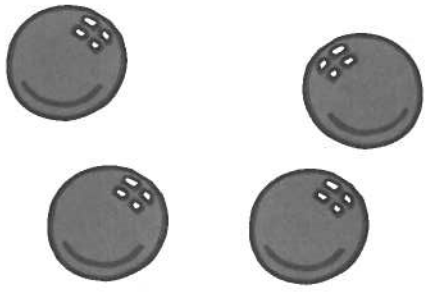
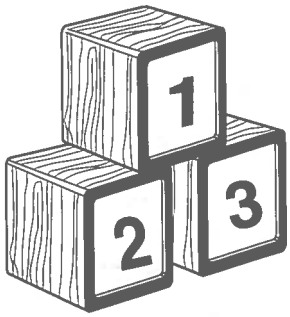
CHAPTER

5

Patterns and Relations





Skill Builder

To complete the sentence below:

First: *Multiply.*

Second: *Find each answer in the code below. Place the letter of the problem in the space above the answer.*

Y: $3 \times 4 \times 2 =$ _____ **N:** $5 \times 2 \times 5 =$ _____

K: $2 \times 5 \times 4 =$ _____ **E:** $3 \times 3 \times 4 =$ _____ **O:** $6 \times 0 \times 7 =$ _____

L: $8 \times 7 \times 1 =$ _____ **S:** $2 \times 2 \times 2 =$ _____ **B:** $7 \times 1 \times 2 =$ _____

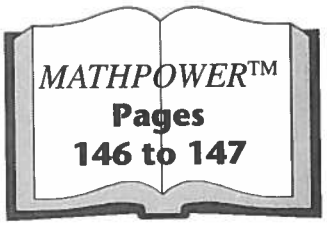
H: $3 \times 3 \times 3 =$ _____ **T:** $1 \times 1 \times 1 =$ _____ **P:** $2 \times 5 \times 2 =$ _____

A	_____	_____	_____	_____	_____	_____	_____	_____	who always tells lies is
	8	40	36	56	36	1	0	50	

called a	_____	_____	_____	_____		_____	_____	_____	_____	_____ .
	14	0	50	24		20	27	0	50	24

GETTING STARTED

Work together with your classmates, using your *MATHPOWER*™ student text, pages 146 and 147.



Mental Math

1. *State 6 multiples of each of the following numbers.*

Example:
Six **multiples** of **3** are 3, 6, 9, 12, 15, 18.

a) 2 → _____

b) 5 → _____

c) 4 → _____

d) 7 → _____

e) 10 → _____

f) 6 → _____

Continues on next page. →

2. *State all the factors of these numbers.*

Example:

12

1×12
2×6
3×4

The **factors** of 12 are 1, 2, 3, 4, 6, 12.

a) 4 **b)** 6 **c)** 7 **d)** 8

e) 10 **f)** 20 **g)** 16 **h)** 13

3. *Evaluate the powers.*

Example:

$2^3 = 2 \times 2 \times 2$
$= 8$

a) $3^2 = 3 \times 3$

$= \_\_\_\_$

b) 4^2 **c)** 6^2

d) 3^3 **e)** 1^6 **f)** 10^3

*Do **Brackets** first!*

4. *Calculate.*

a) $2^2 \times 8$

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

$= \_\_\_\_$

b) $(5 - 2)^2$

$= (\_\_\_\_)^2$

$= \_\_\_\_$

c) $(2 \times 3) + 4$

$= \_\_\_\_ + 4$

$= \_\_\_\_$

d) $(15 \div 3) + 2$ **e)** $(4 + 2)^2$ **f)** $2 \times (3 + 4)$

Skill Builder

1. *Calculate.*

Example: $38.9 \times 100 = 3890$

Move the decimal to the right.

a) $56 \times 100 =$ _____ **b)** $6.95 \times 10 =$ _____ **c)** $6.9 \times 1000 =$ _____

2. *Multiply.*

Example: $2982 \times 0.01 = 29.82$

Move the decimal to the left.

a) $29\,005 \times 0.001 =$ _____ **b)** $75 \times 0.1 =$ _____ **c)** $8.22 \times 0.1 =$ _____

3. *Divide.*

Example: $4.8 \div 10 = 0.48$

Move the decimal to the left.

a) $94 \div 10 =$ _____ **b)** $48.2 \div 100 =$ _____ **c)** $6.8 \div 10 =$ _____

4. *Divide.*

Example: $740 \div 0.1 = 7400$

Move the decimal to the right.

a) $740 \div 0.01 =$ _____ **b)** $0.81 \div 0.1 =$ _____ **c)** $63.2 \div 0.1 =$ _____

LEARNING TOGETHER Finding Patterns

Work together with your classmates, using your *MATHPOWER*™ student text, pages 148 and 149.

MATHPOWER™ **Pages 148 to 149**

Skill Builder

1. *Evaluate.*

*Do **Brackets** first!*

a) $(4 \times 5) - 1$

$= \_\_\_\_ - 1$

$= \_\_\_\_$

b) $7 + (4 \times 3)$

$= 7 + \_\_\_\_$

$= \_\_\_\_$

c) $9 \times (8 - 5)$

d) $3(4 - 2)$

2. *Write each fraction in lowest terms.*

a) $\frac{2}{10} = \frac{2 \div 2}{10 \div 2}$

$= \frac{1}{\square}$

b) $\frac{8}{16}$

c) $\frac{75}{100}$

d) $\frac{90}{100}$

5.1 Variables and Expressions

Practice

1. *Complete the table.*

Written Expression	Algebraic Expression
a) the length plus seven	$l + \square$
b) three times the height	
c) three times the height plus three	
d) two times the height plus four times the width	$\square h + \square w$
e) five times the number of dogs minus two times the number of cats	
f)	$2h$
g)	$2h + 4$
h)	$3w - 6$
i)	$2l + 3w$
j)	$x + 4$

2. *Evaluate.*

a) $x + 4,\ x = 2$

$x + 4$

$= \square + 4$ (Substitute)

$= \_\_\_\_$ (Calculate)

b) $4y,\ y = 3$

c) $t - 1,\ t = 7$

d) $8 - w,\ w = 2$

e) $4m + 2,\ m = 3$

$4m + 2$

$= (4 \times 3) + 2$ (Substitute)

$= \_\_\_\_ + 2$ (Multiply)

$= \_\_\_\_$ (Calculate)

f) $6t - 2,\ t = 5$

g) $9 - 2x,\ x = 4$

$9 - 2x$

$= 9 - 2(4)$

$= 9 - \_\_\_\_$

$= \_\_\_\_$

h) $8 + 6r,\ r = 7$

i) $12 - 3y,\ y = 4$

3. *Evaluate* $4x$ *for each of the following.*

a) $x = 3$

$4x$

$= 4(3)$ (Substitute)

$= \_\_\_\_\_$ (Multiply)

b) $x = 7$

$4x$

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

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

c) $x = 2$

d) $x = 0$

4. *Evaluate* $4y + 2$ *for each value of* y.

a) $y = 1$

$4y + 2$

$= 4(1) + 2$ (Substitute)

$= \_\_\_\_\_ + \_\_\_\_\_$ (Multiply)

$= \_\_\_\_\_$ (Add)

b) $y = 6$

c) $y = 3$

5. *Evaluate for* $x = 2$.

a) $3x$

$= 3(2)$

$= \square$

b) $4x + 7$

$= 4 (\_\_\_\_\_) + 7$

$= \_\_\_\_\_ + 7$

$= \square$

c) $10 - 4x$

d) x^2

$= 2^2$

$= 2 \times 2$

$= \square$

e) $x^2 - 1$

f) $2(x + 1)$

(Do Brackets first!)

