

# Patterns

- 7.1 Variables in Expressions**
- 7.2 Words and Symbols**
- 7.3 Solving Equations**
- 7.4 Developing Patterns**
- 7.5 Tables of Values**
- 7.6 Ordered Pairs**
- 7.7 The Coordinate Plane**
- 7.8 Graphing Ordered Pairs**
- 7.9 Graphing Relations**

*Review*

*Chapter Check*

*Problem Solving: Using the Strategies*

Answers CHAPTER 7 Patterns

# 1991

1. 1991-1992

2. 1992-1993

3. 1993-1994

4. 1994-1995

5. 1995-1996

6. 1996-1997

7. 1997-1998

8. 1998-1999

9. 1999-2000

10. 2000-2001

11. 2001-2002

12. 2002-2003

13. 2003-2004

14. 2004-2005

15. 2005-2006

16. 2006-2007

17. 2007-2008

18. 2008-2009

19. 2009-2010

20. 2010-2011

21. 2011-2012

22. 2012-2013

23. 2013-2014

## Skill Builder



### 1. Add.

a)  $5 + 8 =$  \_\_\_\_\_ b)  $7 + 9 =$  \_\_\_\_\_

c)  $12 + 13 =$  \_\_\_\_\_ d)  $21 + 6 =$  \_\_\_\_\_

Rough Work:

$$\begin{array}{r} 12 \\ +13 \\ \hline \end{array} \qquad \begin{array}{r} 21 \\ + 6 \\ \hline \end{array}$$

### 2. Subtract.

a)  $21 - 5 =$  \_\_\_\_\_ b)  $32 - 12 =$  \_\_\_\_\_

c)  $24 - 15 =$  \_\_\_\_\_ d)  $41 - 13 =$  \_\_\_\_\_

Rough Work:

### 3. Multiply.

a)  $5 \times 3 =$  \_\_\_\_\_ b)  $9 \times 6 =$  \_\_\_\_\_ c)  $11 \times 7 =$  \_\_\_\_\_ d)  $12 \times 7 =$  \_\_\_\_\_

e)  $4 \times 9 =$  \_\_\_\_\_ f)  $8 \times 8 =$  \_\_\_\_\_ g)  $10 \times 5 =$  \_\_\_\_\_ h)  $3 \times 7 =$  \_\_\_\_\_

### 4. Divide.

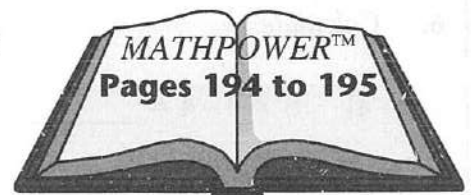
a)  $18 \div 3 =$  \_\_\_\_\_ b)  $24 \div 6 =$  \_\_\_\_\_ c)  $72 \div 6 =$  \_\_\_\_\_ d)  $120 \div 10 =$  \_\_\_\_\_

e)  $24 \div 4 =$  \_\_\_\_\_ f)  $35 \div 7 =$  \_\_\_\_\_ g)  $16 \div 4 =$  \_\_\_\_\_ h)  $100 \div 10 =$  \_\_\_\_\_

## GETTING STARTED



Work together with your classmates, using your **MATHPOWER™** student text, pages 194 and 195.



# Mental Math



## 1. Add.

a)  $6 + 7 =$  \_\_\_\_\_

b)  $10 + 8 =$  \_\_\_\_\_

c)  $9 + 5 =$  \_\_\_\_\_

d)  $4 + 9 =$  \_\_\_\_\_

e)  $5 + 15 =$  \_\_\_\_\_

f)  $12 + 7 =$  \_\_\_\_\_

## 2. Subtract.

a)  $10 - 3 =$  \_\_\_\_\_

b)  $12 - 8 =$  \_\_\_\_\_

c)  $15 - 7 =$  \_\_\_\_\_

d)  $16 - 9 =$  \_\_\_\_\_

e)  $10 - 6 =$  \_\_\_\_\_

f)  $11 - 2 =$  \_\_\_\_\_

## 3. Multiply.

a)  $6 \times 8 =$  \_\_\_\_\_

b)  $9 \times 7 =$  \_\_\_\_\_

c)  $4 \times 6 =$  \_\_\_\_\_

d)  $7 \times 10 =$  \_\_\_\_\_

e)  $5 \times 11 =$  \_\_\_\_\_

f)  $3 \times 8 =$  \_\_\_\_\_

## 4. State the *quotient* and the *remainder*.

a)  $\begin{array}{r} \square \\ 4 \overline{)13} \end{array}$  R  $\square$

b)  $5 \overline{)47}$

c)  $8 \overline{)35}$

d)  $7 \overline{)50}$

e)  $2 \overline{)23}$

f)  $5 \overline{)56}$

## 5. Calculate.

**BEDMAS**

a)  $5 \times 8 + 3 =$  \_\_\_\_\_

b)  $3 \times 6 + 2 =$  \_\_\_\_\_

c)  $2 \times 7 + 1 =$  \_\_\_\_\_

d)  $3 \times 4 + 2 =$  \_\_\_\_\_

## 6. Calculate.

a)  $8 \times 3 - 4 =$  \_\_\_\_\_

b)  $5 \times 6 - 2 =$  \_\_\_\_\_

c)  $3 \times 6 - 4 =$  \_\_\_\_\_

d)  $3 \times 4 - 8 =$  \_\_\_\_\_

Continues on next page. →

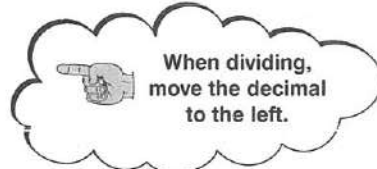
7. Calculate.

a)  $36 \div 10 =$  \_\_\_\_\_

c)  $415 \div 100 =$  \_\_\_\_\_

e)  $206 \div 10 =$  \_\_\_\_\_

g)  $3.8 \div 10 =$  \_\_\_\_\_

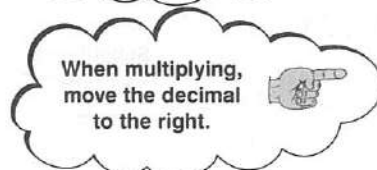


b)  $25 \times 100 =$  \_\_\_\_\_

d)  $76 \times 10 =$  \_\_\_\_\_

f)  $1.5 \times 1000 =$  \_\_\_\_\_

h)  $5.2 \times 10 =$  \_\_\_\_\_



8. Simplify.

a)  $4^2 = 4 \times 4 =$  \_\_\_\_\_

b)  $2^3 = 2 \times 2 \times 2 =$  \_\_\_\_\_

c)  $5^2 =$  \_\_\_\_\_

d)  $6^2 =$  \_\_\_\_\_

e)  $4^2 + 2 = 4 \times 4 + 2$   
= \_\_\_\_\_

f)  $5^2 - 10 =$  \_\_\_\_\_  
= \_\_\_\_\_

## Skill Builder

1. Find the missing value.

a)  $(+10) + (\quad) = +13$

b)  $(+5) + (\quad) = +2$

c)  $(\quad) + (+10) = +11$

d)  $(\quad) + (+3) = -1$

e)  $(+10) - (\quad) = +2$

f)  $(+12) - (\quad) = 0$

g)  $(\quad) - (+7) = +6$

h)  $(\quad) - (+2) = +8$

i)  $(+7) - (\quad) = +2$

2. Calculate.

a) 
$$\begin{array}{r} 56 \\ -9 \\ \hline \end{array}$$

b) 
$$\begin{array}{r} 60 \\ \times 7 \\ \hline \end{array}$$

c) 
$$\begin{array}{r} 78 \\ -12 \\ \hline \end{array}$$

d) 10 cubed = \_\_\_\_\_

e)  $\frac{56}{7} =$  \_\_\_\_\_

f) 
$$\begin{array}{r} 43 \\ -9 \\ \hline \end{array}$$

g) 
$$\begin{array}{r} 48 \\ +12 \\ \hline \end{array}$$

h) 
$$\begin{array}{r} 40 \\ \times 3 \\ \hline \end{array}$$

i) 
$$\begin{array}{r} 12 \\ \times 20 \\ \hline \end{array}$$

j) 
$$\begin{array}{r} 72 \\ -12 \\ \hline \end{array}$$



# 7.1 Variables in Expressions



## Practice

Find the answer.

1. Evaluate the following.

a)  $n + 5, n = 4$

$$n + 5 = 4 + 5$$

$$= \underline{\quad}$$

Substitute 4.

b)  $3n, n = 2$

$$3 \times n = 3 \times \underline{\quad}$$

$$= \underline{\quad}$$

Substitute 2.

c)  $n - 2, n = 5$

$$n - 2 = \underline{\quad}$$

$$= \underline{\quad}$$

d)  $7 + n, n = 0$

e)  $4n, n = 0$

f)  $11 + n, n = 4$

g)  $2n + 1, n = 3$

$$(2 \times n) + 1 = (2 \times \boxed{\quad}) + 1$$

$$= \underline{\quad} + 1$$

$$= \underline{\quad}$$

h)  $3n + 2, n = 1$

i)  $4n - 6, n = 3$

j)  $6 - 2n, n = 1$

2. Substitute 3 for  $m$  in each expression and then, simplify.

a)  $4m = 4 \times 3$

$$= \underline{\quad}$$

b)  $m + 5$

c)  $m - 1$

d)  $7 - m$

e)  $12 - m$

f)  $m + m$

g)  $6m$

h)  $m + 11$

i)  $2m + 1$

3. Substitute 4 for  $x$  in each expression and then, simplify.

a)  $x + 5 =$

b)  $5x =$

c)  $10 - x =$

d)  $2x - 2 = (2 \times \square) - 2$   
 $= \square - 2$   
 $=$  \_\_\_\_\_

e)  $2x + 3 =$

f)  $10 - 2x = 10 - (2 \times \square)$   
 $= 10 -$  \_\_\_\_\_  
 $=$  \_\_\_\_\_

g)  $12 - 3x =$

4. Substitute  $y = 2$  and then, simplify.

a)  $5 - y =$

b)  $y - 2 =$

c)  $2y =$

d)  $2y - 3 =$

e)  $7 - 2y =$

f)  $6 - 3y =$

5. Evaluate the following expressions for  $m = 2$  and  $n = 3$ .

a)  $m + n = 2 + 3$   
 $=$

b)  $n - m =$

c)  $2m + n =$

Do multiplication first.

d)  $3m - n =$

e)  $3(m + n) =$

Do what's in the brackets first.

6. Evaluate the following expressions for  $x = 2.4$  and  $y = 4.2$ .

a)  $x + y = 2.4 + 4.2$

b)  $y - x =$

c)  $3x =$

$=$  \_\_\_\_\_

d)  $3y =$

e)  $3(x + y) =$

Do  
brackets  
first.

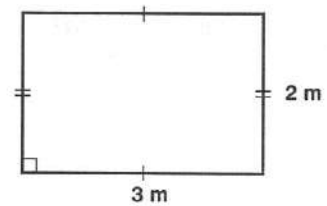


## Problems and Applications

7. The formula for the perimeter of a rectangle is  $2(l + w)$ .  
Find the perimeter if  $l = 3$  m and  $w = 2$  m.

$2(l + w) =$

Do  
brackets  
first.



Sentence: \_\_\_\_\_

8. Sam bought some pens for \$8 each. Let  $n$  stand for the number of pens he bought.  
The expression for the total cost is  $8n$ .

What is the cost of the following?

a) 5 pens

b) 10 pens

$8n =$

$=$

\_\_\_\_\_

\_\_\_\_\_

9. Make up your own expression using the variable  $m$ . \_\_\_\_\_

Have a classmate simplify the expression if  $m = 5$ .





The real word **TIP** written backward is **PIT**. Find 2 other words that give real words when they are written backward.

### Skill Builder

1. Find the perimeter and area of a rectangle if  $l = 5$  cm and  $w = 2$  cm.

a) Perimeter =  $2(l + w)$

b) Area =  $lw$

2. Match the following.

a) 3 increased by 12

20

b) double 10

40

c) 50 decreased by 10

15

d) triple 10

16

e) half of 16

30

f) double 6, then add 4

4

g) 2 squared

2

h) half of 4

8

3. Solve.

a)  $6 \times 3 = \underline{\quad}$     b)  $5 \times 8 = \underline{\quad}$     c)  $9 \times 3 = \underline{\quad}$     d)  $4 \times 4 = \underline{\quad}$

e)  $10 \times 10 = \underline{\quad}$     f)  $7 \times 7 = \underline{\quad}$     g)  $8 \times 6 = \underline{\quad}$     h)  $10 \times 2 = \underline{\quad}$

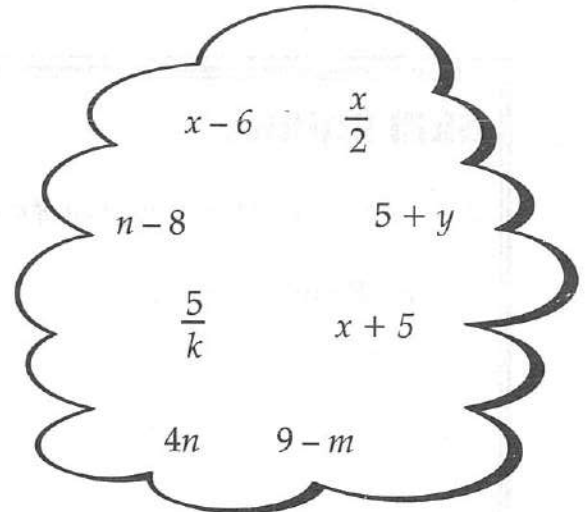
## 7.2 Words and Symbols

### Practice



1. Choose an expression from the cloud to match the words for each of the following.

- a) a number increased by 5 \_\_\_\_\_
- b) a number decreased by 6 \_\_\_\_\_
- c) a number multiplied by 4 \_\_\_\_\_
- d) a number divided by 2 \_\_\_\_\_
- e) 8 subtracted from a number \_\_\_\_\_
- f) the sum of 5 and a number \_\_\_\_\_
- g) a number subtracted from 9 \_\_\_\_\_
- h) 5 divided by a number \_\_\_\_\_



2. The variable  $x$  represents a number. Write the words that can be represented by each of the following expressions.

- a)  $x + 6$  \_\_\_\_\_
- b)  $x - 5$  \_\_\_\_\_
- c)  $4x$  \_\_\_\_\_
- d)  $2x$  \_\_\_\_\_
- e)  $9 + x$  the sum of nine and a number
- f)  $7 - x$  \_\_\_\_\_
- g)  $\frac{x}{3}$  \_\_\_\_\_
- h)  $\frac{7}{x}$  \_\_\_\_\_
- i)  $\frac{x}{2} - 3$  \_\_\_\_\_
- j)  $8 + y$  \_\_\_\_\_

3. Write each of the following using symbols.

a)  $m$  divided by 4

\_\_\_\_\_

b)  $n$  increased by 2

\_\_\_\_\_

c) 10 decreased by  $n$

\_\_\_\_\_

d) 12 divided by  $x$

\_\_\_\_\_

e) half of a number

\_\_\_\_\_

f) five times a number

$5x$

\_\_\_\_\_

g) six less than a number

\_\_\_\_\_

h) twenty-five divided by a number

\_\_\_\_\_

i) seven times a number

\_\_\_\_\_

### Problems and Applications

4. Circle the correct expression for each of the following.

a) Sandra's height increased by five centimetres

(i)  $h - 5$

(ii)  $h + 5$

(iii)  $5h$

b) the width decreased by six metres

(i)  $w - 6$

(ii)  $w + 6$

(iii)  $\frac{w}{6}$

c) the length multiplied by ten

(i)  $\frac{l}{10}$

(ii)  $l + 10$

(iii)  $10l$

d) the time divided by three

(i)  $\frac{t}{3}$

(ii)  $3t$

(iii)  $\frac{3}{t}$

e) six times the number of pens

(i)  $\frac{n}{6}$

(ii)  $6n$

(iii)  $\frac{6}{n}$

f) the number of Canadians who have flown in space increased by 2

(i)  $2n$

(ii)  $n - 2$

(iii)  $n + 2$

g) The mass of a Siberian tiger is ten times the mass of a Canadian beaver.

