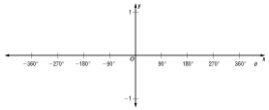


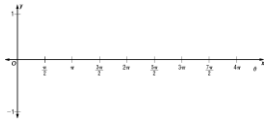


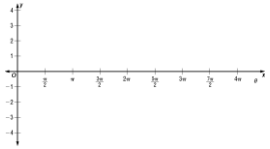




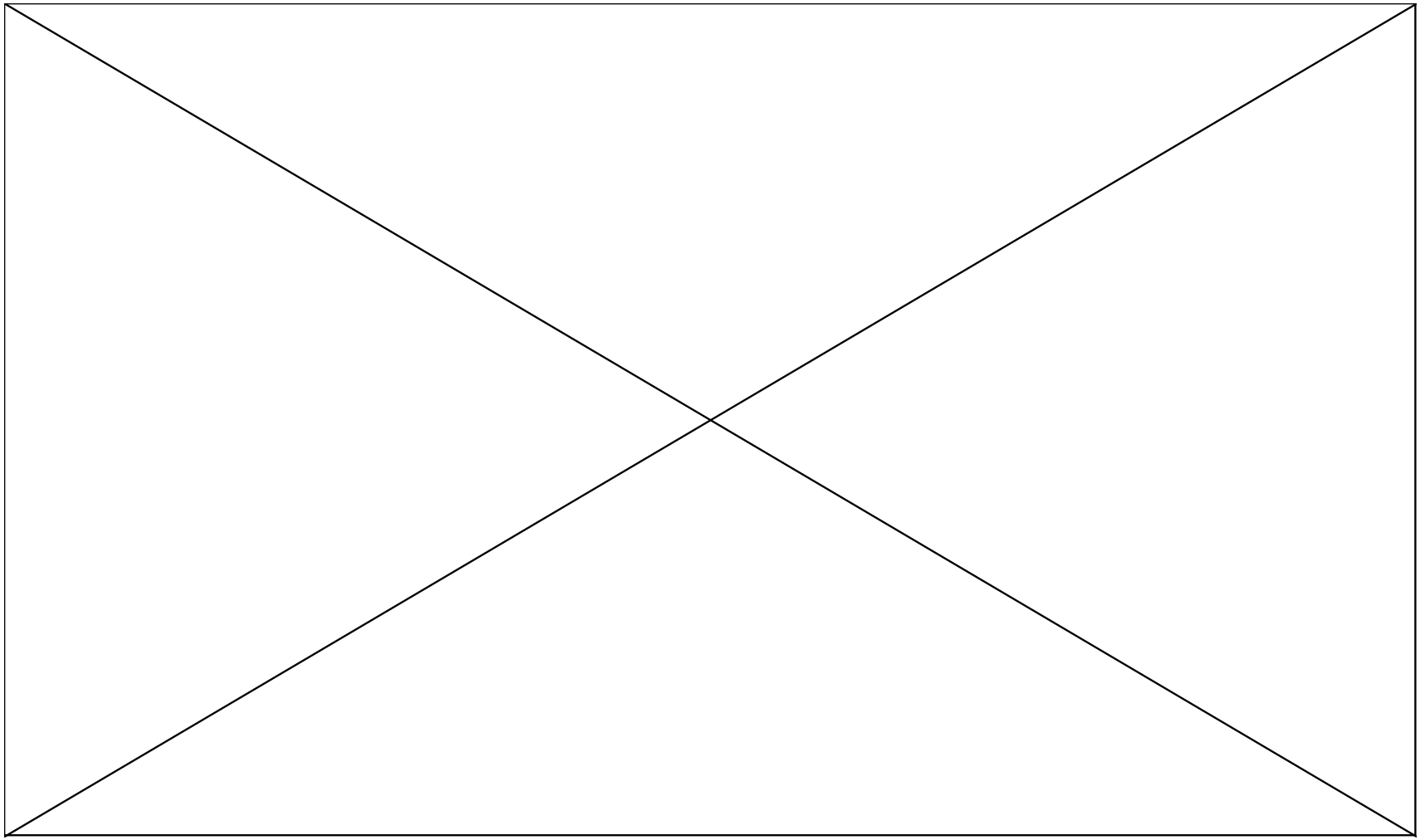








Concepts in Motion Animation



Five-Minute CHECK

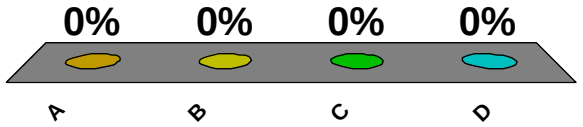
1 Find the value of 1.8 + 0.6.