$= 2(\square + 1)$

$= 2(\_\_\_\_\_)$ (Multiply)

$= \square$

6. *Evaluate for* $y = 3$.

a) $4y$

b) $8 - y$

c) $10 - 3y$

d) $4 + y^2$

e) $y^2 - 2$

f) $2(y - 2)$

7. *Evaluate for* $x = 1$ *and* $y = 4$.

a) $x + y$ b) $2x + y$ c) $4x + y + 3$

8. *Evaluate for* $x = 3.2$ *and* $y = 1.4$.

a) $x + y$ b) $x - y$ c) $x + 2y$

9. *Evaluate.*

a) $2x,\ x = -2$ b) $5n,\ n = -1$ c) $y + 6,\ y = -3$

Problems and Applications

10. The points total of an NHL team is given by the expression

$$2w + t.$$

w = number of wins
t = number of ties

Complete the table to find the points totals.

Team	Wins (w)	Ties (t)	Points ($2w + t$)
Calgary	43	11	
Edmonton	26	8	
Montréal	48	6	
Ottawa	10	4	

Show your work below!

Rough Work:

Calgary:

$2w + t$

$= (2 \times 43) + 11$ *Substitute*

$= \_\_\_\_\_ + 11$ *Calculate*

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

Edmonton:

Montréal:

Ottawa:

11. The total cost of a banquet, in dollars, is calculated using the expression $22n$.

n = number of people

What is the cost for 37 people?

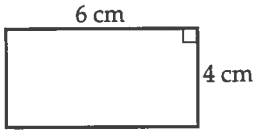
Sentence: _____

Skill Builder

1. *Find the **area** and **perimeter** of each rectangle.*

Substitute into the formulas.

a)



length 6 cm, width 4 cm

$A = l \times w$

$= 6 \times 4$

$=$ _____ cm^2

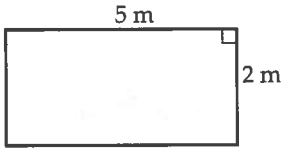
$P = 2(l + w)$

$= 2($_____ + _____$)$

$= 2 \times$ _____

$=$ _____ cm

b)



length 5 m, width 2 m

$A = l \times w$

$P = 2(l + w)$

2. *Multiply.*

Move the decimal to the left.

a) $3045 \times 0.01 =$ _____

b) $26 \times 0.001 =$ _____

c) $56\,265 \times 0.1 =$ _____

d) $47\,762 \times 0.001 =$ _____

3. *Divide.*

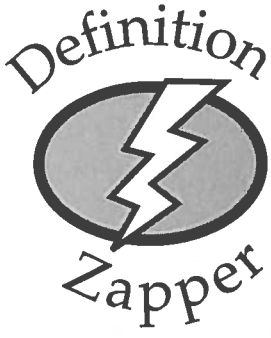
Move the decimal to the right.

a) $718 \div 0.01 =$ _____

b) $1099 \div 0.1 =$ _____

c) $67 \div 0.01 =$ _____

d) $93 \div 0.001 =$ _____



Write the definition of a **variable**.

_____

_____

Give an **example** of a **variable.**

_____

5.2 Developing and Working With Formulas

Practice

1. *Complete the table. State a rule for each pattern.*

a)

x	1	2	3	4	5	6
y	4	8	12			

Rule: $y =$ ☐ x

b)

s	1	3	5	7	9	11
t	6	8	10			

Rule: $t =$ _____

2. *Complete the table. Write a formula for each pattern.*

a)

Hours (h)	1	2	3	4	5	6
Wages (w)	9	18	27			

Rule: $w =$ _____

b)

Number of tickets (n)	2	4	6	8	10	12
Cost (c)	12	24	36			

Rule: _____

3. *The formula for the area of a rectangle is* $A = l \times w$.

a) Find A, when $l = 9$ m and $w = 3$ m.

$A = l \times w$ (Formula)

$A =$ _____ $\times$ _____ (Substitute)

$A =$ _____ m^2 (Calculate)

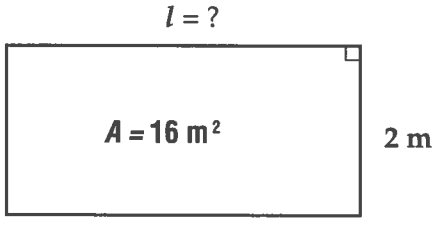
b) Find A, when $l = 6$ m and $w = 5$ m.

c) Find l, when $A = 16\ m^2$ and $w = 2$ m.

Formula

Substitute

Calculate



4. *The formula for the perimeter of a rectangle is* $P = 2(l + w)$.

a) Find P when $l = 5$ m and $w = 2$ m.

$P = 2(l + w)$ (Formula)

$P = 2($_____ + _____$)$ (Substitute)

$P = 2 \times$ _____ (Calculate)

$P =$ _____

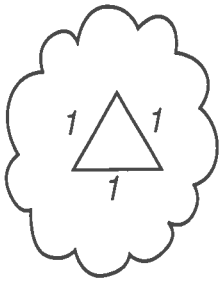
b) Find P when $l = 6$ m and $w = 4$ m.

Problems and Applications

5. **a)** *Complete the table. Each small triangle has a side length of 1 unit.*

Number of Triangles (n)	Figure	Perimeter (P)
1		3
2		4
3		5
4		
5		
6		

Perimeter is the distance around a figure.



b) Write a formula for the perimeter.

Note: n = *number of triangles*

$P = n +$ ☐

c) What is the perimeter of the figure made from 30 triangles?

Use the formula from ***b).***

Substitute

Calculate

Sentence: _____

Skill Builder

1. *Complete the tables.*

a)

x	y
7	10
5	8
3	6
1	
−1	
−3	
−5	−2

b)

x	y
−4	−3
−5	−4
−6	−5
−7	

b)

x	y
6	10
5	9
4	8
3	
1	

Continues on next page. →

2. a) Solve each problem.
   b) Connect the dots with the correct answers in the same order as the problems are lettered.

Use a ruler!

Start: + 7

−3

−11

3

−4

A. $9 + (-2) =$ _____

B. $4 + (-1) =$ _____

C. $-8 + (-3) =$ _____

D. $-7 + (+4) =$ _____

E. $-3 - 1$

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

$=$ _____

Write an addition sentence.