(i)  $t = 10b$

(ii)  $t = \frac{b}{10}$

(iii)  $t = b + 10$

h) The Toronto Blue Jays won two more games than the Atlanta Braves.

(i)  $t = 2 - a$

(ii)  $t = 2 + a$

(iii)  $t = 2a$

5. P.J. earns \$5.00/h cutting lawns in the neighbourhood.

Time (h)	1	2	3	4	5	6	7	8
Pay (\$)	5	10						

a) Complete the table.

b) Write an expression for the amount earned. \_\_\_\_\_



Use each number from the squares only once to make the following number sentences true.

**2**

**3**

**5**

**7**

**8**

**9**

$$\bigcirc + \bigcirc = \bigcirc$$

$$\bigcirc - \bigcirc = \bigcirc$$

## 7.4 Developing Patterns

### Practice



1. Tracey's heart beats about 70 times per minute.

a) Complete the table.

Time (min)	1	2	3	4	5	6
Number of Beats	70					

b) Describe the pattern. \_\_\_\_\_  
\_\_\_\_\_

c) How long would it take Tracey's heart to beat 420 times?



d) How long would it take Tracey's heart to beat 840 times?  
\_\_\_\_\_

e) How many times will Tracey's heart beat in

(i) 20 min?

(ii) 1 h?

(iii) 2 h?

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



2. The letter Z is constructed with dots.

a) Draw the next three diagrams.

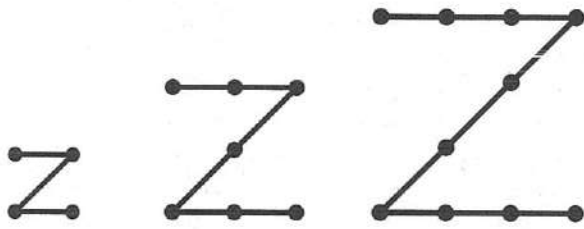


Diagram 1

Diagram 2

Diagram 3

Diagram 4

Diagram 5

Diagram 6

b) Copy and complete the table.

Diagram	1	2	3	4	5	6
Number of Dots						

c) By what number does the number of dots increase from one diagram to the next? \_\_\_\_\_

d) How many dots are in diagram 8? \_\_\_\_\_

3. The distances that a car travels in different times are shown in the table.

Time (h)	1	2	3	4	5	6
Distance (km)	60	120	180	240	300	360

a) Describe the pattern in words.

b) Write an equation to calculate the distance.

distance  $\rightarrow d = \underline{\quad} \times \underline{\quad}$

$t = \text{time in hours}$

c) How far will the car travel in

(i) 7 h?

(ii) 9 h?



## Skill Builder

1. Evaluate each expression for  $a = 5$ .

$$\begin{aligned} \text{a) } a + 2 &= \square + 2 \\ &= \underline{\quad} \end{aligned}$$

$$\text{b) } 10 - a =$$

$$\text{c) } 7 - a =$$

$$\text{d) } 5 - a =$$

$$\begin{aligned} \text{e) } 2a + 1 &= (2 \times 5) + 1 \\ &= \square + 1 \\ &= \underline{\quad} \end{aligned}$$

$$\text{f) } 4a + 3 =$$

$$\begin{aligned} \text{g) } 3 + 2a &= 3 + (2 \times 5) \\ &= 3 + \square \\ &= \underline{\quad} \end{aligned}$$

$$\text{h) } 1 + 3a =$$

2. Evaluate each expression for  $t = 2.3$ .

$$\text{a) } t + 1 =$$

$$\text{b) } 3 - t =$$

$$\text{c) } t + 7 =$$



3. Calculate.

Watch the signs!

$$\begin{array}{r} \text{a) } 15 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } 27 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } 25 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } 25 \\ + 19 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } 67 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } 27 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } 92 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } 48 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } 18 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j) } 25 \\ \times 5 \\ \hline \end{array}$$



NO CALCULATOR

## 7.3 Solving Equations



### Practice

1. Substitute the value into each equation. Does it make the sentence true or false?

	Equation	Value of Variable	Substitute	True or False
a)	$n + 7 = 10$	$n = 3$	$3 + 7 = 10$	True
b)	$x - 5 = 10$	$x = 5$		
c)	$3b = 18$	$b = 15$		
d)	$5u = 20$	$u = 4$		
e)	$\frac{x}{5} = 2$	$x = 15$		
f)	$2w = 6$	$w = 3$		
g)	$2z + 1 = 7$	$z = 3$		
h)	$3e - 2 = 10$	$e = 4$		

2. Solve each equation.

a)  $x + 3 = 7$

$x = \underline{\hspace{2cm}}$

b)  $f + 3 = 4$

$f = \underline{\hspace{2cm}}$

c)  $m + 2 = 9$

d)  $n + 1 = 6$

e)  $y + 4 = 8$

f)  $z + 8 = 12$

3. Solve each equation.

a)  $x - 5 = 7$

b)  $a - 3 = 7$

c)  $z - 1 = 6$

d)  $n - 8 = 0$

e)  $w - 2 = 4$

f)  $4 - n = 0$



4. Solve each equation.

a)  $3n = 6$

b)  $2s = 10$

c)  $6x = 24$

d)  $5y = 20$

$n = \underline{\hspace{2cm}}$

5. Solve the following equations.

a)  $\frac{x}{4} = 3$

b)  $\frac{y}{2} = 4$

c)  $\frac{c}{7} = 3$

$x = \underline{\hspace{2cm}}$

d)  $\frac{r}{2} = 8$

e)  $\frac{m}{4} = 1$

f)  $\frac{n}{3} = 6$

6. Solve these equations.

Watch the signs!

a)  $5 + x = 12$

b)  $y + 7 = 13$

c)  $\frac{m}{4} = 2$

d)  $\frac{n}{5} = 5$

$x = \underline{\hspace{2cm}}$

e)  $8a = 32$

f)  $3q = 18$

g)  $y - 3 = 8$

h)  $b - 9 = 3$

7. Solve these equations.

Use guess and check.

a)  $2n + 7 = 15$

Guess	Substitute into $2n + 7 = 15$	Check
$n = 1$	$(2 \times 1) + 7 = 9$	Too small
$n = 2$	$(2 \times 2) + 7 = \square$	

Answer:  $n = \underline{\hspace{2cm}}$

b)  $3x - 2 = 7$

Use guess and check.

Guess	Substitute into $3x - 2 = 7$	Check
$x = 1$	$(3 \times 1) - 2 = 1$	

Answer:  $x =$  \_\_\_\_\_

c)  $4p + 2 = 22$


Answer: \_\_\_\_\_

### Problems and Applications

8. a) If  $x = 5$ , what numbers can be placed in the triangle and the square to make the equation true?

$$x + \triangle = \square$$

- b) If  $x = 3$ , what numbers can be placed in the triangle and the square to make the equation true.

$$\triangle + x = \square$$

- c) If  $x = 2$ , what numbers can be placed in the triangle and the square to make the equation true?

$$\triangle - x = \square$$

9. A copy shop charges 9¢ per page.  
a) How much would it cost to copy 225 pages?

Write an equation.

Sentence: \_\_\_\_\_

- b) How many pages can you copy for \$18.00?

10. John spent \$28.00 on rides at the exhibition.  
If each ride cost \$2.00, on how many rides did he go?

Write an equation.



What relation is a man to his mother's brother?



## Skill Builder

1. Evaluate the expression  $2n + 1$  for each value of  $n$ .

**Substitute.**

a)  $n = 3$

$$2n + 1 = (2 \times 3) + 1$$

$$= \boxed{\phantom{00}} + 1$$

$$= \underline{\hspace{2cm}}$$

b)  $n = 1$

$$2n + 1 =$$

c)  $n = 0$

d)  $n = 6$

e)  $n = 10$

f)  $n = 5$

2. Use the guess and check method to solve each equation.

a)  $n + 8 = 13$

$$n = \underline{\hspace{2cm}}$$

b)  $n + 7 = 14$

c)  $n - 4 = 7$

d)  $n - 3 = 10$

e)  $3n = 12$

f)  $4n = 20$

g)  $2n - 1 = 7$

h)  $3n + 1 = 10$

Guess	Substitute	Check


Answer:  $n = \underline{\hspace{2cm}}$

Answer:  $\underline{\hspace{2cm}}$

3. What is the next number in each pattern?

a) 2, 4, 6, 8,  $\underline{\hspace{1cm}}$

b) 2, 5, 7, 10,  $\underline{\hspace{1cm}}$

c) 5, 10, 15, 20,  $\underline{\hspace{1cm}}$

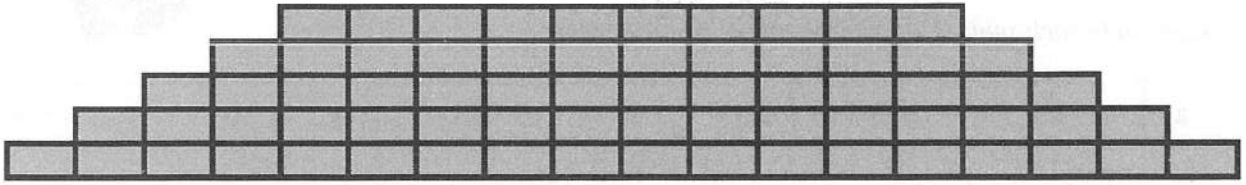
d) 4, 8, 12, 16,  $\underline{\hspace{1cm}}$

e) 13, 11, 9, 7,  $\underline{\hspace{1cm}}$

f) 24, 21, 18,  $\underline{\hspace{1cm}}$

## Problems and Applications

4. A brick patio has 10 rectangular bricks in the first row.



Each row of bricks in the patio has 2 more bricks than the row before it.

- a) Complete the table.

Row	1	2	3	4	5	6	7	8	9	10	11
Number of Bricks											

- b) How many bricks would there be in the

(i) 7th row?

(ii) 9th row?

\_\_\_\_\_

\_\_\_\_\_

### Skill Builder

1. What are the next 2 numbers in each pattern?

a) 0, 2, 4, 6, \_\_\_\_\_, \_\_\_\_\_

b) 0, 3, 6, 9, \_\_\_\_\_, \_\_\_\_\_

c) 5, 7, 9, 11, \_\_\_\_\_, \_\_\_\_\_

d) 2, 6, 10, 14, \_\_\_\_\_, \_\_\_\_\_

2. Calculate.

a)  $56 \times 1000 =$  \_\_\_\_\_

b)  $1.2 \times 100 =$  \_\_\_\_\_

c)  $610 \div 10 =$  \_\_\_\_\_

d)  $240 \div 100 =$  \_\_\_\_\_

e)  $\frac{1}{2}$  of 12 = \_\_\_\_\_

f)  $\frac{1}{2}$  of 18 = \_\_\_\_\_



NO CALCULATOR



# 7.5 Tables of Values



## Practice

1. Complete each table. Describe the pattern in words.

a)

$x$	$x + 5$
1	
2	
3	
4	
5	
6	

Pattern: Increase the number by \_\_\_\_\_

b)

$x$	$3x$
1	
2	
3	
4	
5	
6	

Pattern: \_\_\_\_\_

c)

$x$	$x + 8$
1	
2	
3	
4	
5	
6	

Pattern: \_\_\_\_\_

d)

$x$	$2x + 1$
1	
2	
3	
4	
5	
6	

Solution:

$(2 \times 1) + 1 = \square$

$(2 \times 2) + 1 = \square$

Pattern: \_\_\_\_\_

e)

$x$	$3x - 2$
1	
2	
3	
4	
5	
6	

Solution:


$(3 \times 1) - 2 = \square$

Pattern: \_\_\_\_\_

## Problems and Applications

2. Theatre tickets cost \$45.00 each.

a) Complete the table.



Number of Tickets ( $n$ )	Cost (\$)
1	
2	
3	
4	


- b) Write an equation that relates the cost ( $C$ ) to the number of tickets ( $n$ ).

$$C = \underline{\quad} \times \underline{\quad}$$

3. School shirts cost \$200.00 for the design of the crest plus \$20.00 per shirt.

Complete the table.

Number of Shirts ( $n$ )	Cost (\$) ( $20n + 200$ )
10	$(20 \times 10) + 200 =$
20	$(20 \times 20) + 200 =$
50	
100	



- 4.

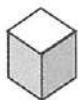


Diagram 1

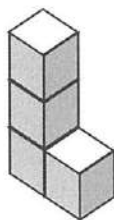


Diagram 2

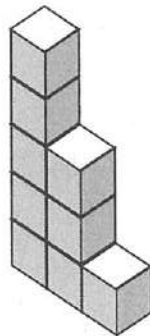


Diagram 3

Diagram 4

Diagram 5

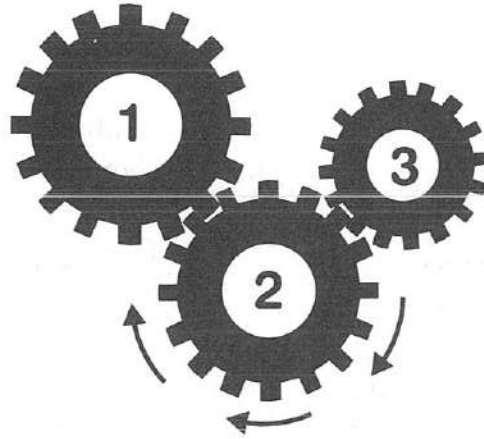
- a) Draw or build with cube-a-links the next 2 diagrams.

b) Complete the table.

Diagram	1	2	3	4	5
Number of Cubes					

- c) How many cubes will there be in the 6th diagram? \_\_\_\_\_





Gear 2 rotates clockwise.  
Which way does gear 3 rotate?