A. 2.4

B. 1.86

C. 1.2

D. 1.14



CheckPoint

Five-Minute CHECK

2 Find the value of 85.24 + 12.8.

A. 94.22

B. 97.24

C. 97.32

D. 98.04

0%

A B C D

CheckPoint

Five-Minute CHECK

3 Find the value of 114 – 2.9.

A. 111

B. 111.1

C. 112.9

D. 112.1

0%

A B C D

CheckPoint

Five-Minute CHECK

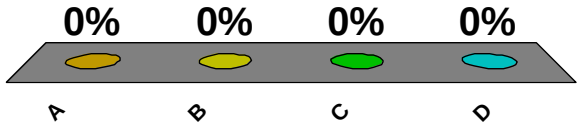
4 Find the value of 8 × 47.

A. 376

B. 367

C. 476

D. 592



CheckPoint

Five-Minute CHECK

5 Find the value of $\frac{72}{4}$.

A. 228

B. 76

C. 18

D. 12

0%

A B C D

CheckPoint

Five-Minute CHECK

Standardized Test Practice

6 The sales figures for a business for the months in the first quarter are shown in the table. What were the total sales for the first quarter?

Month	Sales
January	$12,000
February	$15,000
March	$10,000

A. $12,000

B. $17,000

C. $27,000

D. $37,000

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-1)

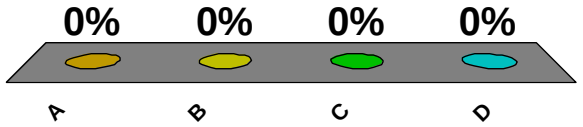
1 Find the next term in the list 4, 10, 16, 22, 28, …

A. 32

B. 34

C. 36

D. 40



CheckPoint

Five-Minute CHECK (over Lesson 1-1)

2 Find the next term in the list 8, 13, 18, 23, 28, …

A. 33

B. 36

C. 37

D. 39

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-1)

3 Ken uses $\frac{1}{2}$ cup of cat food each day for his cat. If there are $10\frac{1}{2}$ cups left in the bag, how long will the cat food last? Use the four-step problem solving plan to solve.

0%

A. 10 days

B. 11 days

C. 21 days

D. 22 days

A B C D

Five-Minute CHECK (over Lesson 1-1)

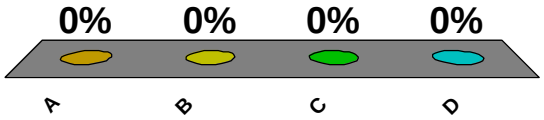
4 Using six coins, how can you make change for 95 cents that will not make change for a quarter? Use the four-step problem-solving plan to solve.

A. 3 quarters, 3 nickels, 1 dime

B. 3 quarters, 2 nickels, 1 dime

C. 3 quarters, 1 nickel, 2 dimes

D. 3 quarters, 1 nickel, 1 dime



CheckPoint

Five-Minute CHECK (over Lesson 1-1)

Standardized Test Practice

5 Ron plans to add 3 books to his science fiction collection every month. If he has 18 science fiction books now, how many will he have in one year?

A. 21

B. 36

C. 54

D. 57

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-2)

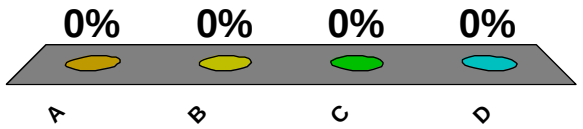
1 Find the value of the expression $54 - \frac{42}{7}$.