F. $5 - (-2)$

$=$ _____

$=$ _____

5.3 Relations as Ordered Pairs

Practice

1. *For each of the following equations,*
   i) ***write** each relation **in words**,*
   ii) ***complete** the **table** of values, and*
   iii) ***write** the **ordered pairs**.*

a) $x + y = 6$

x	y
3	3
2	
1	
0	
−1	

i) Written sentence:
The sum of x and y is _____.

ii) Find the value of y.
$x + y = 6$

$3 + \square = 6$ ← Substitute $x = 3$

$2 + \square = 6$ ← Substitute $x = 2$

$1 + \square = 6$

$0 + \square = 6$

$-1 + \square = 6$

iii) The **ordered pairs** are **(3, 3)**, **(2, ☐)**, _____,

_____, and _____.

b) $x + y = 2$

x	y
2	
1	
0	
−1	
−2	

i) Written sentence: _____

_____

ii) Find the value of y.

$x + y = 2$

$2 + \square = 2$

$1 + \square = 2$

iii) The **ordered pairs** are _____

_____

c) $x - y = 2$

x	y
6	
5	
4	
3	
2	

i) _____

_____

ii) Find the value of y.

iii) _____

_____

2. *Use the equation* $x + y = 9$ *to find the missing value in each ordered pair.*

Ordered pair → ***(x, y)***

a) $(3, \square)$ **b)** $(7, \square)$ **c)** $(4, \square)$ **d)** $(-1, \square)$

Think: $x + y = 9$, $3 + \square = 9$

$x + y = 9$, $7 + \square = 9$

e) $(\square, 2)$ **f)** $(\square, 6)$ **g)** $(\square, 1)$ **h)** $(\square, -2)$

Think: $x + y = 9$, $\square + 2 = 9$

3. *For each of the following equations,*

i) ***write*** *each relation* ***in words,***

ii) ***complete*** *the* ***table*** *of values, and*

iii) ***write*** *the* ***ordered pairs.***

a) $y = x + 3$

x	y
2	
1	
0	
−1	
−2	

i) Written in words:

The y-value is equal to the x-value plus _____.

ii) Find the value of y.

$y = x + 3$

$y = \boxed{2} + 3$ *Substitute $x = 2$.*

$y =$ _____

$y = \square + 3$ *Substitute $x = 1$.*

$y =$ _____

iii) The **ordered pairs** are $(2, \square)$, _____, _____, _____, and _____.

b) $y = x - 1$

x	y
3	
2	
1	
0	
−1	

i) Written in words: _____

_____

ii) Find the value of y.

iii) The **ordered pairs** are _____

_____

4. *For the equation* $y = x + 2$, *find the missing value in each ordered pair.*

Substitute

a) $(2, \square)$ **b)** $(3, \square)$ **c)** $(-1, \square)$ **d)** $(\square, 2)$

Think: $y = x + 2$, $y = 2 + 2$, $y = \square$

5. ***Complete** the **table** of values and **write** the **ordered pairs** for each relation.*

a) $y + x = 5$

x	y
4	
3	
2	
1	
0	
−1	

Rough Work:

$\square + 4 = 5$

***The ordered pairs are** (4, ____), _____*

b) $y = x - 3$

x	y
7	
6	

***Hint:** Put in your own values of x.*

Rough Work:

_____

Problems and Applications

6. *Write an equation for each relation.*

a)

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

$x + y = \square$

b)

x	y
8	4
7	3
6	2
5	1
4	0

$y = x - \square$

c)

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

_____

d)

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

_____

7. The pronghorn can run at about 15 m/s for a short period of time.

a) Complete the table to find the distances a pronghorn can cover in different lengths of time.

Time (*s*)	Distance (*m*)
1	15
2	30
3	
4	
5	

b) Describe the relation in words.

_____

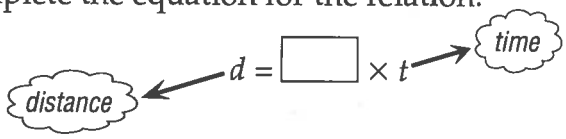
_____

c) Write the results from the table as ordered pairs.

_____

_____

d) Complete the equation for the relation.



e) Use the above equation to find the distance, d, a pronghorn can run in 12 s.

$d = \square \times t$

$= \square \times \square$ ← Substitute $t = 12$

$= $ _____

_____

f) Use the equation to find the distance a pronghorn can run in 50 s.

_____

g) What distance can a pronghorn run in 2 min?

1 min = _____ s

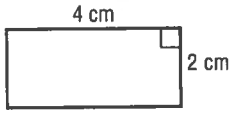
Remember t must be in seconds.

_____

Skill Builder

1. *Calculate the* ***area*** *(A) of each figure.*

a) rectangle with $l = 4$ cm, $w = 2$ cm



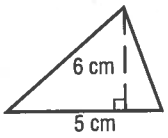
$A = l \times w$ (Formula)

$A =$ _____ (Substitute)

$A =$ _____ (Calculate)

(Substitute into the formula.)

b) triangle with $b = 5$ cm, $h = 6$ cm



$A = (b \times h) \div 2$ (Formula)

$A = (\_\_\_\_ \times \_\_\_\_) \div 2$ (Substitute)

$A = \_\_\_\_ \div 2$ (Calculate)

$A =$ _____

2. *Estimate.*

a) 583 + 329

Est.
600
+ 300
_____

b) 102.9 + 49.99

Est.

c) 6132 − 3823

Est.

d) 21.21 − 9.45

Est.

e) 923 + 80

Est.

f) 4.59 − 3.001

Est.

g) 812 − 69.9

Est.

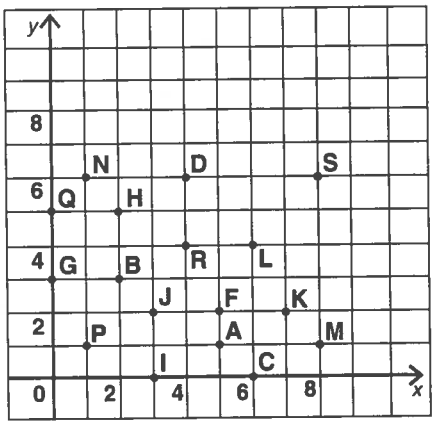
h) 0.91 + 2.105

Est.

5.4 Graphing Ordered Pairs

Practice

1. *State the coordinate of each point.*



A(5, ____), B(____, ____)

_____ , _____

_____ , _____

_____ , _____

_____ , _____

_____ , _____

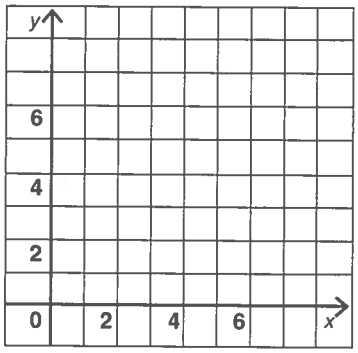
_____ , _____

_____ , _____

Problems and Applications

2. For each of the following,
   - **i)** **plot** the points,
   - **ii)** **join** the points in the order given,
   - **iii)** **name** the figure, and
   - **iv)** find the **area** of the figure.

a) O(0, 0), D(0, 5), E(5, 5), F(5, 0)

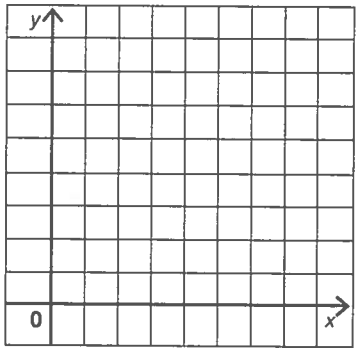


Plot and join the points.