## Skill Builder

1. Write the solution for each equation.

a)  $x + 3 = 10$

$x =$  \_\_\_\_\_

b)  $x + 3 = 7$

\_\_\_\_\_

c)  $b + 2 = 10$

\_\_\_\_\_

d)  $n - 8 = 8$

\_\_\_\_\_

e)  $y + 3 = 6$

\_\_\_\_\_

f)  $x - 5 = 11$

\_\_\_\_\_

g)  $a - 9 = 2$

\_\_\_\_\_

h)  $b + 5 = 6$

\_\_\_\_\_

i)  $n - 4 = 5$

\_\_\_\_\_

2. Calculate.

a)  $7 \times 6 =$  \_\_\_\_\_

$70 \times 6 =$  \_\_\_\_\_

$700 \times 6 =$  \_\_\_\_\_

c)  $8 \times 4 =$  \_\_\_\_\_

$80 \times 4 =$  \_\_\_\_\_

$800 \times 4 =$  \_\_\_\_\_

e)  $2 \times 8 =$  \_\_\_\_\_

$20 \times 8 =$  \_\_\_\_\_

$200 \times 8 =$  \_\_\_\_\_

b)  $5 \times 3 =$  \_\_\_\_\_

$50 \times 3 =$  \_\_\_\_\_

$500 \times 3 =$  \_\_\_\_\_

d)  $8 \div 4 =$  \_\_\_\_\_

$80 \div 4 =$  \_\_\_\_\_

$800 \div 4 =$  \_\_\_\_\_

f)  $9 \div 9 =$  \_\_\_\_\_

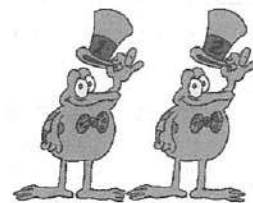
$90 \div 9 =$  \_\_\_\_\_

$900 \div 9 =$  \_\_\_\_\_





# 7.6 Ordered Pairs



## Practice

1. (i) Complete the table. (ii) Write the solutions as ordered pairs.

a)  $x + y = 3$

$x$	$y$
0	
1	
2	
3	

**SUBSTITUTE**

$x + y = 3$   
 $0 + \underline{\quad} = 3$   
 $1 + \underline{\quad} = 3$   
 $2 + \underline{\quad} = 3$   
 $3 + \underline{\quad} = 3$

b)  $x - y = 0$

$x$	$y$
	0
	1
	2
	3

**SUBSTITUTE**

$x - y = 0$   
 $\underline{\quad} - 0 = 0$   
 $\underline{\quad} - 1 = 0$

Ordered Pairs:

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Ordered Pairs:

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

c)  $x + y = 8$

$x$	$y$
0	
1	
2	
3	

(Empty cloud shape for substitution work)

d)  $y - x = 2$

$x$	$y$
	2
	3
	4
	5

$y - x = 2$   
 $2 - \underline{\quad} = 2$   
 $3 - \underline{\quad} = 2$   
 $4 - \underline{\quad} = 2$

Ordered Pairs:

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Ordered Pairs:

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

e)  $y = x + 5$

$x$	$y$
0	
	6
2	
	8

$y = x + 5$   
 $\underline{\quad} = 0 + 5$   
 $6 = \underline{\quad} + 5$

f)  $x - 4 = y$

$x$	$y$
4	
	1
6	
	3

(Empty cloud shape for substitution work)

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_



2. Find 4 ordered pairs that are solutions for each equation.

Draw a table, first.

a)  $x + y = 8$

$x$	$y$
0	
1	
2	
3	

(0, )  
( )  
( )  
( )

b)  $x + y = 12$


\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

c)  $x + y = 7$

d)  $x + 3 = y$

e)  $x - y = 5$

f)  $x - y = 10$

$x$	$y$
	0
	1
	2
	3

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

$x$	$y$
11	
12	
13	
14	

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Write an equation for each table of values.

a)

$x$	$y$
0	6
1	5
2	4
3	3
4	2
5	
6	

$x + y =$  \_\_\_\_\_

b)

$x$	$y$
1	0
2	1
3	2
4	3
5	4
6	
7	

\_\_\_\_\_

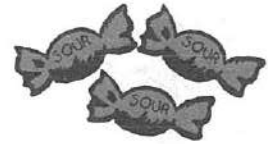
c)

$x$	$y$
3	4
5	6
7	8
9	10
11	
13	

$y - x =$  \_\_\_\_\_

## Problems and Applications

4. Rene bought 3 sour candies for 15¢.



a) Set up a table of values to show how much each would cost.

(i) 1 candy

(ii) 2 candies

(iii) 4 candies

Number of Candies ( $n$ )	Cost, in Cents ( $c$ )
1	
2	
3	15
4	

Write the ordered pairs.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

b) Write an equation that will help Rene determine her cost, in cents, if she knows the number of candies she buys.

$$c = \underline{\quad} \times \underline{\quad}$$

c) Use your equation to find the cost of 20 candies.

\_\_\_\_\_



We call (8, 6) an \_\_\_\_\_.

The 2 numbers in an ordered pair are the \_\_\_\_\_ of a point.



# Calculator Zapper

Use your calculator to find the answers.



Hint:  
Press **C** 25 **√**

$1 \times 2 \times 3 \times 4 + 1 = \underline{25}$  or  $5^2$   
 $2 \times 3 \times 4 \times 5 + 1 = \underline{\hspace{2cm}}$  or  $\text{cloud}$   
 $3 \times 4 \times 5 \times 6 + 1 = \underline{\hspace{2cm}}$  or  $\text{cloud}$   
 $4 \times 5 \times 6 \times 7 + 1 = \underline{\hspace{2cm}}$  or  $\text{cloud}$   
 $5 \times 6 \times 7 \times 8 + 1 = \underline{\hspace{2cm}}$  or  $\text{cloud}$

Is there a pattern? Describe the pattern. \_\_\_\_\_

## Skill Builder

1. Solve each equation.

a)  $x + 2 = 8$

$x = \underline{\hspace{2cm}}$

b)  $y + 3 = 5$

$\underline{\hspace{2cm}}$

c)  $a - 6 = 3$

$\underline{\hspace{2cm}}$

d)  $n - 3 = 12$

$\underline{\hspace{2cm}}$

e)  $4g = 36$

$\underline{\hspace{2cm}}$

f)  $r + 15 = 25$

$\underline{\hspace{2cm}}$

2. Evaluate the following expressions for  $y = 4$ .

a)  $4y = \underline{\hspace{2cm}}$

$4 \times 4 = \underline{\hspace{2cm}}$

b)  $y - 2 = \underline{\hspace{2cm}}$



c)  $8y = \underline{\hspace{2cm}}$



d)  $2y = \underline{\hspace{2cm}}$



e)  $2y - 1 = \underline{\hspace{2cm}}$



f)  $y \div 2 = \underline{\hspace{2cm}}$

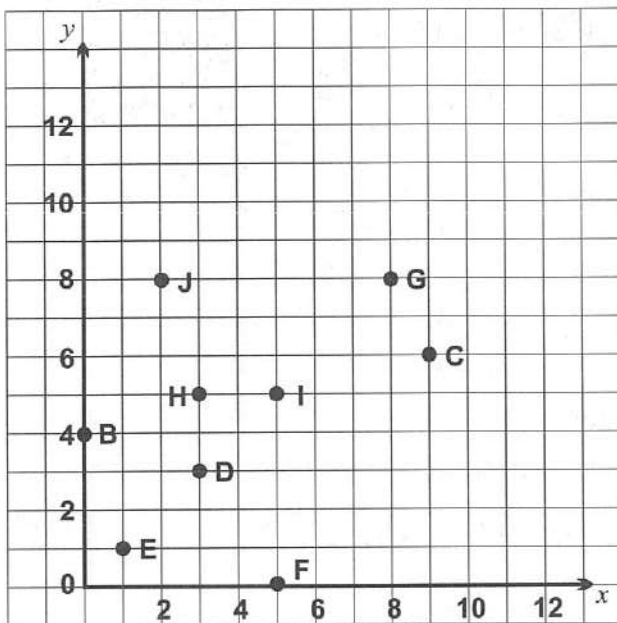


Substitute

# 7.7 The Coordinate Plane

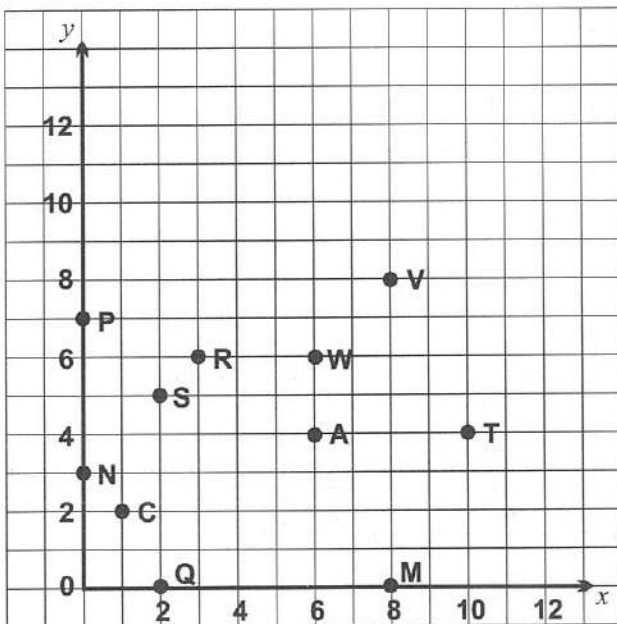
## Practice

1. Write the letter of the point named by each ordered pair.



- |                   |                   |
|-------------------|-------------------|
| a) $(3, 3)$ _____ | b) $(0, 4)$ _____ |
| c) $(5, 5)$ _____ | d) $(2, 8)$ _____ |
| e) $(1, 1)$ _____ | f) $(5, 0)$ _____ |
| g) $(8, 8)$ _____ | h) $(9, 6)$ _____ |
| i) $(3, 5)$ _____ |                   |

2. Write the coordinates (ordered pair) of each letter on the graph.



- |                               |            |
|-------------------------------|------------|
| a) P $(0, \underline{\quad})$ | b) W _____ |
| c) N _____                    | d) A _____ |
| e) C _____                    | f) V _____ |
| g) S _____                    | h) M _____ |
| i) Q _____                    | j) T _____ |
| k) R _____                    |            |

**Coordinates —**  
an ordered pair  
 $(x, y)$  that locates  
a point on the graph

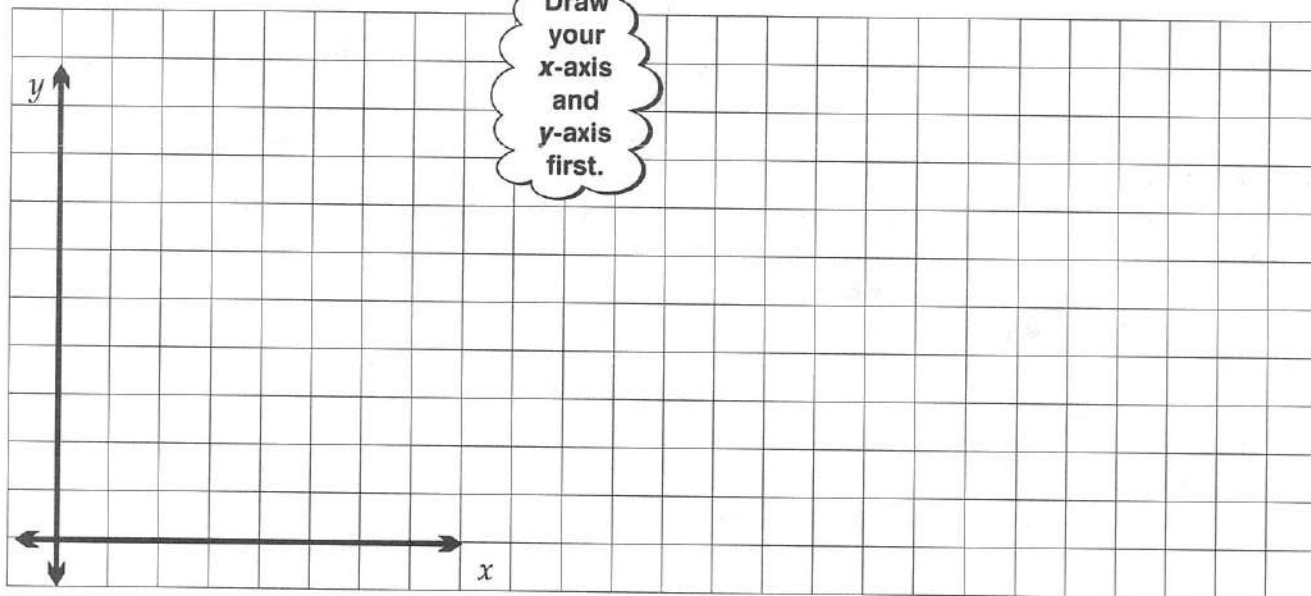


## Problems and Applications

3. (i) Graph each set of ordered pairs on a grid.  
(ii) Join the points. Use a ruler.  
(iii) What is the name of each polygon?

a)  $(0, 0), (0, 5), (5, 5), (5, 0)$

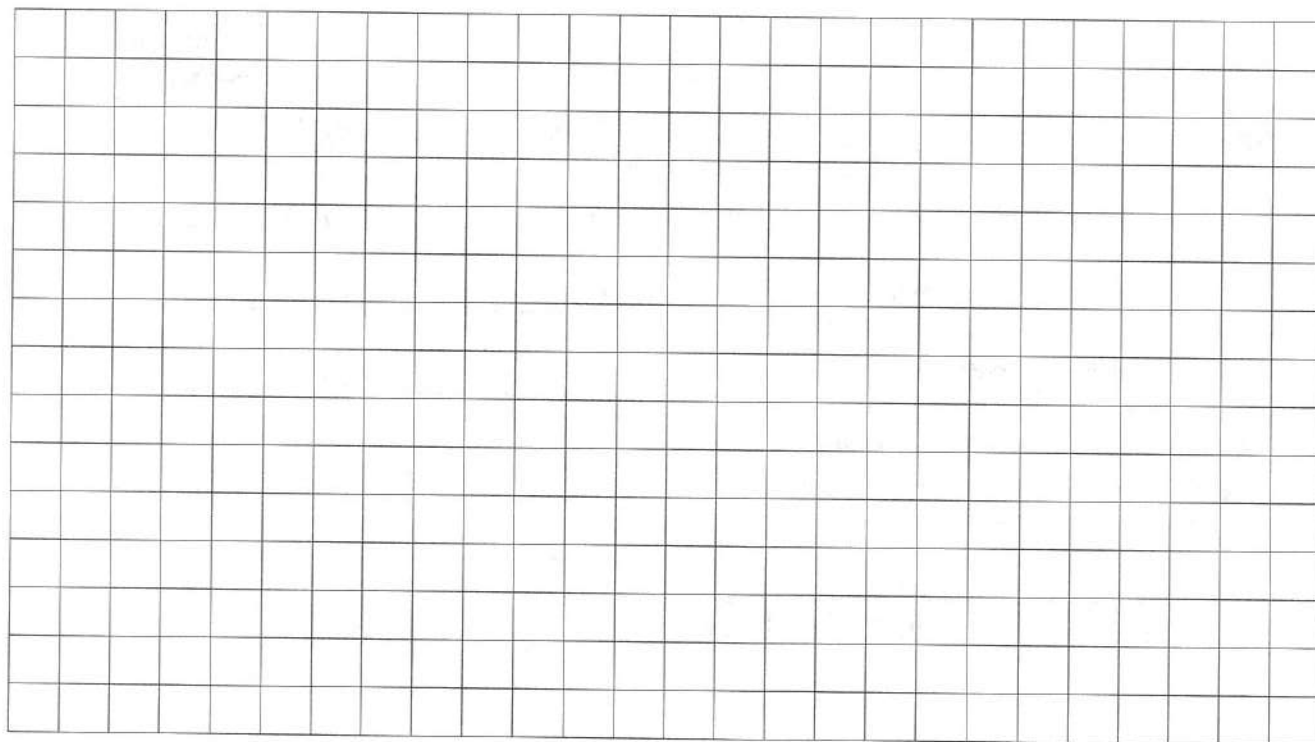
b)  $(1, 2), (4, 3), (3, 7)$



Name \_\_\_\_\_

c)  $A(1, 7), B(1, 2), C(6, 2), D(6, 7)$

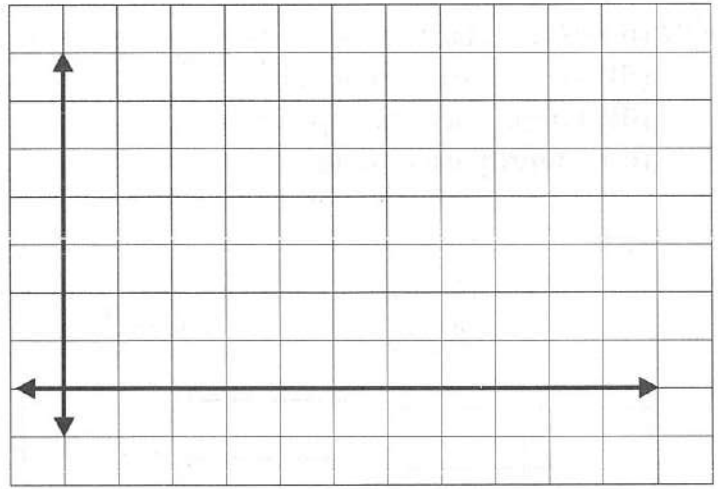
d)  $A(0, 2), B(0, 8), C(8, 8), D(8, 2)$



Name \_\_\_\_\_

4. (i) Plot the points  
 $A(1, 1)$ ,  $B(2, 5)$ ,  $C(7, 5)$ , and  $D(8, 1)$ .  
 (ii) Join the points in order.  
 (iii) Name the polygon formed.