A. 1.7

B. 5

C. 48

D. 60



CheckPoint

Five-Minute CHECK (over Lesson 1-2)

2 Find the value of the expression 80 + 6(11).

A. 97

B. 146

C. 886

D. 946

0%

A B C D

Five-Minute CHECK (over Lesson 1-2)

3 Find the value of the expression $\frac{(37+38)}{(30-5)}$.

A. –12.5

B. –6

C. 3

D. 8.8

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-2)

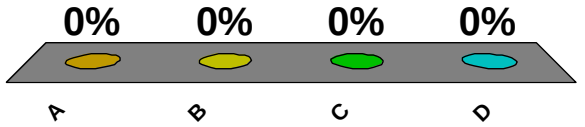
4 **Write a numerical expression for the verbal phrase: thirteen more than eight.**

A. 8 + 13

B. 8 – 13

C. 13 ÷ 8

D. 13 × 8



CheckPoint

Five-Minute CHECK (over Lesson 1-2)

5 **Write a numerical expression for the verbal phrase: thirty-six divided by two.**

A. 36×2

B. $36 + 2$

C. $\frac{2}{36}$

D. $\frac{36}{2}$

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-2)

Standardized Test Practice

6 **Which expression does not have a value of 24?**

A. $8 + 4 \bullet 2$

0%

B. $10 \bullet 4 - 8 \bullet 2$

C. $\dfrac{(8 \bullet 6)}{(6 - 4)}$

D. $\dfrac{27}{9} \bullet (14 - 6)$

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-3)

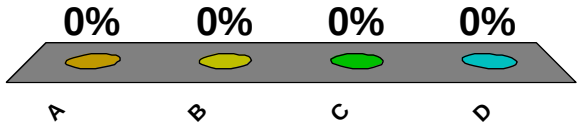
1 Evaluate $c + 8 - a$ for $a = 4$ and $c = 3$.

A. 15

B. 10

C. 9

D. 7



CheckPoint

Five-Minute CHECK (over Lesson 1-3)

2 Evaluate $\frac{ac}{2}$ for $a = 4$ and $c = 3$.

A. 3

B. 3.5

C. 6

D. 12

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-3)

3 Evaluate $7a - (2c + b)$ for $a = 4$, $b = 2$, and $c = 3$.

A. 16

B. 20

C. 21

D. 24

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-3)

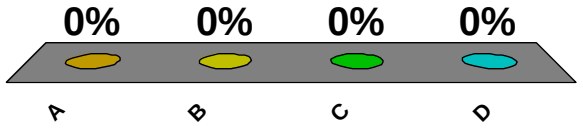
4 Translate the phrase into an algebraic expression.
three feet shorter than the height of a building

A. $3b$

B. $b + 3$

C. $3 - b$

D. $b - 3$



CheckPoint

Five-Minute CHECK (over Lesson 1-3)

5 Translate the phrase into an algebraic expression.
eight more than three times a number

A. $3n + 8$

B. $8n + 3$

0%

C. $3(n + 8)$

D. $11n$

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-3)

Standardized Test Practice

6 Which expression represents *three less than four times a number*?

A. $3 - 4n$

B. $4n - 3$

C. $4(n - 3)$

D. $3n - 4$

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-4)

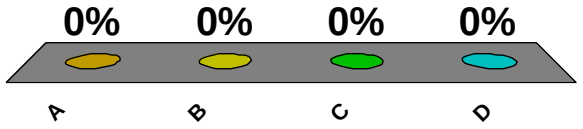
1 Name the property shown by the statement $(4b)c = 4(bc)$.

A. Associative Property of Multiplication

B. Commutative Property of Multiplication

C. Distributive Property of Multiplication

D. Multiplicative Identity



CheckPoint

Five-Minute CHECK (over Lesson 1-4)

2 Name the property shown by the statement $4y + 0 = 4y$.

A. Additive Inverse

B. Additive Identity

C. Multiplicative Identity

D. Multiplicative Property of Zero

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-4)

3 Find the sum mentally. 18 + 13 + 2 + 7

A. 30

B. 37

C. 40

D. 45

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-4)

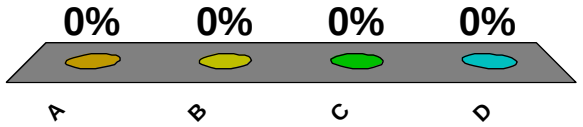
4 Find the product mentally. 6 • 7 • 5

A. 18

B. 45

C. 120

D. 210



CheckPoint

Five-Minute CHECK (over Lesson 1-4)