Name of the figure: _____

Area of the figure: _____

b) P(1, 1), Q(1, 5), R(6, 5), S(6, 1)

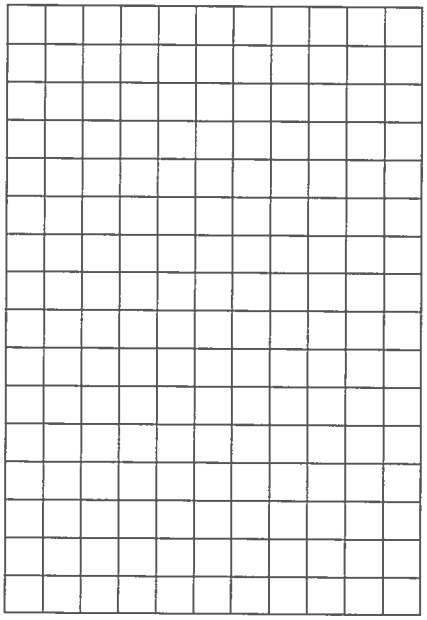


Name of the figure: _____

Area of the figure: _____

c) D(1, 1), E(7, 1), F(7, 5), G(1, 5)

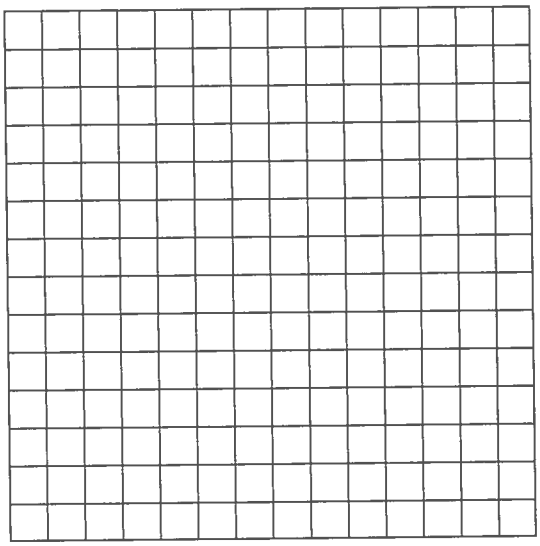
Draw *the x-axis and y-axis.*
Label *the axes.*
Plot *the points.*
Join *the points.*



Name of the figure: _____

Area of the figure: _____

3. a) **Plot** the points P(3, 1), Q(3, 4), R(6, 7), S(9, 4) and T(9, 1) on the grid.
Join the points in the order given.



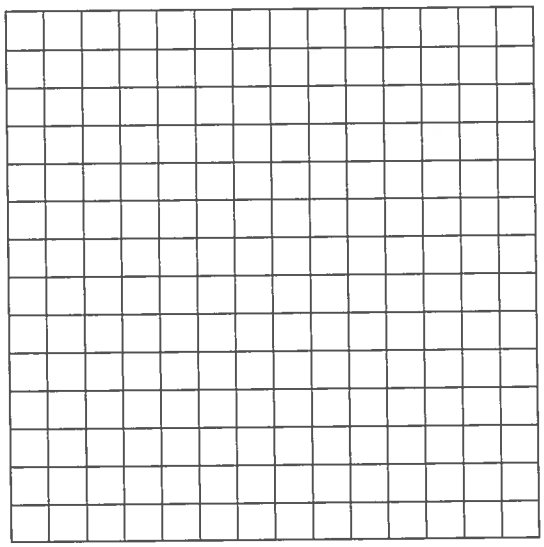
b) **Name** the figure.

_____

_____

4. *Let's make a rectangle.*

a) **Plot** the points D(8, 2), E(2, 2) and F(2, 5) on the grid.



b) Find the coordinates of G so that DEFG is a rectangle. *Plot* G.

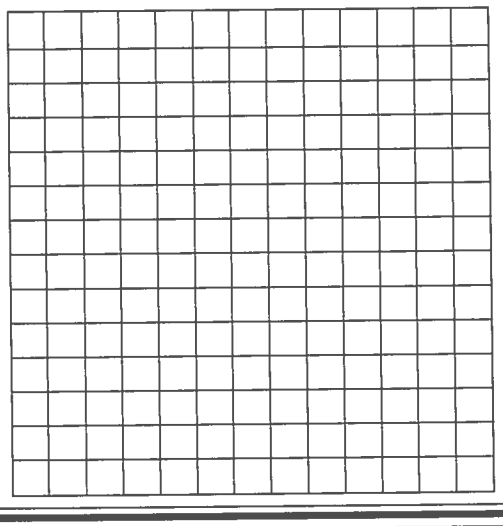
c) Calculate the **perimeter** of this rectangle.

_____

d) Calculate the **area** of this rectangle.

_____

Skill Builder



1. a) **Plot** the points P(3, 1), Q(6, 4), and R(9, 1) on the grid and join them.

b) **Name** the figure.

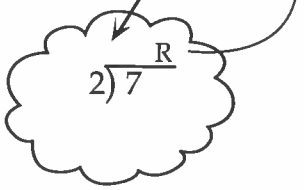
_____

c) **Calculate** the area.

Continues on next page. →

2. *Write as* ***mixed numbers*** *in lowest terms.*

a) $\frac{7}{2} = \frac{\square}{\square}$ (2)

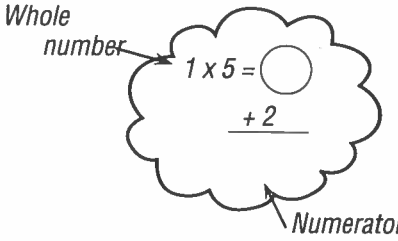


b) $\frac{13}{5} =$ _____

c) $\frac{10}{6} =$ _____ Reduce!