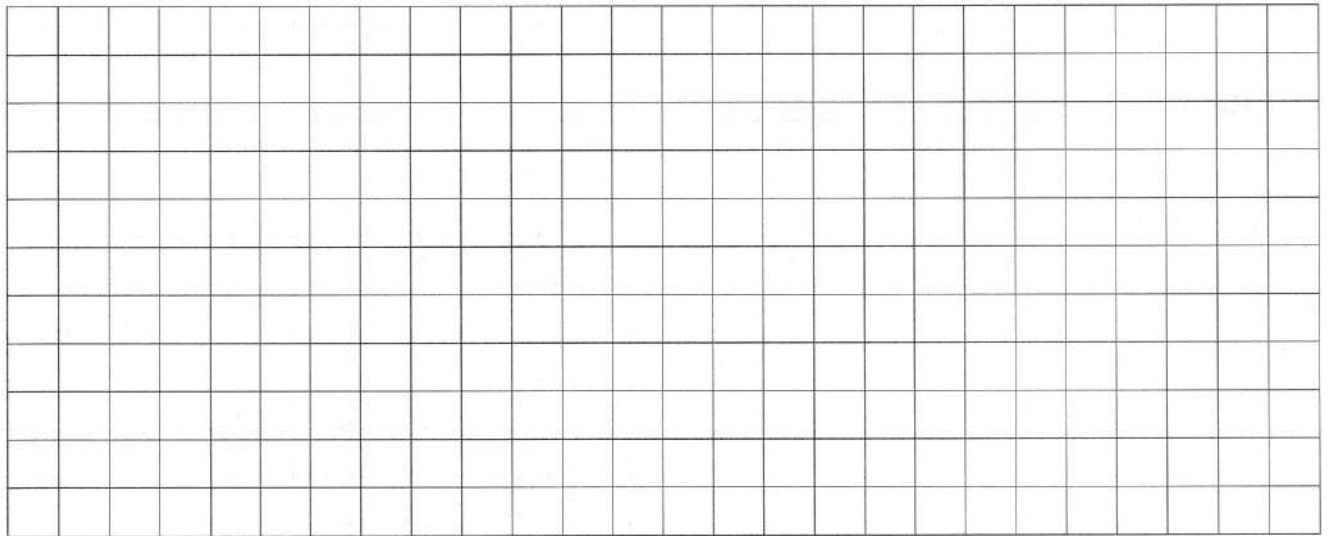
\_\_\_\_\_



5. Plot each set of points.

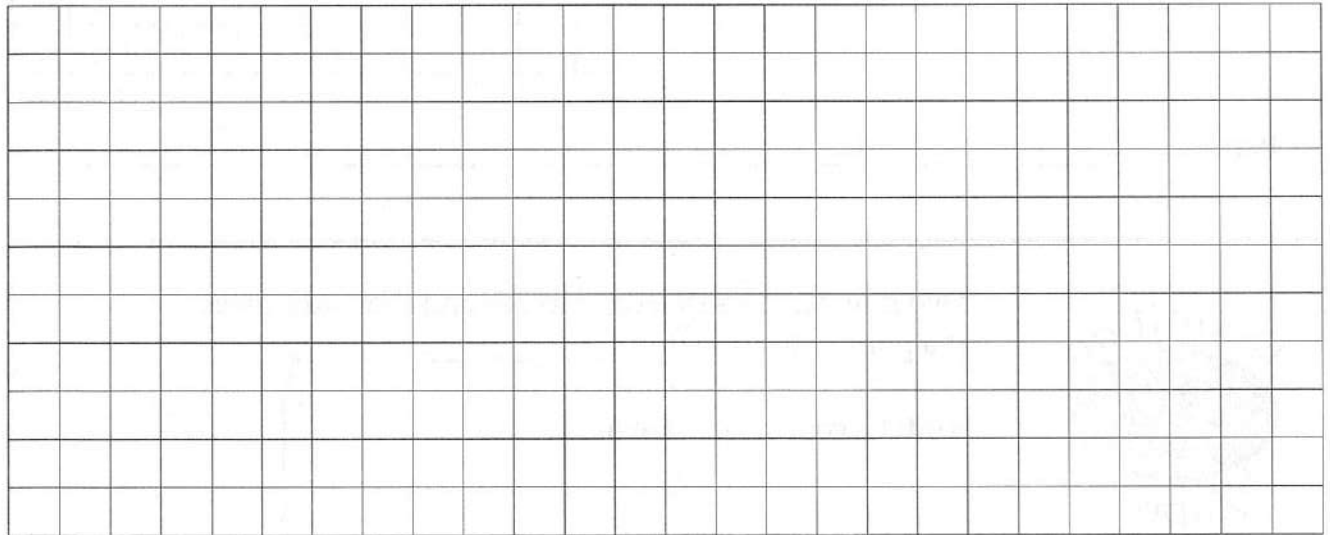
a)  $(1, 2)$ ,  $(2, 4)$ ,  $(3, 6)$ ,  $(4, 8)$

b)  $(8, 0)$ ,  $(6, 2)$ ,  $(4, 4)$ ,  $(2, 6)$



c)  $(2, 0)$ ,  $(2, 1)$ ,  $(2, 3)$ ,  $(2, 4)$

d)  $(0, 5)$ ,  $(1, 5)$ ,  $(2, 5)$ ,  $(3, 5)$



What pattern is formed by each set above? \_\_\_\_\_



6. (i) Make a **table** of values for each equation.  
 (ii) Write the **ordered pairs**.  
 (iii) **Graph** each set of points.  
 (iv) **Identify** each pattern.

a)  $x + y = 5$

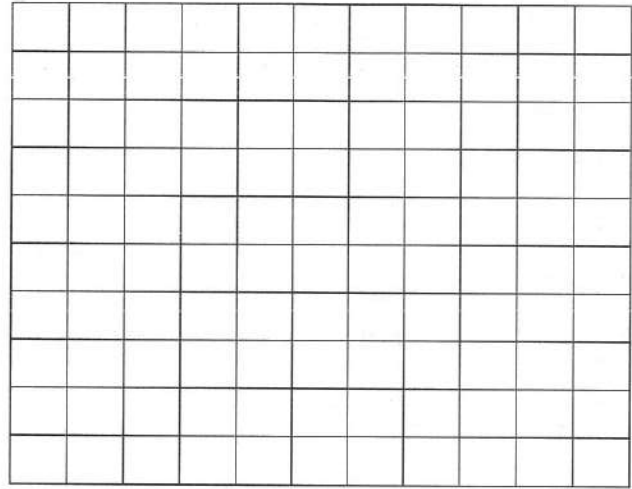
$x$	$y$

\_\_\_\_\_

\_\_\_\_\_

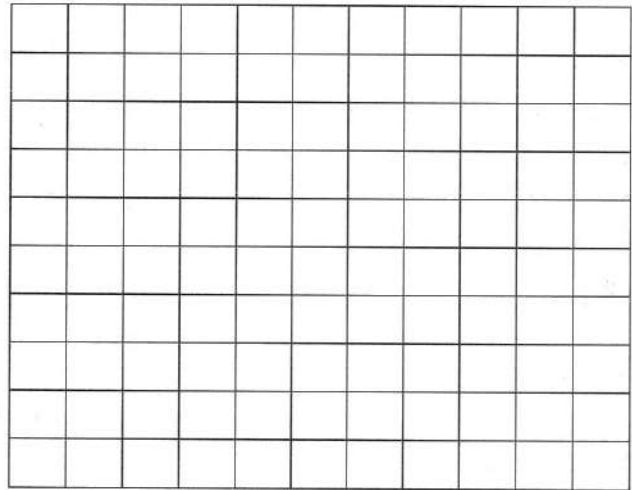
\_\_\_\_\_

\_\_\_\_\_



Pattern: \_\_\_\_\_

b)  $x = y$

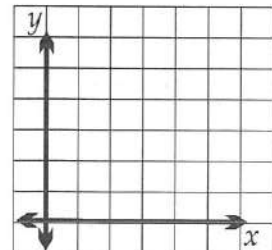


Pattern: \_\_\_\_\_



Two number lines called the  $x$ -axis and the  $y$ -axis meet at a point called the \_\_\_\_\_.

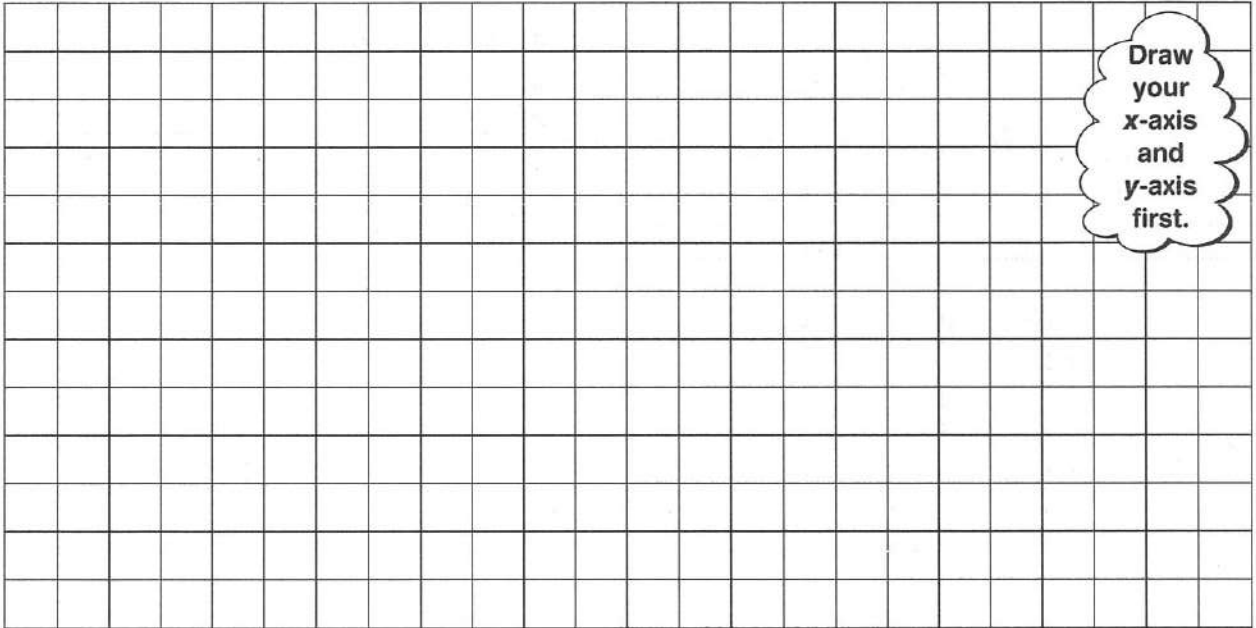
**Hint:** Its coordinates are  $(0, 0)$ .





## Skill Builder

- Graph these points: (4, 4), (6, 3), (8, 0).
  - Join the points to form a straight line.
  - Name 2 more ordered pairs on the line. \_\_\_\_\_ and \_\_\_\_\_

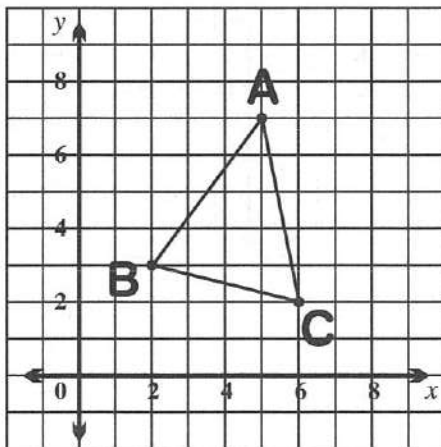


- Calculate.

- $4 \times 2 \times 3 =$  \_\_\_\_\_
- $8 + 7 + 4 =$  \_\_\_\_\_
- $10 \times 2 \times 2 =$  \_\_\_\_\_
- $2 \times 4 \times 5 =$  \_\_\_\_\_
- $7 \times 9 \times 0 =$  \_\_\_\_\_
- $12 \div 3 \div 4 =$  \_\_\_\_\_
- $20 \div 4 - 5 =$  \_\_\_\_\_
- $5 + 8 - 2 =$  \_\_\_\_\_
- $9 - 6 + 7 =$  \_\_\_\_\_



- Write the coordinates of the vertices of the triangle.

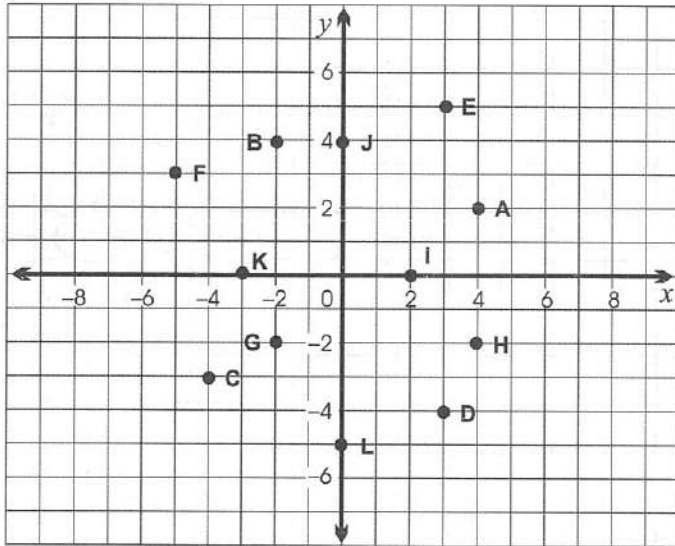


Vertex	Coordinates
A	(__, __)
B	(__, __)
C	(__, __)

# 7.8 Graphing Ordered Pairs

## Practice

1. Name the **coordinates** (ordered pair) of each point on the grid.



A(\_\_\_\_, \_\_\_\_)

B(\_\_\_\_, \_\_\_\_)

\_\_\_\_\_

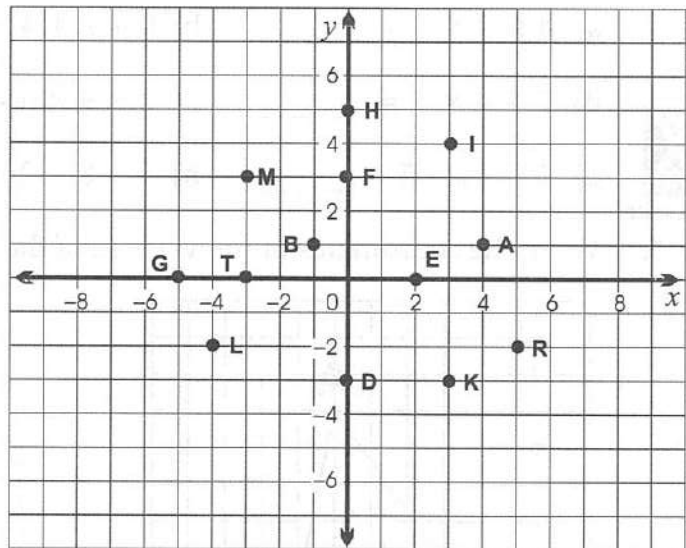
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Name the points with the following **coordinates** on the grid.