5 Simplify $3 \bullet (y \bullet 9)$.

A. $12y$

B. $27y$

C. $12y + 27$

D. $3y + 27$

0%

A B C D

Five-Minute CHECK (over Lesson 1-4)

Standardized Test Practice

6 Rewrite $(3 + n) + 7$ using the Associative Property.

A. $(n + 3) + 7$

B. $(3 + 7) + n$

C. $7 + (3 + n)$

D. $3 + (n + 7)$

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-5)

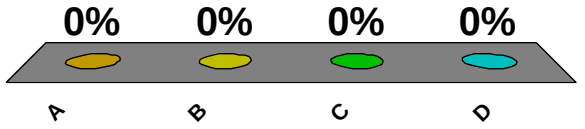
1 Which value is the solution of $5 - x = 2$?

A. 3

B. 5

C. 7

D. none of the above



CheckPoint

Five-Minute CHECK (over Lesson 1-5)

2 Which value is the solution of $7n = 42$?

A. 8

B. 7

C. 6

D. none of the above

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-5)

3 Which value is the solution of $\frac{85}{b} = 5$?

A. 15

0%

B. 17

C. 19

D. none of the above

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-5)

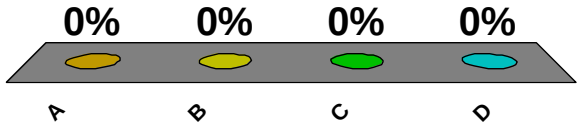
4 Solve $25 = 5x$ mentally.

A. 5

B. 20

C. 30

D. 125



CheckPoint

Five-Minute CHECK (over Lesson 1-5)

5 Solve $19 - w = 5$ mentally.

A. –24

B. –14

C. 14

D. 24

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-5)

Standardized Test Practice

6 Which value of x makes the equation $3x - 2 = 7$ true?

A. 9

0%

B. 6

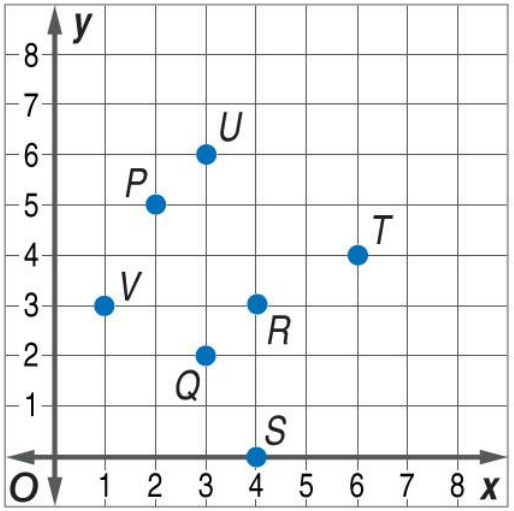
C. 4

D. 3

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-6)



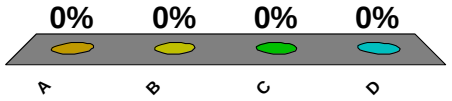
1 **Name the point which corresponds to the ordered pair (2, 5) in the graph.**

A. *V*

B. *U*

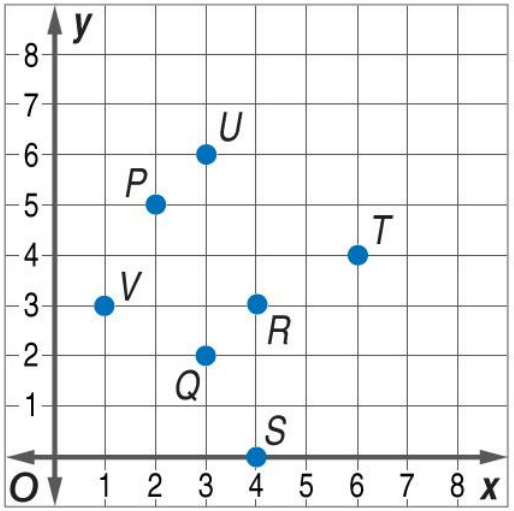
C. *T*

D. *P*



CheckPoint

Five-Minute CHECK (over Lesson 1-6)