3. *Write as an improper fraction.*

a) $1\frac{2}{5} = \frac{\square}{5}$



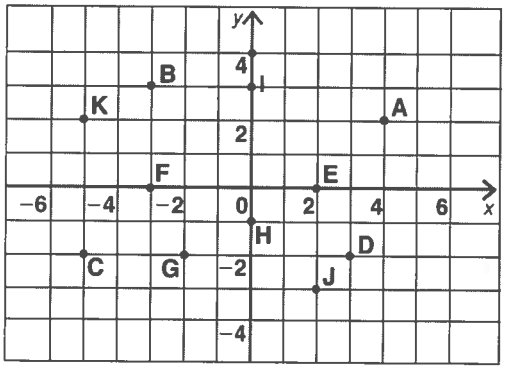
b) $3\frac{1}{3} =$ _____

c) $2\frac{3}{4} =$ _____

5.5 Graphing on the Coordinate Plane

Practice

1. *Write the coordinates for each point.*



A(_____, _____), _____

_____, _____

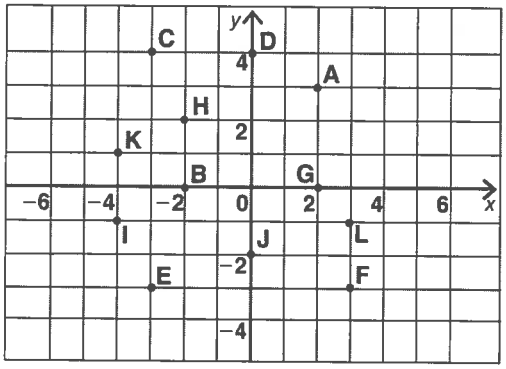
_____, _____

_____, _____

_____, _____

_____

2. *Use the grid below to name the points given by these ordered pairs.*



a) (2, 3) → A b) (−2, 2) → _____

c) (−3, −3) → _____ d) (3, −3) → _____

e) (−4, −1) → _____ f) (−3, 4) → _____

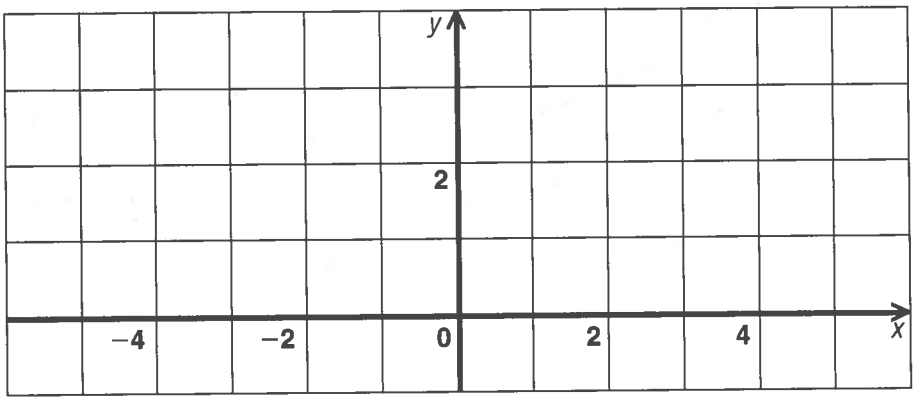
g) (2, 0) → _____ h) (0, 4) → _____

i) (−2, 0) → _____ j) (0, −2) → _____

k) (−4, 1) → _____ l) (3, −1) → _____

Problems and Applications

3. *Let's make a word!*



First: Plot and label the following points.

A(−3, 0), B(−3, 1), C(−5, 0), D(−5, 2), E(−3, 2), F(−4, 1), G(−1, 2), H(1, 2), I(−1, 0), M(1, 1), N(−1, 1), P(1, 0), Q(2,2), R(2, 0), S(5, 1), T(4, 0), U(4, 2), V(3, 0), W(3, 2)

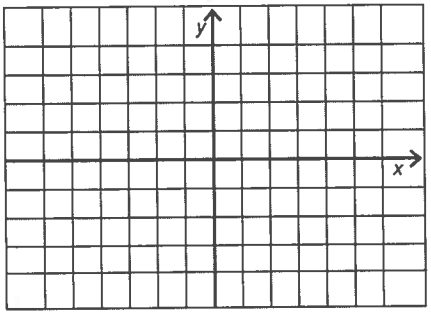
Second: **a)** To find the first letter, join
A to B,
A to C,
D to C,
D to E,
and B to F.

b) To find the second letter, join
G to H,
G to I,
M to H,
M to N,
and P to N.

c) To find the third letter, join Q to R.

d) To find the last letter, join
S to T,
S to U,
V to W,
V to T,
and U to W.

4. ***Plot*** *the points on a grid and* ***join*** *them in order.*



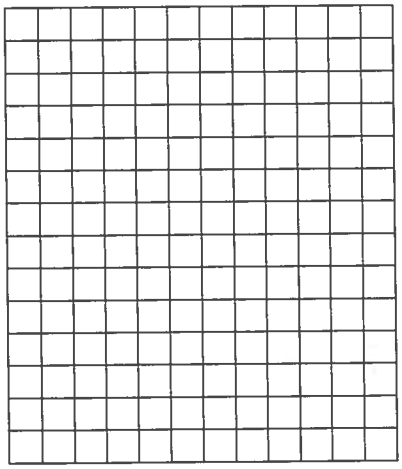
a) A(−3, 0), B(−3, 3), C(0, 3), D(0, 0)

Name the figure.

_____

Find the area.

_____



b) E(−5, 5), F(−5, −5), G(1, −5), H(1, 5)

Name the figure.

_____

Find the area.

_____

Number Zapper

Place the digits 2, 4, 6, and 8 in the boxes to make

a) the greatest quotient.

b) the smallest quotient.

Remainder must be 0.

Quotient →

a) $\square \overline{)\square\square\square}$ b) $\square \overline{)\square\square\square}$

Skill Builder

1. *Complete the table of values.*

a) $x + y = 8$

x	y
4	4
3	
2	
1	
0	

b) $x - y = 1$

x	y
3	2
2	
1	
0	
−1	

2. *Write each number in* ***scientific notation.***

a) $56\,000 = 5.6 \times 10^{\square}$

b) $785\,000 =$ _____

c) $1500 =$ _____

d) $3720 =$ _____

e) $0.031 = \square \times 10^{-2}$

f) $0.000\,21 =$ _____

g) $0.06 =$ _____

h) $0.000\,57 =$ _____

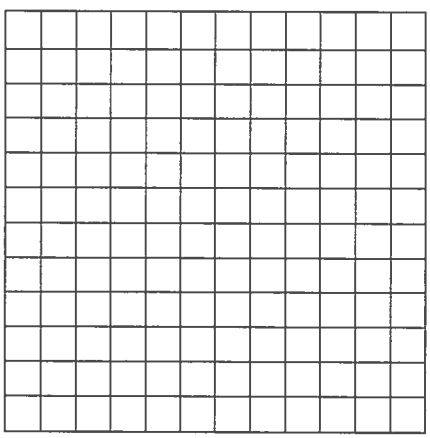
5.6 Graphing Relations

Practice

1. *Graph each relation and express it in words.*

a)

x	y
3	0
2	1
1	2
0	3
−1	4

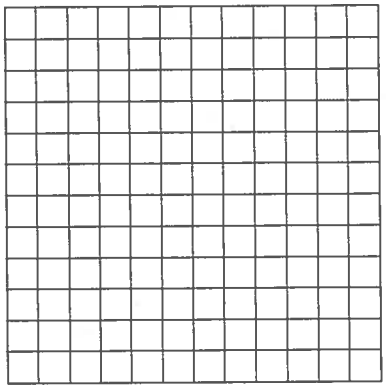


Written expression:

The sum of x and y is $\square$.

b)

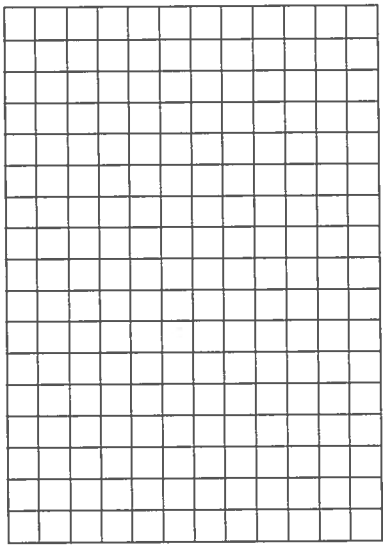
x	y
5	4
3	2
1	0
−1	−2
−3	−4



Written expression:

c)

x	y
5	10
3	6
1	2
−1	−2
−3	−6



Written expression:

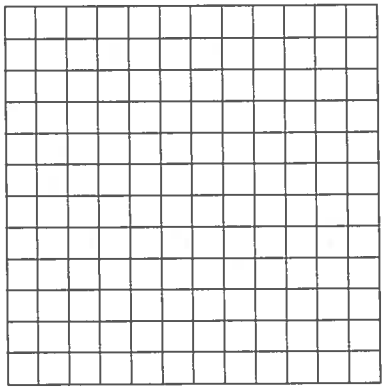
2. *Find 5* ***ordered pairs*** *that satisfy each relation.* ***Draw*** *each graph.*

Draw the graph.

a) $x + y = 7$

x	y
3	4
2	
1	

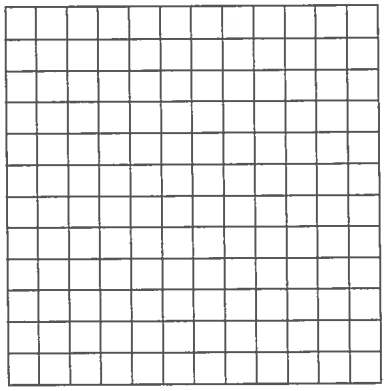
Ordered Pairs:
(3, 4)



b) $x - y = 1$

x	y

Ordered Pairs:



c) $y = x + 4$

x	y

Ordered Pairs:

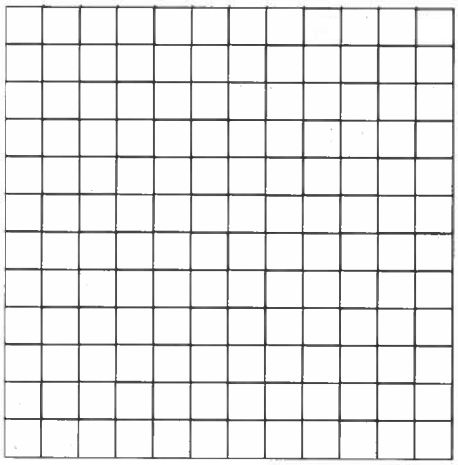
_____

_____

_____

_____

_____



d) $y = x - 2$

x	y

Ordered Pairs:

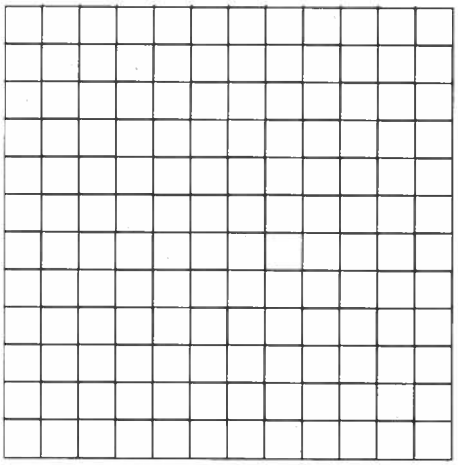
_____

_____

_____

_____

_____



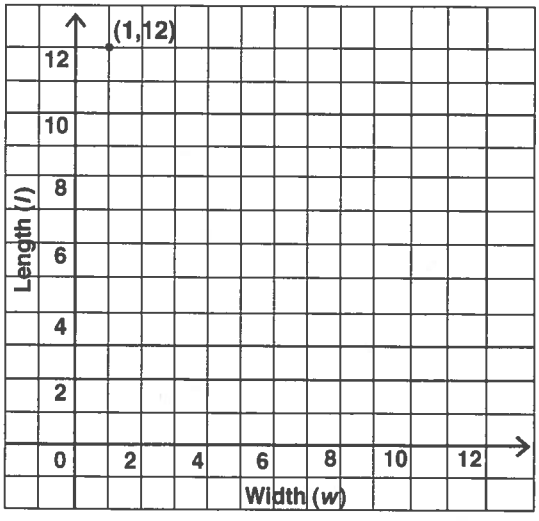
Problems and Applications

3. *The area of a rectangle is* **12 cm²**.

   a) Complete the table for the possible values of the length and width.

Width (w)	Length (l)	Ordered Pair (w, l)
1	12	(1, 12)
2	6	
3	4	
4		
6		
12		

   b) Graph the relation **and** write the coordinates of each point on the grid.



Review

1. *Write these words as an algebraic expression.*

Example:
the length plus seven → $l + 7$

a) the amount minus seven → _____

b) three times the height → _____

c) four times the height plus three → _____

2. *Write each expression in words.*

Example:
$6w + 3$ → six times the width plus three

a) $3w + 2$ → _____

b) $\frac{w}{3}$ → _____

c) $5a + b$ → _____

3. *Evaluate for* $x = 6$.

a) $x - 5$
$= 6 - 5$ (Substitute)
$=$ _____ (Calculate)

b) $\frac{x}{2}$

c) x^2

d) $x^2 - 2$

e) $4x$

f) $3x - 2$

4. *Evaluate for* $x = 2$ *and* $y = 1$.

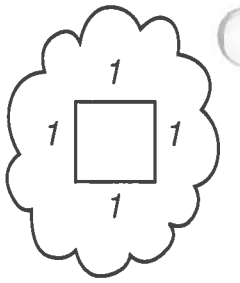
a) $x + y$
$=$ ____ $+$ ____ (Substitute)
$=$ ____ (Calculate)

b) $x - y$

c) $2x + y$

5. a) *Complete the table. Each side of square is one unit in length.*

Number of Squares (n)	Figure	Perimeter (P)
1		4
2		6
3		8
4		
5		
6		



b) Complete the formula for the perimeter.

$P = 2n +$ ☐

n is the number of squares.

c) Use this formula to find the perimeter of the figure made from 20 squares.

$P = 2n +$ ☐

Formula

Substitute, n = 20

Calculate

6. Use the equation $x + y = 5$, to find the missing values in each ordered pair.

a) (1, ☐)

Think: $x + y = 5$

$1 +$ ☐ $= 5$

b) (5, ☐)

c) (☐, 2)

d) (☐, 0)

e) (−1, ☐)

f) (☐, −2)

7. *For each of the following equations,*
   - i) ***write** the relation **in words**,*
   - ii) ***complete** the **table** of values, **and***
   - iii) ***write** the **ordered pairs**.*

a) $x + y = 8$

x	y
4	4
3	
2	
1	
0	

Rough Work:

$4 + 4 = 8$

$3 + \square = 8$

Written in words:

The sum of the x and y values is _____.

The **ordered pairs** are (4, 4), _____,

_____, _____, and _____.

b) $y = x + 5$

x	y
2	
1	
0	
−1	
−2	

Rough Work:

$y = 2 + 5$

$= \square$

$y = 1 + 5$

$= \square$

Written in words: _____

_____

The ordered pairs are _____

_____

8. *Write an equation for each relation.*

a)

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

$x + y = \square$

b)

x	y
5	3
4	2
3	1
2	0
1	−1

$x - \square = \square$

c)

x	y
3	5
2	4
1	3
0	2
−1	1

_____

9. a) Complete the table for a car travelling at 70 km/h.