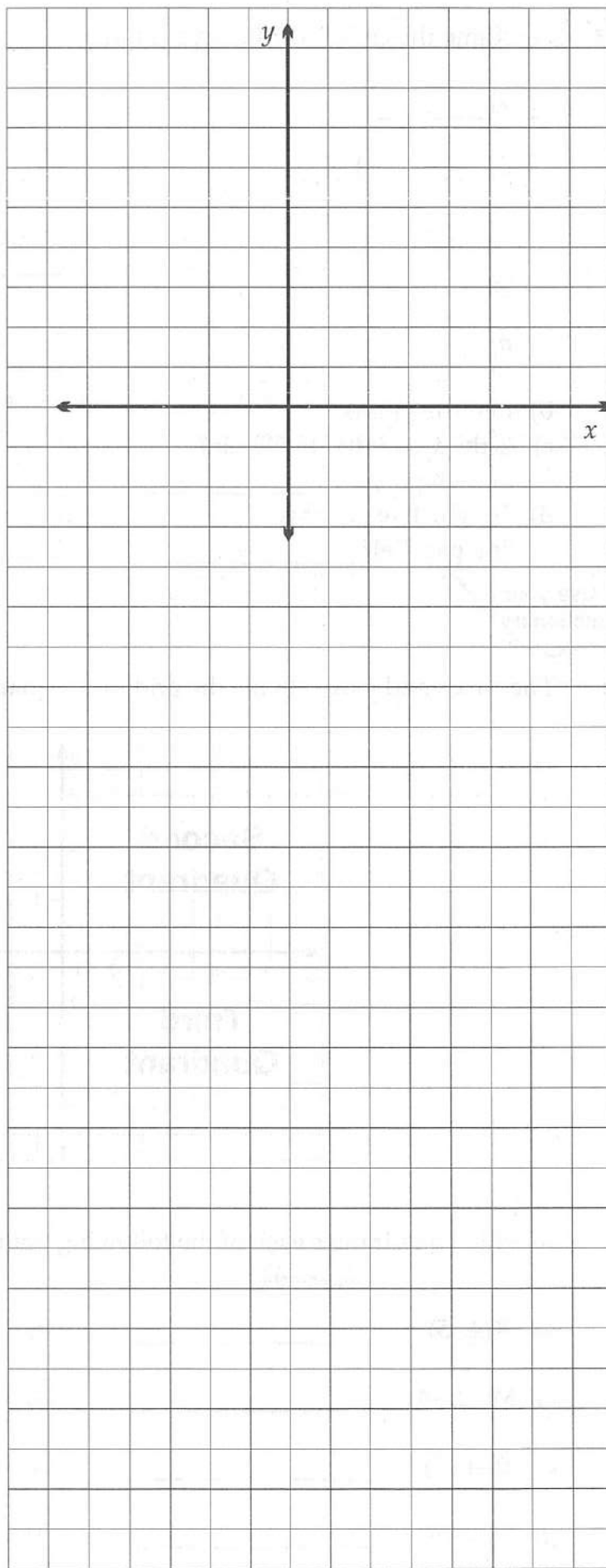
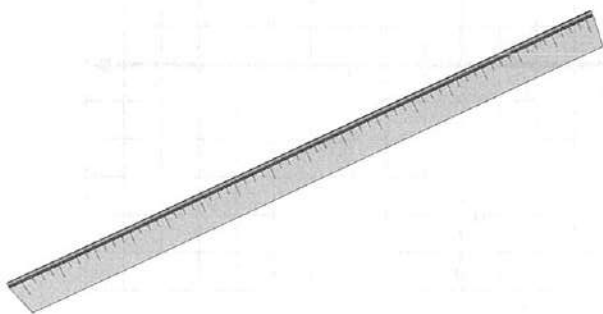
- a)  $(-3, 3)$  \_\_\_\_\_
- b)  $(4, 1)$  \_\_\_\_\_
- c)  $(-4, -2)$  \_\_\_\_\_
- d)  $(3, -3)$  \_\_\_\_\_
- e)  $(0, 3)$  \_\_\_\_\_
- f)  $(0, -3)$  \_\_\_\_\_
- g)  $(-1, 1)$  \_\_\_\_\_
- h)  $(-5, 0)$  \_\_\_\_\_
- i)  $(0, 5)$  \_\_\_\_\_



## Problems and Applications

3. a) Plot the points  $P(-2, 1)$ ,  $Q(0, 4)$ ,  $R(6, 4)$ , and  $S(4, 1)$  on the grid.  
b) Join the points in order to form a figure.  
c) Name the figure.

\_\_\_\_\_



4. a) Plot the points  $A(-4, 3)$ ,  $B(-4, -3)$ ,  $C(4, -3)$ ,  $D(4, -1)$ ,  $E(2, -1)$ , and  $F(2, 3)$  on a grid.  
b) Join the points in order to form a figure.  
c) Describe the figure.

\_\_\_\_\_



5. a) Name the coordinates of each point.

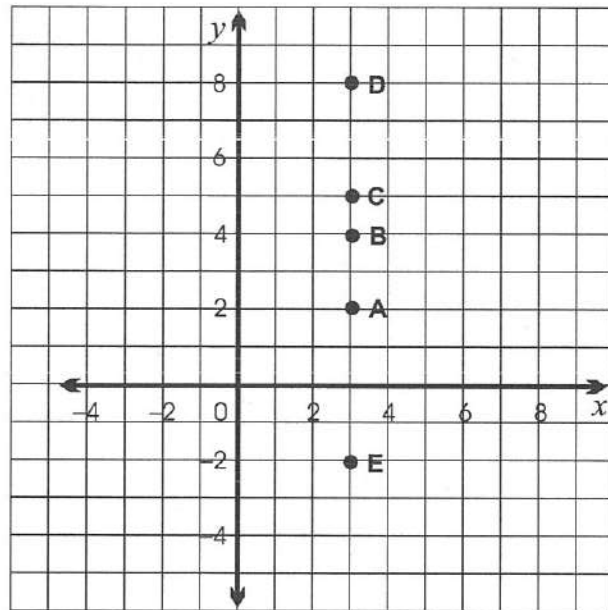
A(\_\_\_\_, \_\_\_\_)

B(        )

C(        )

D(        )

E(        )



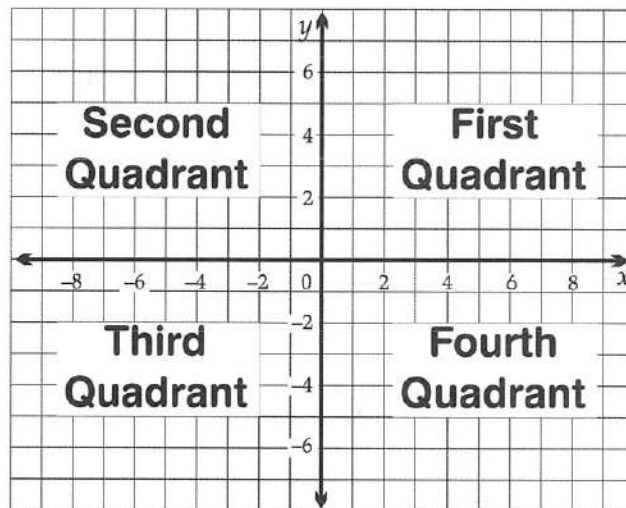
b) Join the points.

c) Is the  $x$ -coordinate the same in each point? \_\_\_\_\_

d) To which axis is this line **parallel**? \_\_\_\_\_

Use your dictionary.

6. The  $x$ -axis and  $y$ -axis divide the grid into 4 quadrants.



In which **quadrant** is each of the following points?

Plot them on the grid.

quadrants

a) K(4, 5) \_\_\_\_\_

b) N(1, -2) \_\_\_\_\_

c) M(-2, -4) \_\_\_\_\_

d) Q(-1, -1) \_\_\_\_\_

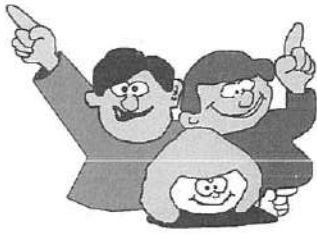
e) T(-4, 1) \_\_\_\_\_

f) W(5, 5) \_\_\_\_\_

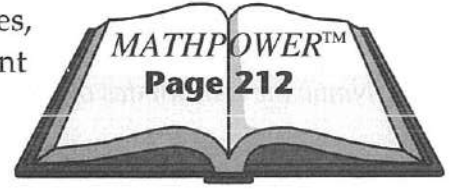
g) R(3, -5) \_\_\_\_\_

h) S(-3, 4) \_\_\_\_\_

# LEARNING TOGETHER Interpreting Graphs



Work together with your classmates, using your *MATHPOWER™* student text, page 212.



Now, write the meaning of

a) interpolation \_\_\_\_\_

b) extrapolation \_\_\_\_\_

## Skill Builder

1. Complete each table.

a)  $2x - 1 = y$

$x$	$y$
0	
1	
2	

Substitute

$(2 \times 0) - 1 = \underline{\hspace{2cm}}$

$(2 \times 1) - 1 = \underline{\hspace{2cm}}$

$(2 \times 2) - 1 = \underline{\hspace{2cm}}$

b)  $3x + 1 = y$

$x$	$y$
0	
1	
2	

2. Multiply.

a)  $70 \times 3 = \underline{\hspace{2cm}}$

b)  $20 \times 3 = \underline{\hspace{2cm}}$

c)  $40 \times 6 = \underline{\hspace{2cm}}$

d)  $700 \times 7 = \underline{\hspace{2cm}}$

e)  $80 \times 2 = \underline{\hspace{2cm}}$

f)  $100 \times 8 = \underline{\hspace{2cm}}$

g)  $50 \times 5 = \underline{\hspace{2cm}}$

h)  $10 \times 40 = \underline{\hspace{2cm}}$

i)  $30 \times 2 = \underline{\hspace{2cm}}$

j)  $100 \times 9 = \underline{\hspace{2cm}}$

k)  $200 \times 2 = \underline{\hspace{2cm}}$

l)  $60 \times 6 = \underline{\hspace{2cm}}$

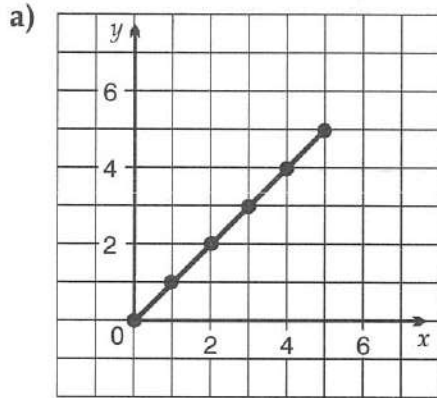


# 7.9 Graphing Relations

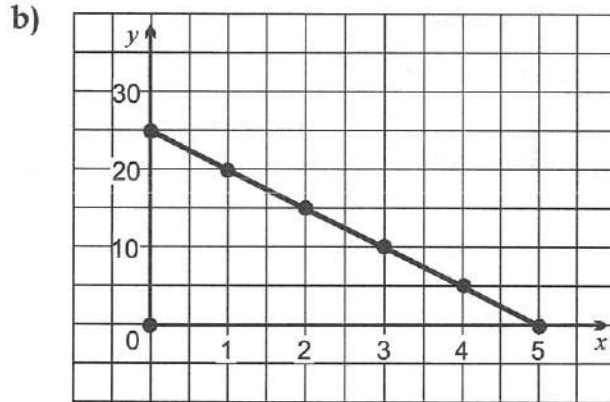
## Practice

Points lie in a straight line.

1. Name the coordinates of the points for each *linear* relation.



\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,  
 \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.



\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,  
 \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

2. (i) Complete each table of values.

(ii) Graph each relation.



a)

Time (h)	Distance (km)
0	0
1	90
2	180
3	
4	
5	

**THINK:**

$90 \times 0 =$  \_\_\_\_\_

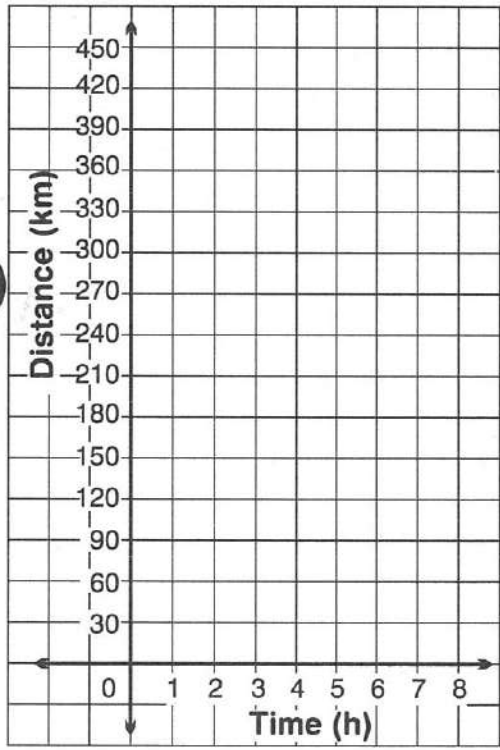
$90 \times 1 =$  \_\_\_\_\_

$90 \times 2 =$  \_\_\_\_\_

$90 \times 3 =$  \_\_\_\_\_

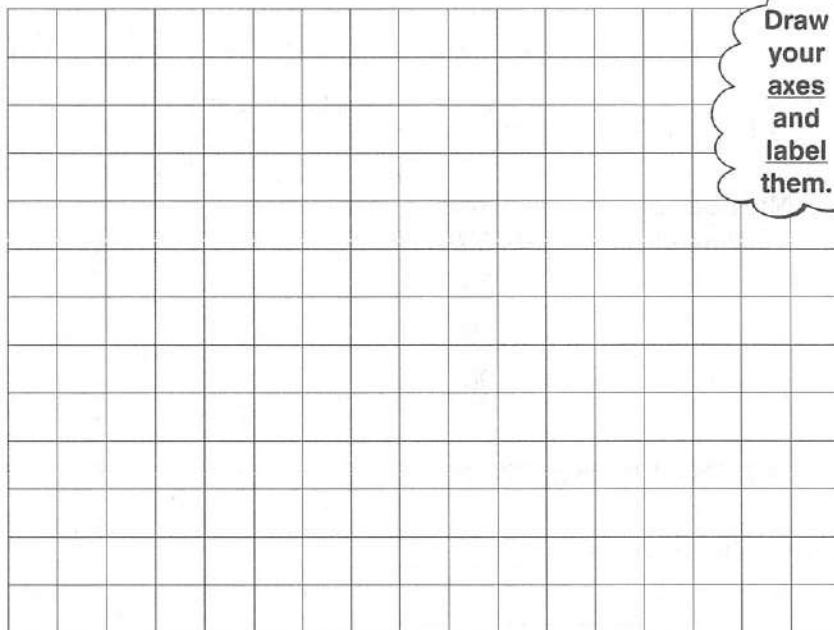
$90 \times 4 =$  \_\_\_\_\_

$90 \times 5 =$  \_\_\_\_\_



b)

Time (h)	Cost (\$)
0	0
1	6.00
2	12.00
3	
4	
5	



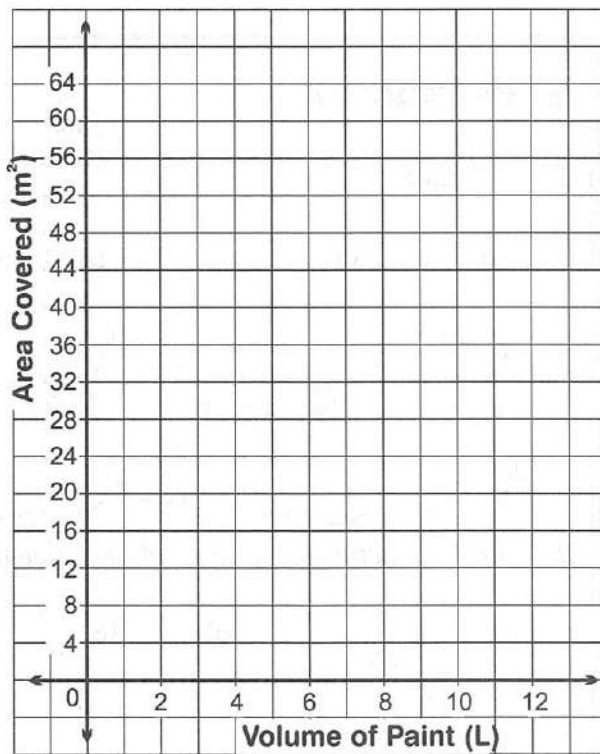
Draw your axes and label them.