2 Name the point which corresponds to the ordered pair (4, 3) in the graph.

A. *Q*

B. *R*

C. *S*

D. *V*

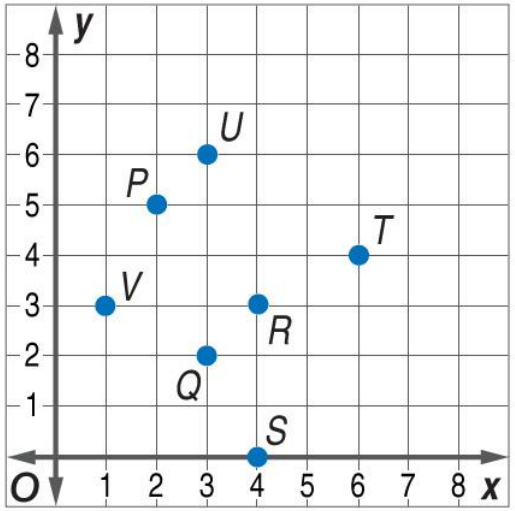
0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-6)

3 Find the ordered pair that names the point *Q* in the graph.



A. (2, 3)

B. (3, 2)

C. (3, 3)

D. (4, 3)

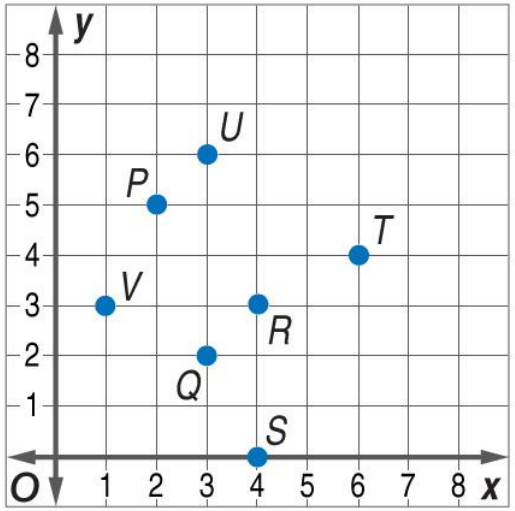
0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-6)

4 Find the ordered pair that names the point *T* in the graph.

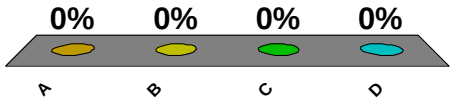


A. (6, 4)

B. (4, 6)

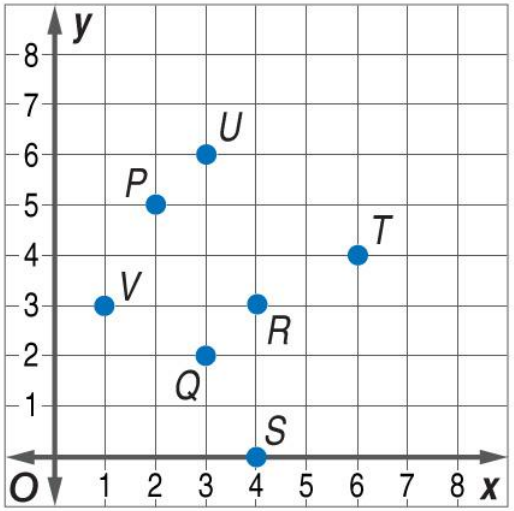
C. (4, 3)

D. (3, 6)



CheckPoint

Five-Minute CHECK (over Lesson 1-6)



5 Determine the domain (D) and the range (R) of the relation in the graph.

A. D = {0, 2, 3, 4, 5, 6}
R = {1, 2, 3, 4, 6}

B. D = {1, 2, 3, 4, 5, 6}
R = {1, 2, 3, 4, 6}

C. D = {1, 2, 3, 4, 5, 6}
R = {0, 1, 2, 3, 4, 5, 6}

D. D = {1, 2, 3, 4, 6}
R = {0, 2, 3, 4, 5, 6}

0%

A B C D

CheckPoint

Five-Minute CHECK (over Lesson 1-6)

Standardized Test Practice

6 What point lies on both the *x*-axis and the *y*-axis?

A. (1, 1)

B. (0, 1)

C. (0, 0)

D. (1, 0)

0%

A B C D

CheckPoint