### Problems and Applications

3. This table of values shows the area covered by different volumes of paint.

a) Graph the relation. (Join the points.)

Volume of Paint (L)	Area Covered (m <sup>2</sup> )
2	16
4	32
6	48
8	64



b) How many square metres can be covered by

(i) 1 L of paint? \_\_\_\_\_

(ii) 10 L of paint? \_\_\_\_\_

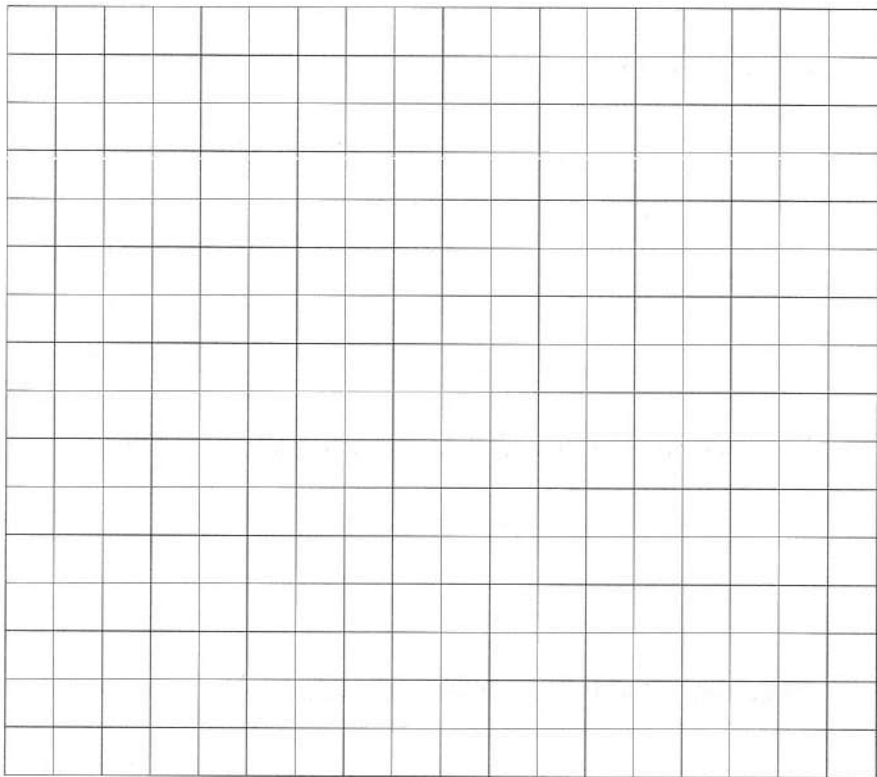
(iii) 3 L of paint? \_\_\_\_\_



4. This table shows the cost for different quantities of Popsicles.

a) Graph the relation.

Number of Popsicles	Cost (in cents)
2	30
4	60
6	90



b) What is the price of

(i) 1 Popsicle? \_\_\_\_\_

(ii) 5 Popsicles? \_\_\_\_\_

(iii) 8 Popsicles? \_\_\_\_\_

c) How many Popsicles can you buy for \$1.50? \_\_\_\_\_

### Skill Builder

**HINT:**  
Substitute



1. Evaluate.

a)  $x + 1$ , when  $x = 5$

$5 + 1 =$  \_\_\_\_\_

b)  $3x$ , when  $x = 3$

\_\_\_\_\_

c)  $x - 2$ , when  $x = 6$

\_\_\_\_\_

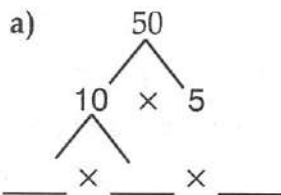
d)  $2x + 1$ , when  $x = 1$

\_\_\_\_\_

e)  $4x - 3$ , when  $x = 2$

\_\_\_\_\_

2. Draw a factor tree for each of the following numbers.



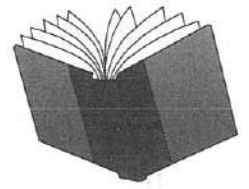
b) 16

c) 24

d) 20



# Review



1. Substitute 4 for  $x$  in each expression.

a)  $3x = 3 \times 4$   
 $=$  \_\_\_\_\_

b)  $x + 3$

c)  $x - 3$

d)  $7 - x$

e)  $2x + 2$

f)  $3x - 1$

2. Evaluate the following for  $x = 2$  and  $y = 3$ .

a)  $x + y = 2 + 3$   
 $=$  \_\_\_\_\_

b)  $y - x =$

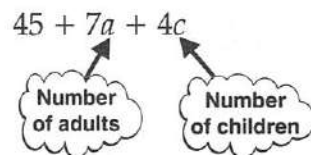
c)  $2x - y =$

d)  $2x + y =$

e)  $3x - y =$

f)  $\frac{x}{2} + y =$

3. To find the total cost (in dollars) of taking a car on a ferry, use the formula



What is the total cost of taking a car on a ferry with 2 adults and 3 children?

**HINT:**  
 Substitute  
 $a = 2$   
 $c = 3$

$$45 + 7a + 4c =$$



4. Choose an expression from the cloud to match each phrase.

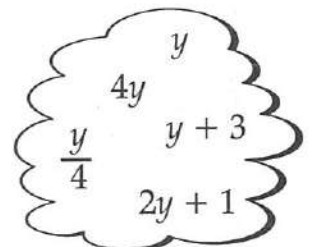
a) 3 more than  $y$  \_\_\_\_\_

b) 4 times  $y$  \_\_\_\_\_

c)  $y$  divided by 4 \_\_\_\_\_

d)  $y$  minus 3 \_\_\_\_\_

e) 2 times  $y$ , then increased by 1 \_\_\_\_\_



5. Complete the table.

	Expression	Written Phrase
a)	$x + 4$	
b)	$x - 3$	
c)	$x + 9$	a number increased by 9
d)	$3x$	
e)	$\frac{x}{3}$	
f)	$11 + x$	
g)	$2x - 1$	

6. Write an expression for each of the following.

a) three more than the width \_\_\_\_\_

b) four times the number of cans \_\_\_\_\_

c) the time increased by two      $t + 2$     

d) the number of pens divided by 5 \_\_\_\_\_

e) \$15 less than the price of the book \_\_\_\_\_

7. Solve each equation.

a)  $x + 5 = 7$

$x =$  \_\_\_\_\_

b)  $y + 11 = 13$

\_\_\_\_\_

c)  $w - 4 = 2$

\_\_\_\_\_

d)  $m - 6 = 4$

\_\_\_\_\_

e)  $3n = 15$

\_\_\_\_\_

f)  $5g = 25$

\_\_\_\_\_

g)  $\frac{x}{4} = 3$

\_\_\_\_\_

h)  $\frac{y}{10} = 5$

\_\_\_\_\_

i)  $y - 7 = 4$

\_\_\_\_\_

j)  $4c = 28$

k)  $x + 6 = 11$

l)  $\frac{x}{2} = 6$

Solve.

m)  $2x + 1 = 5$

Guess	Substitute Into $2x + 1 = 5$	Check
$x = 0$	$(2 \times 0) + 1 = 1$	Too small
$x =$		

$x =$  \_\_\_\_\_

n)  $3w - 2 = 7$

Guess		Check

\_\_\_\_\_

8. The 3 diagrams below show how squares have been arranged.

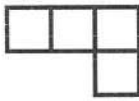


Diagram 1

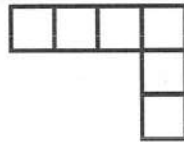


Diagram 2

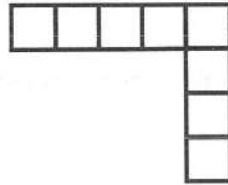


Diagram 3

a) Draw the next three diagrams.

b) Complete the table.

Diagram	1	2	3	4	5	6
Number of Squares						

c) Describe the relationship between the number of squares and the diagram.

\_\_\_\_\_

d) How many squares are in the 7th diagram? \_\_\_\_\_



9. Complete these tables of values.

a)

$x$	$x + 5$
1	
2	
3	
4	

**Substitute**

$x + 5$

$1 + 5 = \underline{\quad}$

$\underline{\quad} + 5 = \underline{\quad}$

b)

$x$	$x - 1$
	0
	1
	2
	3

**Substitute**

c)

$x$	$2x + 3$
1	
2	
3	
4	

**Substitute**

$2x + 3$

$(2 \times 1) + 3 = \underline{\quad}$

$(2 \times \underline{\quad}) + 3 = \underline{\quad}$

d)

$x$	$3x - 2$
1	
2	
3	
4	

**Substitute**

10. A luncheon costs \$100 to rent the room plus \$10 per person for food.

To calculate the cost, use this formula:

$10n + 100$

**Number of people**

Complete this table of values.

**Use the formula.**

Number of People ( $n$ )	10	20	30	50
Cost (\$)				



**Substitute:**

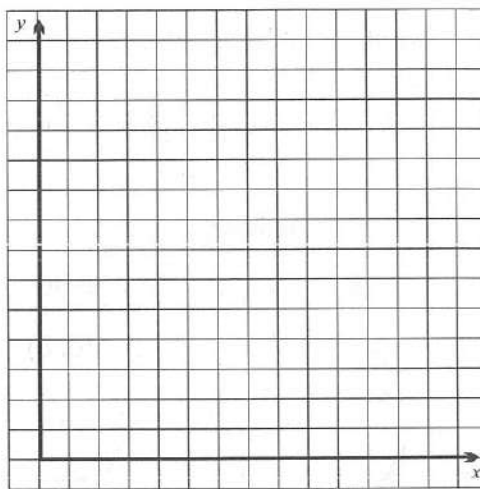
$10n + 100 = (10 \times 10) + 100$

$= 100 + 100$

$= \underline{\quad}$

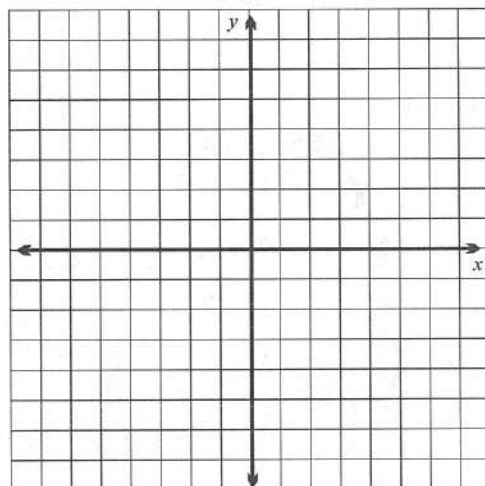
11. a) Plot the points  
 $D(0, 0)$ ,  $E(4, 4)$ ,  $F(7, 4)$ ,  
 and  $G(11, 0)$ .  
 b) Join the points in order.  
 c) Name the figure formed.

\_\_\_\_\_



12. a) Plot the points  $A(-2, 2)$ ,  
 $B(4, 2)$ ,  $C(4, -3)$ , and  $D(-2, -3)$ .  
 b) Join the points in order.  
 c) Name the figure formed.

\_\_\_\_\_



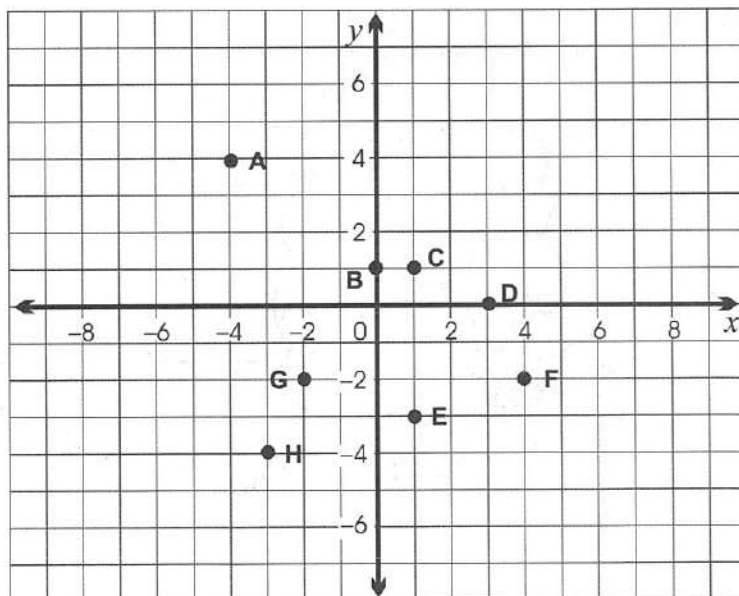
13. Write the coordinates (ordered pair) of each of the points shown in the graph.

$A(-4, \underline{\quad})$        $E$  \_\_\_\_\_

$B$  \_\_\_\_\_       $F$  \_\_\_\_\_

$C$  \_\_\_\_\_       $G$  \_\_\_\_\_

$D$  \_\_\_\_\_       $H$  \_\_\_\_\_



14. (i) Complete the table of values.  
 (ii) Write the ordered pairs.  
 (iii) Graph each set of points.

a)  $x + y = 8$

$x$	$y$
0	8
1	
2	
3	
4	

**Substitute**

$x + y = 8$

**Ordered Pairs**

$0 + \square = 8$        $(0, 8)$

$1 + \square = 8$       \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

b)  $x - y = 2$

$x$	$y$
	0
	1
	2
	3
	4

**Substitute**

$\square - 0 = 2$       \_\_\_\_\_

$\square - 1 = 2$       \_\_\_\_\_

$\square - 2 = 2$       \_\_\_\_\_

$\square - 3 = 2$       \_\_\_\_\_

$\square - 4 = 2$       \_\_\_\_\_

c)  $y = x - 1$

$x$	$y$
0	-1
1	
2	
3	
4	

**Substitute**

$\square = 0 - 1$       \_\_\_\_\_

$\square = 1 - 1$       \_\_\_\_\_

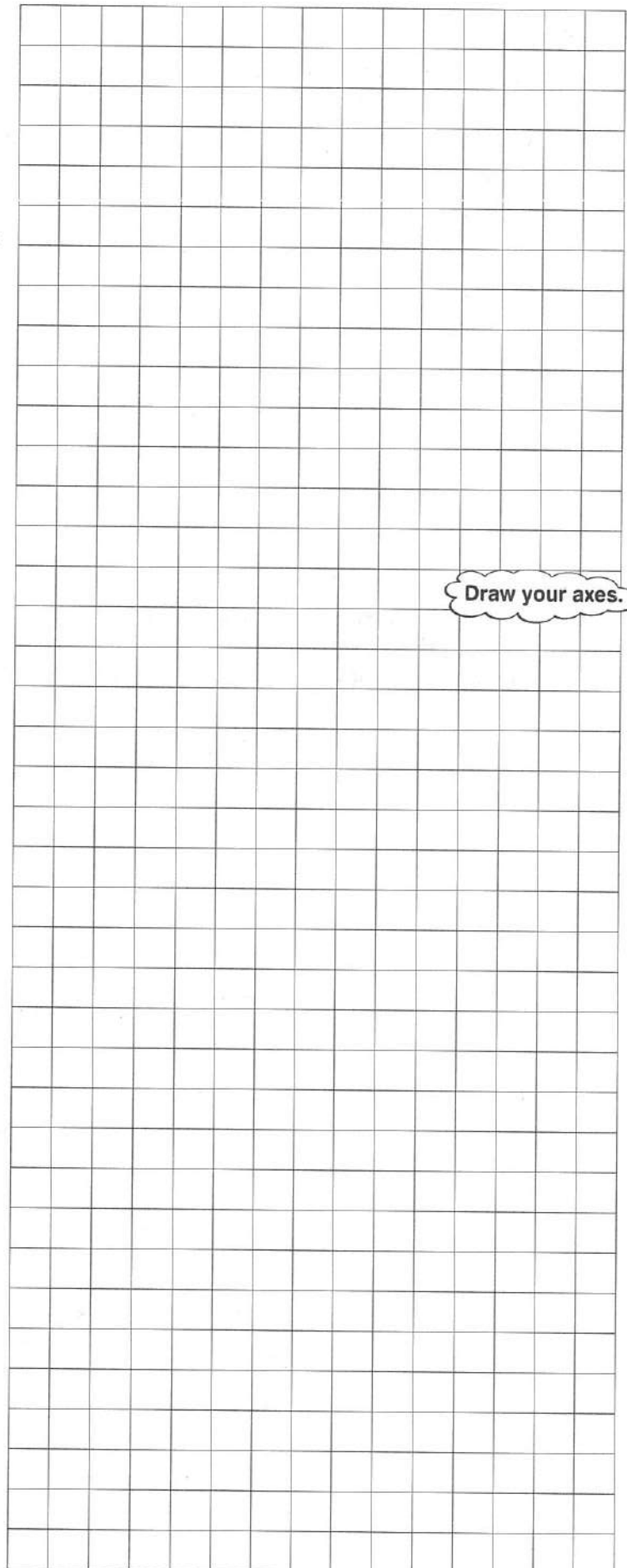
$\square = 2 - 1$       \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Draw your axes.



15. (i) Complete these tables.  
(ii) Write the solutions as ordered pairs.

a)  $x + y = 9$

$x$	$y$
1	
2	
3	
4	
5	
6	

Ordered Pairs

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

b)  $x - y = 3$

$x$	$y$
3	
5	
7	
9	
11	
13	

Ordered Pairs

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

c)  $2x + 1 = y$

$x$	$y$
1	3
2	
3	
4	
5	

Substitute

$(2 \times 1) + 1 =$  \_\_\_\_\_

Ordered Pairs

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

d)  $3x - 2 = y$

$x$	$y$
0	-2
1	
2	
3	
4	

Substitute

$(3 \times 0) - 2 =$  \_\_\_\_\_

Ordered Pairs

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# Chapter Check



1. Evaluate the following expressions for  $x = 2$  and  $y = 1$ .

Substitute

a)  $x + y = 2 + 1$

b)  $x - y =$

c)  $2x + y =$

= \_\_\_\_\_

d)  $x + 4y =$

e)  $2x + 3y =$

f)  $1 + x + 2y =$

2. Write an expression for each phrase.

a) a number multiplied by 15

\_\_\_\_\_

b) a number divided by 3

\_\_\_\_\_

c) a number increased by 9

\_\_\_\_\_

d) twelve more than a number

     $x + 12$     

e) a number decreased by 5

\_\_\_\_\_

f) six times a number

\_\_\_\_\_

3. Write each expression in words.

a)  $y + 3$

\_\_\_\_\_

b)  $w - 11$

\_\_\_\_\_

c)  $7m$

\_\_\_\_\_

d)  $\frac{n}{4}$

\_\_\_\_\_

e)  $x - 3$

    a number decreased by three    

f)  $9 - y$

\_\_\_\_\_

g)  $4 + a$

\_\_\_\_\_



4. Solve each equation.

a)  $x - 3 = 4$

b)  $d + 2 = 8$

c)  $y - 9 = 4$

$x =$  \_\_\_\_\_

d)  $x + 3 = 12$

e)  $6m = 36$

f)  $\frac{b}{3} = 2$

g)  $4x = 28$

h)  $\frac{c}{3} = 9$

i)  $x + 7 = 10$

5. The cost to have your house cleaned is calculated by using the formula  $50 + 4n$ .

Complete the table.

Use the formula.

Number of hours to clean house

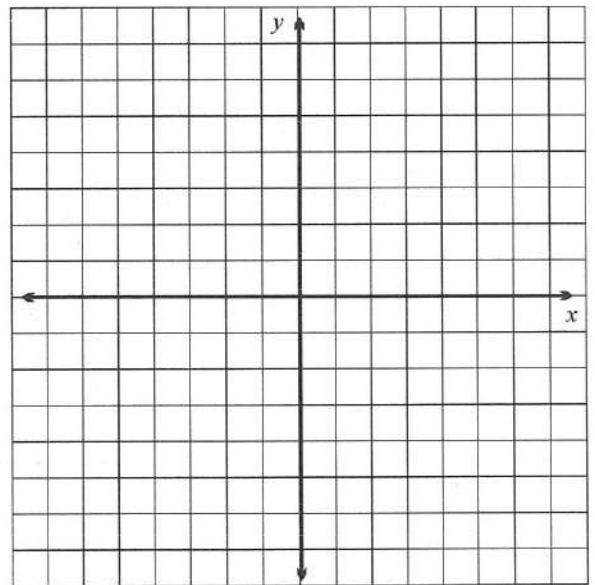
Time (h)	2	4	6	8
Cost (\$)				



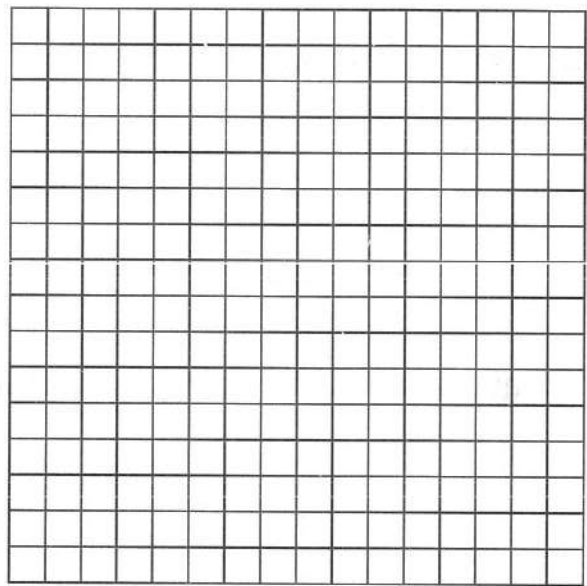
Substitute:  $50 + 4n$   
 $= 50 + (4 \times 2)$   
 $= 50 + 8$   
 $=$  \_\_\_\_\_

6. a) Plot the points  $A(-2, 2)$ ,  $B(0, 5)$ ,  $C(6, 5)$ , and  $D(4, 2)$ .  
 b) Join the points in order.  
 c) Name the figure formed.

\_\_\_\_\_



7. a) Plot the points  
 $W(4, 4)$ ,  $X(4, -4)$ ,  $Y(0, -4)$ ,  
 and  $Z(0, 4)$ .  
 b) Join the points in order.  
 c) Name the figure formed.



8. Complete these tables of values.

a)

$x$	$x + 7$
2	
3	
4	
5	

**Substitute**  
 $x + 7 = 2 + 7$   
 $=$  \_\_\_\_\_

b)

$x$	$2x - 3$
2	
3	
4	
5	

**Substitute**  
 $2x - 3 = (2 \times 2) - 3$   
 $= 4 - 3$   
 $=$  \_\_\_\_\_

9. (i) Complete the table of values. (ii) Write the ordered pairs. (iii) Draw the graph.

a)  $x + y = 7$

$x$	$y$
	1
	2
	3
	4
	5

**Ordered Pairs**

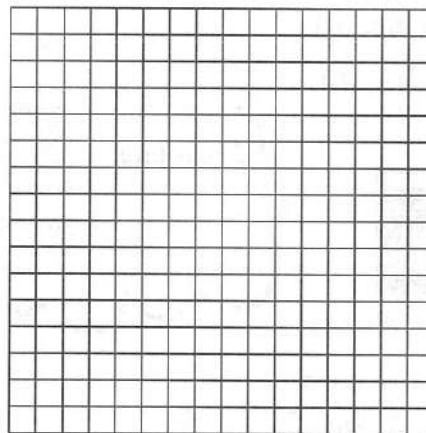
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



b)  $y = x + 1$

$x$	$y$
0	
1	
2	
3	

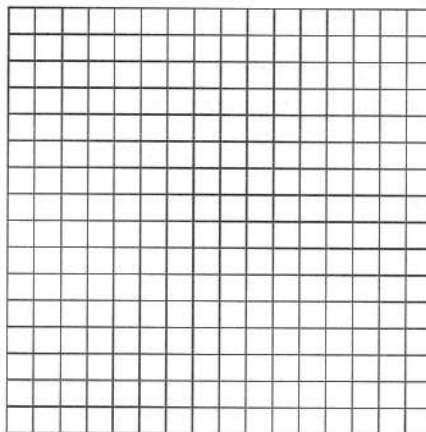
**Ordered Pairs**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**Draw your x-axis and y-axis first.**

10. Name the **coordinates** (ordered pairs) of the points shown on the graph.

A(\_\_\_\_, \_\_\_\_)

\_\_\_\_\_

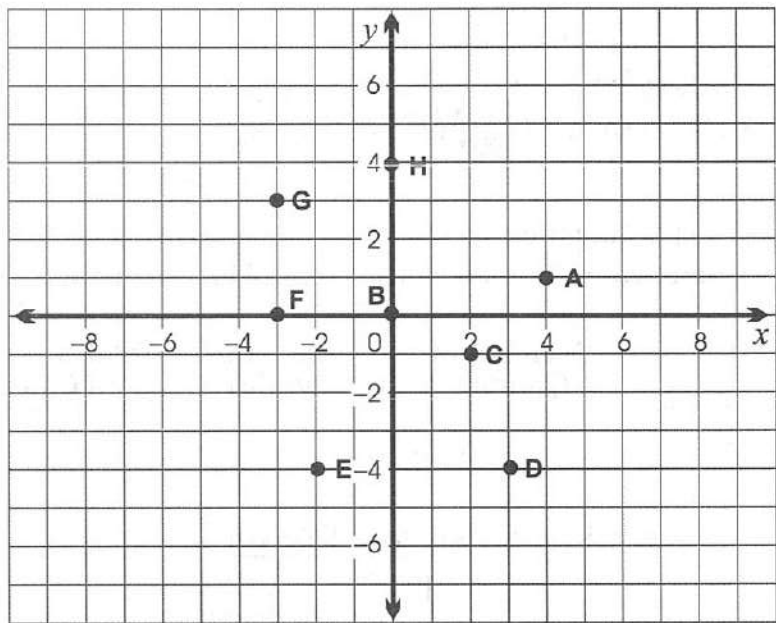
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

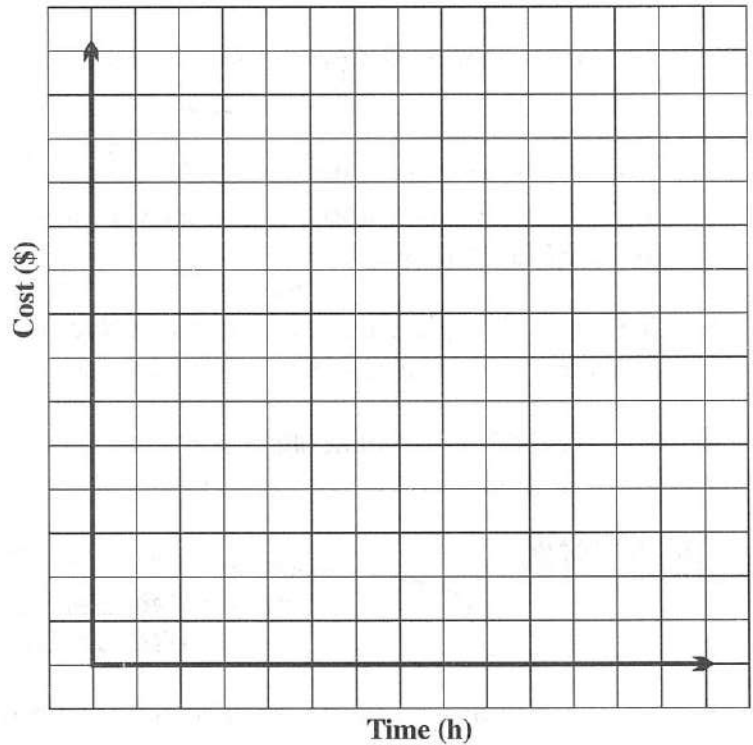
\_\_\_\_\_

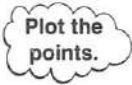
\_\_\_\_\_



11. The table shows Galina's earnings.

Time (h)	Earnings (\$)
1	10
2	20
3	30
4	
5	
6	

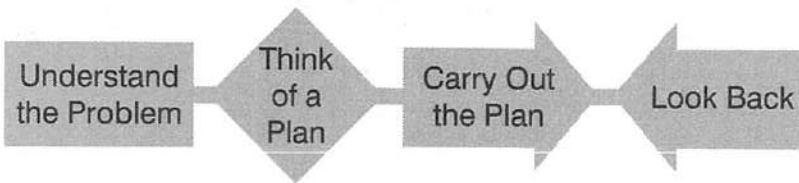


- Complete the table of values.
- Graph the relation.
- Join the points. 
- Use the graph to find how much Galina earns in 8 h.

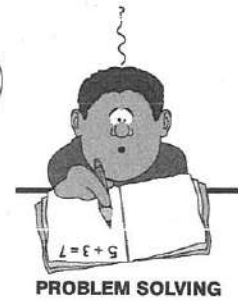
\_\_\_\_\_



## Problem Solving: Using the Strategies



Show your work on looseleaf.

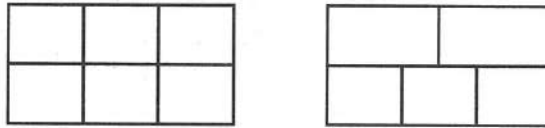


- The parking meter contains 21 coins in quarters and loonies. There was \$13.50 inside the meter. How many of each type of coin were there?

Set up a table.

Number of Quarters	Number of Loonies	Total Number of Coins	Total Value \$13.50	Check

- These are floor plans of two different houses.



Without lifting your pencil, draw one line that crosses each room only once.

- Joe bought **three** cartons of milk that cost \$2.69 **each**. What was his **change** from a \$10.00 bill?
- Ramon, Mary, Inga, and Paul go to the movies in a car. Two sit in the front and two sit in the back. Only Ramon and Mary can drive. In how many possible ways can they sit in the car? **List** the ways.

Multiply

- The numbers **5 and 6** are two **consecutive** numbers. The product of these numbers is 30. What are two **consecutive** numbers whose product is 182?
- Shirley left for school at 08:35 and returned home at 15:30. How long was Shirley away from home?

### DATA BANK

Use the Data Bank on page 391 of your MATHPOWER™ student text.

- How much deeper than Lake Erie is Lake Huron?

\_\_\_\_\_

- Which of the Great Lakes is the deepest? \_\_\_\_\_

- Which of the Great Lakes is the largest? \_\_\_\_\_

# Answers CHAPTER 7 Patterns

## Skill Builder page 343

1. a) 13 b) 16 c) 25 d) 27
2. a) 16 b) 20 c) 9 d) 28
3. a) 15 b) 54 c) 77 d) 84  
e) 36 f) 64 g) 50 h) 21
4. a) 6 b) 4 c) 12 d) 12  
e) 6 f) 5 g) 4 h) 10

## Mental Math pages 344–345

1. a) 13 b) 18 c) 14  
d) 13 e) 20 f) 19
2. a) 7 b) 4 c) 8  
d) 7 e) 4 f) 9
3. a) 48 b) 63 c) 24  
d) 70 e) 55 f) 24
4. a) 3 R1 b) 9 R2 c) 4 R3  
d) 7 R1 e) 11 R1 f) 11 R1
5. a) 43 b) 20 c) 15 d) 14
6. a) 20 b) 28 c) 14 d) 4
7. a) 3.6 b) 2500 c) 4.15  
d) 760 e) 20.6 f) 1500  
g) 0.38 h) 52
8. a) 16 b) 8 c) 25  
d) 36 e) 18 f) 15

## Skill Builder page 345

1. a) +3 b) -3 c) +1  
d) -4 e) +8 f) +12  
g) +13 h) +10 i) +5
2. a) 47 b) 420 c) 66  
d) 1000 e) 8 f) 34  
g) 60 h) 120 i) 240  
j) 60

## 7.1 Variables in Expressions pages 346–348

### Practice

1. a) 9 b) 6 c) 3 d) 7  
e) 0 f) 15 g) 7 h) 5  
i) 6 j) 4
2. a) 12 b) 8 c) 2  
d) 4 e) 9 f) 6  
g) 18 h) 14 i) 7
3. a) 9 b) 20 c) 6 d) 6  
e) 11 f) 2 g) 0
4. a) 3 b) 0 c) 4  
d) 1 e) 3 f) 0
5. a) 5 b) 1 c) 7  
d) 3 e) 15
6. a) 6.6 b) 1.8 c) 7.2  
d) 12.6 e) 19.8

### Problems and Applications

7. 10 m
8. a) \$40.00 b) \$80.00
9. Answers may vary.

## Word Zapper page 349

Answers may vary.

## Skill Builder page 349

1. a) 14 cm b) 10 cm<sup>2</sup>
2. a) 15 b) 20 c) 40 d) 30  
e) 8 f) 16 g) 4 h) 2
3. a) 18 b) 40 c) 27 d) 16  
e) 100 f) 49 g) 48 h) 20

## 7.2 Words and Symbols pages 350–352

### Practice

1. a)  $x + 5$  b)  $x - 6$  c)  $4n$   
d)  $\frac{x}{2}$  e)  $n - 8$  f)  $5 + y$   
g)  $9 - m$  h)  $\frac{5}{x}$
2. a) a number increased by six  
b) a number decreased by five  
c) a number multiplied by four  
d) a number multiplied by two  
e) the sum of nine and a number  
f) a number subtracted from seven  
g) a number divided by three  
h) seven divided by a number  
i) a number divided by two, then decreased by three  
j) the sum of eight and a number
3. a)  $\frac{m}{4}$  b)  $n + 2$  c)  $10 - n$   
d)  $\frac{12}{x}$  e)  $\frac{x}{2}$  f)  $5x$   
g)  $x - 6$  h)  $\frac{25}{x}$  i)  $7x$

### Problems and Applications

4. a)  $h + 5$  b)  $w - 6$  c)  $10l$   
d)  $\frac{t}{3}$  e)  $6n$  f)  $n + 2$   
g)  $t = 10b$  h)  $t = 2 + a$
5. a) 15, 20, 25, 30, 35, 40 b)  $5n$

## Logic Zapper page 352

$$5 + 3 = 8 \quad 9 - 7 = 2$$

Answers may vary.

## Skill Builder page 353

1. a) 7 b) 5 c) 2 d) 0  
e) 11 f) 23 g) 13 h) 16
2. a) 3.3 b) 0.7 c) 9.3
3. a) 24 b) 36 c) 34 d) 44  
e) 55 f) 23 g) 86 h) 43  
i) 36 j) 125

## 7.3 Solving Equations pages 354–357

### Practice

1. b)  $5 - 5 = 10$ , False  
c)  $3 \times 15 = 18$ , False  
d)  $5 \times 4 = 20$ , True  
e)  $\frac{15}{5} = 2$ , False  
f)  $2 \times 3 = 6$ , True  
g)  $2 \times 3 + 1 = 7$ , True  
h)  $3 \times 4 - 2 = 10$ , True
2. a)  $x = 4$  b)  $f = 1$  c)  $m = 7$   
d)  $n = 5$  e)  $y = 4$  f)  $z = 4$
3. a)  $x = 12$  b)  $a = 10$  c)  $z = 7$   
d)  $n = 8$  e)  $w = 6$  f)  $n = 4$
4. a)  $n = 2$  b)  $s = 5$   
c)  $x = 4$  d)  $y = 4$
5. a)  $x = 12$  b)  $y = 8$  c)  $c = 21$   
d)  $r = 16$  e)  $m = 4$  f)  $n = 18$
6. a)  $x = 7$  b)  $b = 6$  c)  $m = 8$   
d)  $n = 25$  e)  $a = 4$  f)  $g = 6$   
g)  $y = 11$  h)  $h = 12$
7. a)  $n = 4$  b)  $x = 3$  c)  $p = 5$

### Problems and Applications

8. Answers may vary.
9. a) \$20.25 b) 200 pages
10. 14 rides

## Logic Zapper page 357

nephew

## Skill Builder page 358

1. a) 7 b) 3 c) 1  
d) 13 e) 21 f) 11
2. a)  $n = 5$  b)  $n = 7$  c)  $n = 11$   
d)  $n = 13$  e)  $n = 4$  f)  $n = 5$   
g)  $n = 4$  h)  $n = 3$
3. a) 10 b) 13 c) 25  
d) 20 e) 5 f) 15

## 7.4 Developing Patterns pages 359–361

### Practice

1. a) 140, 210, 280, 350, 420  
b) multiply the time by 70  
c) 6 min d) 12 min  
e) (i) 1400 (ii) 4200  
(iii) 8400
2. b) 4, 7, 10, 13, 16, 19  
c) 3 d) 25
3. a) multiply the time by 60  
b)  $d = 60 \times t$   
c) (i) 420 km (ii) 540 km

### Problems and Applications

4. a) 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30  
b) (i) 22 bricks (ii) 26 bricks



**Skill Builder**

page 361

1. a) 8, 10 b) 12, 15  
c) 13, 15 d) 18, 22
2. a) 56 000 b) 120 c) 61  
d) 2.4 e) 6 f) 9

**7.5 Tables of Values**

pages 362–363

1. a) 6, 7, 8, 9, 10, 11; increase the number by 1  
b) 3, 6, 9, 12, 15, 18; increases by 3  
c) 9, 10, 11, 12, 13, 14; increases by 1  
d) 3, 5, 7, 9, 11, 13; increases by 2  
e) 1, 4, 7, 10, 13, 16; increases by 3

**Problems and Applications**

2. a) \$45.00, \$90.00, \$135.00, \$180.00  
b)  $C = 45n$
3. \$400.00, \$600.00, \$1200.00, \$2200.00
4. b) 1, 4, 9, 16, 25 c) 36

**Logic Zapper**

page 364

Gear 1: counterclockwise  
Gear 3: counterclockwise

**Skill Builder**

page 364

1. a)  $x = 7$  b)  $x = 4$  c)  $b = 8$   
d)  $n = 16$  e)  $y = 3$  f)  $x = 16$   
g)  $a = 11$  h)  $b = 1$  i)  $n = 9$
2. a) 42, 420, 4200  
b) 15, 150, 1500  
c) 32, 320, 3200  
d) 2, 20, 200  
e) 16, 160, 1600  
f) 1, 10, 100

**7.6 Ordered Pairs**

pages 365–367

**Practice**

1. a) (0, 3), (1, 2), (2, 1), (3, 0)  
b) (0, 0), (1, 1), (2, 2), (3, 3)  
c) (0, 8), (1, 7), (2, 6), (3, 5)  
d) (0, 2), (1, 3), (2, 4), (3, 5)  
e) (0, 5), (1, 6), (2, 7), (3, 8)  
f) (4, 0), (5, 1), (6, 2), (7, 3)
2. a) (0, 8), (1, 7), (2, 6), (3, 5)  
b) Answers may vary.  
c) Answers may vary.  
d) Answers may vary.  
e) (5, 0), (6, 1), (7, 2), (8, 3)  
f) (11, 1), (12, 2), (13, 3), (14, 4)
3. a)  $x + y = 6$   
b)  $x - y = 1$  or  $y + 1 = x$  or  $x = y + 1$   
c)  $y - x = 1$  or  $y = x + 1$  or  $x + 1 = y$

**Problems and Applications**

4. a) (1, 5), (2, 10), (3, 15), (4, 20)  
b)  $c = 5n$  c) \$1.00

**Definition Zapper**

page 367

ordered pair, coordinates

**Calculator Zapper**

page 368

$11^2, 19^2, 29^2, 41^2$

Add 8, 10, 12, 14, etc., then square.

**Skill Builder**

page 368

1. a)  $x = 6$  b)  $y = 2$  c)  $a = 9$   
d)  $n = 15$  e)  $g = 9$  f)  $r = 10$
2. a) 16 b) 2 c) 32  
d) 8 e) 7 f) 2

**7.7 The Coordinate Plane**

pages 369–372

**Practice**

1. a) D b) B c) I  
d) J e) E f) F  
g) G h) C i) H
2. a) P(0, 7) b) W(6, 6) c) N(0, 3)  
d) A(6, 4) e) C(1, 2) f) V(8, 8)  
g) S(2, 5) h) M(8, 0) i) Q(2, 0)  
j) T(10, 4) k) R(3, 6)

**Problems and Applications**

3. a) square b) triangle  
c) square d) rectangle
4. trapezoid 5. line
6. a) straight line b) straight line

**Definition Zapper**

page 372

origin

**Skill Builder**

page 373

1. Answers may vary.
2. a) 24 b) 19 c) 40  
d) 40 e) 0 f) 1  
g) 0 h) 11 i) 10
3. A(5, 7), B(2, 3), C(6, 2)

**7.8 Graphing Ordered Pairs**

pages 374–376

**Practice**

1. A(4, 2), B(-2, 4), C(-4, -3),  
D(3, -4), E(3, 5), F(-5, 3),  
G(-2, -2), H(4, -2), I(2, 0),  
J(0, 4), K(-3, 0), L(0, -5)
2. a) M b) A c) L  
d) K e) F f) D  
g) B h) G i) H

**Problems and Applications**

3. parallelogram 4. L shape
5. a) A(3, 2), B(3, 4), C(3, 5), D(3, 8),  
E(3, -2)  
c) yes d) y-axis
6. a) first b) fourth c) third  
d) third e) second  
f) first g) fourth h) second

**Skill Builder**

page 377

1. a) -1, 1, 3 b) 1, 4, 7  
2. a) 210 b) 60 c) 240  
d) 4900 e) 160 f) 800  
g) 250 h) 400 i) 60  
j) 900 k) 400 l) 360

**7.9 Graphing Relations**

pages 378–380

**Practice**

1. a) (0, 0), (1, 1), (2, 2),  
(3, 3), (4, 4), (5, 5)  
b) (0, 25), (1, 20), (2, 15), (3, 10),  
(4, 5), (5, 0)
2. a) 270, 360, 450  
b) 18.00, 24.00, 30.00

**Problems and Applications**

3. b) (i)  $8m^2$  (ii)  $80m^2$   
(iii)  $24m^2$
4. b) (i) 15¢ (ii) 75¢  
(iii) \$1.20  
c) 10 Popsicles

**Skill Builder**

page 380

1. a) 6 b) 9 c) 4  
d) 3 e) 5
2. a)  $2 \times 5 \times 5$  b)  $2 \times 2 \times 2 \times 2$   
c)  $2 \times 2 \times 2 \times 3$  d)  $2 \times 2 \times 5$

**Review**

pages 381–387

1. a) 12 b) 7 c) 1  
d) 3 e) 10 f) 11
2. a) 5 b) 1 c) 1  
d) 7 e) 3 f) 4
3. \$71.00
4. a)  $y + 3$  b)  $4y$  c)  $\frac{y}{4}$   
d)  $y - 3$  e)  $2y + 1$
5. a) a number increased by 4  
b) a number decreased by 3  
d) 3 times a number  
e) a number divided by 3  
f) 11 increased by a number  
g) two times a number, then decreased by 1
6. a)  $w + 3$  b)  $4n$   
d)  $\frac{n}{5}$  e)  $p - 15$
7. a)  $x = 2$  b)  $y = 2$  c)  $w = 6$   
d)  $m = 10$  e)  $n = 5$  f)  $g = 5$   
g)  $x = 12$  h)  $y = 50$  i)  $y = 11$   
j)  $c = 7$  k)  $x = 5$  l)  $x = 12$   
m)  $x = 2$  n)  $w = 3$
8. b) 4, 6, 8, 10, 12, 14  
c) multiply the diagram number by 2 and add 2  
d) 16
9. a) 6, 7, 8, 9 b) 1, 2, 3, 4  
c) 5, 7, 9, 11 d) 1, 4, 7, 10
10. 200, 300, 400, 600
11. c) trapezoid 12. c) rectangle
13. A(-4, 4), B(0, 1), C(1, 1),  
D(3, 0), E(1, -3), F(4, -2),  
G(-2, -2), H(-3, -4)
14. a) (1, 7), (2, 6), (3, 5), (4, 4)  
b) (2, 0), (3, 1), (4, 2), (5, 3), (6, 4)  
c) (0, -1), (1, 0), (2, 1), (3, 2), (4, 3)

15. a) (1, 8), (2, 7), (3, 6),  
 (4, 5), (5, 4), (6, 3)  
 b) (3, 0), (5, 2), (7, 4),  
 (9, 6), (11, 8), (13, 10)  
 c) (1, 3), (2, 5), (3, 7),  
 (4, 9), (5, 11)  
 d) (0, -2), (1, 1),  
 (2, 4), (3, 7), (4, 10)

**Chapter Check** pages 388–391

1. a) 3    b) 1    c) 5  
 d) 6    e) 7    f) 5
2. a)  $15x$     b)  $\frac{x}{3}$     c)  $x + 9$   
 e)  $x - 5$     f)  $6x$
3. a) a number increased by 3  
 b) a number decreased by 11  
 c) a number multiplied by 7  
 d) a number divided by 4  
 f) 9 decreased by a number  
 g) 4 increased by a number
4. a)  $x = 7$     b)  $d = 6$     c)  $y = 13$   
 d)  $x = 9$     e)  $m = 6$     f)  $b = 6$   
 g)  $x = 7$     h)  $c = 27$     i)  $x = 3$
5. 58, 66, 74, 82
6. c) parallelogram
7. c) rectangle
8. a) 9, 10, 11, 12    b) 1, 3, 5, 7
9. a) (6, 1), (5, 2), (5, 4), (4, 3), (2, 5)  
 b) (0, 1), (1, 2), (2, 3), (3, 4)
10. A(4, 1), B(0, 0), C(2, -1), D(3, -4),  
 E(-2, -4) F(-3, 0), G(-3, 3),  
 H(0, 4)
11. a) 40, 50, 60    d) \$80.00

**Problem Solving: Using the Strategies**  
 page 392

1. 11 loonies and 10 quarters  
 3. \$1.93    4. 12 ways  
 5. 13 and 14    6. 6 h and 55 min

**DATA BANK** page 392

1. 165 m    2. Superior  
 3. Superior