Time (*h*)	Distance (*km*)
1	70
2	
3	
4	

Rough Work:

$\begin{array}{r} 70 \\ \times 2 \\ \hline \end{array}$ $\begin{array}{r} 70 \\ \times 3 \\ \hline \end{array}$

b) How far would the car travel in 5 h?

c) Write the results from the table as ordered pairs.

The ordered pairs are (1, 70) , _____ , _____ and _____ .

d) Let t represent the time in hours. Complete the equation, $D =$ ☐ $\times t$, to find the distance travelled in kilometres.

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

a) (4, 0) → **A** **b)** (3, 2) → _____

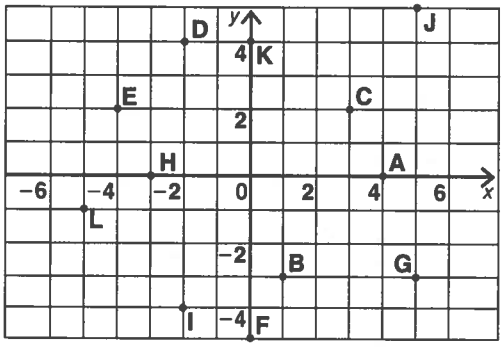
c) (−4, 2) → _____ **d)** (5, −3) → _____

e) (−2, −4) → _____ **f)** (0, 4) → _____

g) (−3, 0) → _____ **h)** (5, 5) → _____

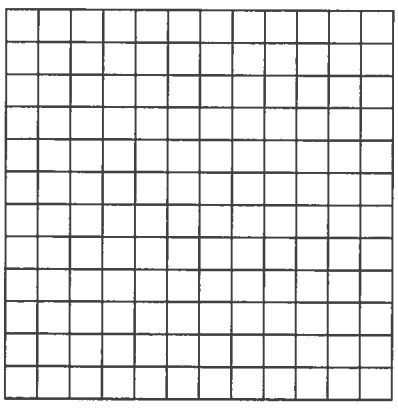
i) (−5, −1) → _____ **j)** (0, −5) → _____

k) (−2, 4) → _____ **l)** (1, −3) → _____



11. a) ***Plot*** *each pair of points and then* ***join*** *them to form line segments.*

A(−5, −3), **B**(5, 3). Join $\overline{\mathbf{AB}}$.
D(−3, 4), **E**(4, −3). Join $\overline{\mathbf{DE}}$.
F(4, −1), **G**(−4, 1). Join $\overline{\mathbf{FG}}$.
H(−2, 3), **I**(2, −3). Join $\overline{\mathbf{HI}}$.
J(−5, 4), **K**(−4, 5). Join $\overline{\mathbf{JK}}$.
L(−3, 3), **M**(3, −3). Join $\overline{\mathbf{LM}}$.



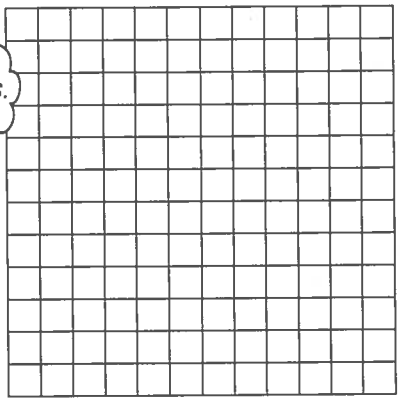
*Draw the **x** and **y** axes. Label the axes.*

b) Which line segments **pass through (0, 0)**?

12. ***Plot*** *the points on a grid and* ***join*** *them in order.*

a) P(1, 4), Q(1, −1), R(4, −1), S(4, 4)

Draw and label the axes.



Name the figure.

_____

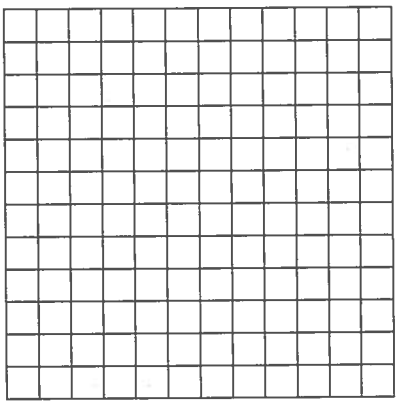
Find the **area** of the figure.

_____

_____

_____

b) A(−1, 1), B(−1, 4), C(−4, 4), D(−4, 1)



Name the figure.

_____

Find the **area** of the figure.

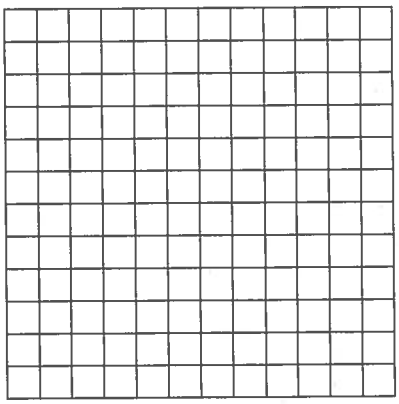
_____

_____

_____

13. ***Plot*** *the points on a grid and* ***join*** *them in order. Name the figure.*

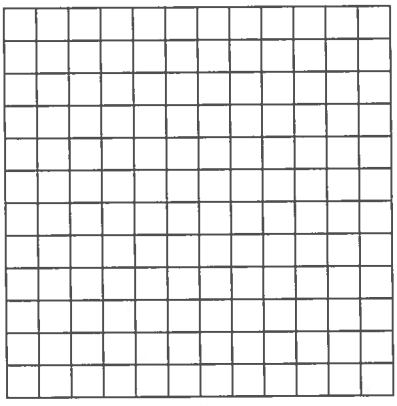
a) D(0, −4), E(6, −4), F(4, −2), G(2, −2)



Name the figure.

_____

b) I(−8, −5), J(−3, −5), K(−1, −2), L(−6, −2)



_____

14. *For each of the following,*

i) ***complete*** *the* ***table*** *of values for each relation,*

ii) ***write*** *the* ***ordered pairs****, and*

iii) ***draw*** *the* ***graph****.*

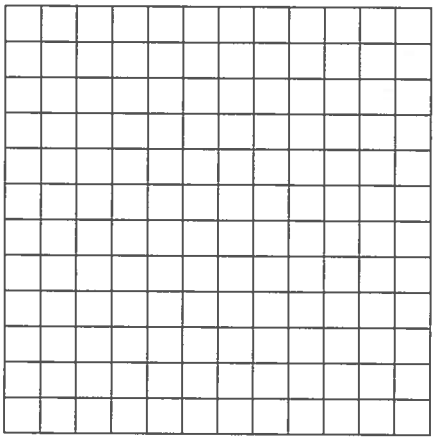
a) $x + y = 7$

x	y
6	1
4	
2	
0	
−2	

Rough Work:

$6 + \square = 7$

$4 + \square = 7$



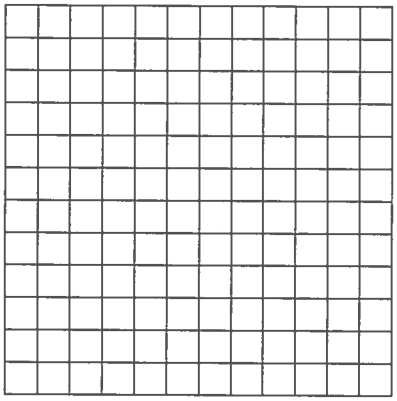
The ordered pairs are (6, 1) , _____ , _____ , _____ and _____ .

b) $x - y = 2$

x	y
7	
5	
3	
1	
0	

Rough Work:

$7 - \square = 2$



Ordered pairs! _____

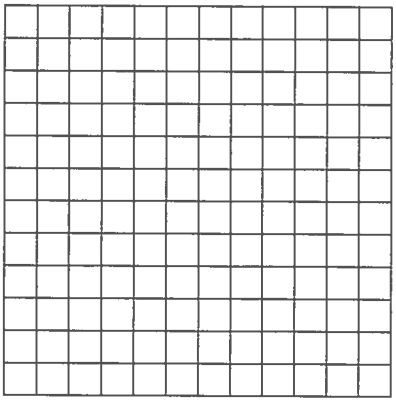
c) $y = x + 3$

x	y
2	
1	
0	
−1	
−2	

Rough Work:

$y = 2 + 3$

$y = \square$

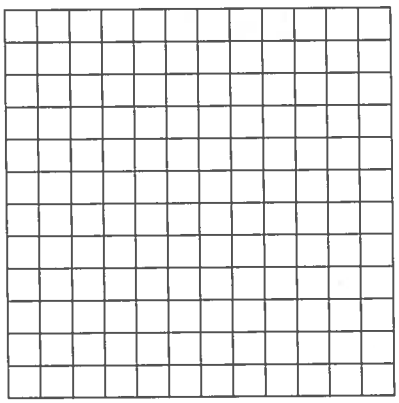


Ordered pairs! _____

d) $y = x - 4$

x	y

Rough Work:

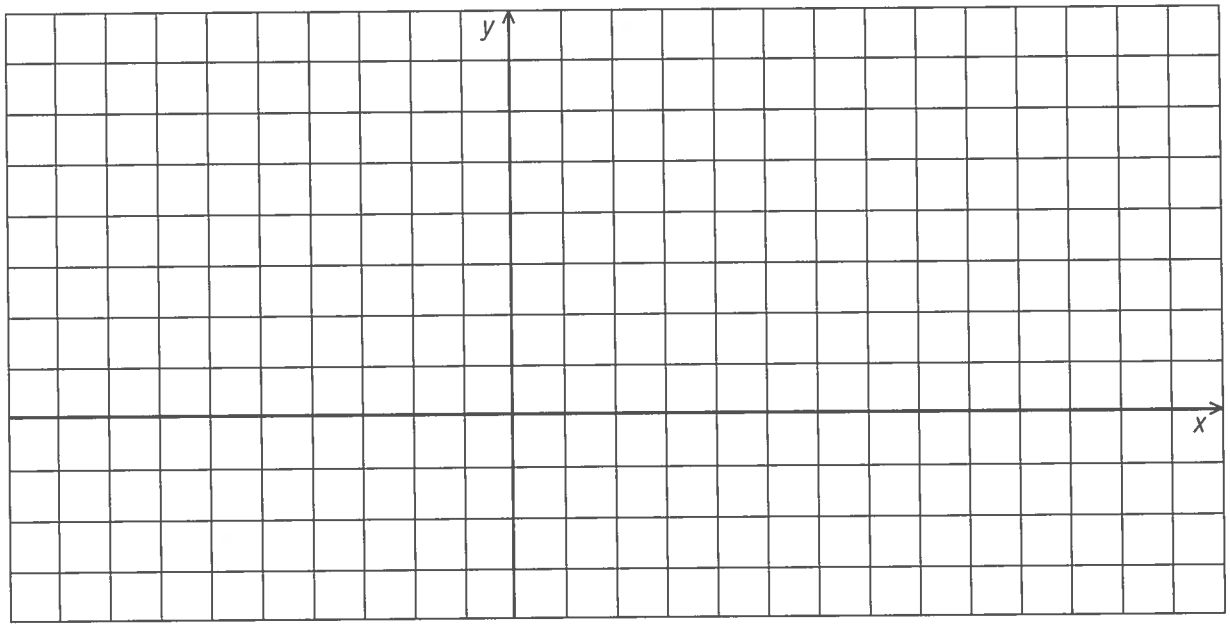


Ordered pairs!

Math Zapper

Plot and label the following points.

A(−5, 5), B(−8, 5), C(−8, 3), D(−5, 3), E(−5, 1), F(−8, 1), G(−3, 1), H(−3, 5), I(−1, 3), J(1, 5), K(1, 1), L(3, 5), M(3, 1), N(5, 1), P(7, 1), Q(5, 5), R(9, 5), S(12, 5), T(9, 3), U(11, 3), V(9, 1), W(12, 1).



To **find** the **hidden message**, **join** each of the following:

a) A to B **b)** B to C **c)** C to D **d)** D to E

e) E to F **f)** G to H **g)** H to I **h)** I to J

i) J to K **j)** L to M **k)** Q to N **l)** N to P

m) R to S **n)** R to V **o)** T to U **p)** V to W.

Chapter Check

1. *Evaluate for $x = 3$ and $y = 5$.*

a) $x + y$

Substitute

Calculate

b) $y - x$

c) $3x - y$

d) $2(x + y)$

Substitute

Brackets! (Add)

Multiply

2. *The formula for the perimeter of a rectangle is*

$$P = 2(l + w)$$

a) Find P, when $l = 5$ m and $w = 2$ m.

Formula

Substitute

Brackets

Multiply

b) Find P, when $l = 10$ m and $w = 4$ m.

3. In the diagrams, each small triangle has a side length of 1 unit.

a) *Complete the table.*

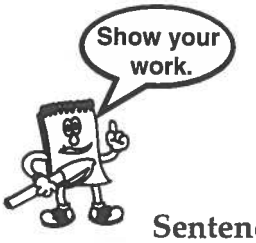
Number of triangles (n)	Diagram	Perimeter (P)
1		3
2		4
3		5
4		
5		
6		

b) Complete the formula for the perimeter in terms of the number of triangles.

$P = n +$ ☐

Let n = number of triangles.

c) Use the formula to find the perimeter of the figure made with 10 triangles.



Formula

Substitute

Calculate

Sentence: _____

4. *For each of the following equations,*

i) ***write*** *the relation* ***in words,***

ii) ***complete*** *the* ***table of values,***

iii) ***write*** *the* ***ordered pairs,*** *and*

iv) ***draw*** *the* ***graph.***

a) $x + y = 6$

x	y
4	2
3	
2	
1	
0	

Rough Work:

$4 + \square = 6$

$x + y = 6$

Written in words: _____

Ordered Pairs: _____

b) $y = x + 5$

x	y
3	8
2	
1	
0	
−1	

Rough Work:

$y = 3 + 5$

$= \square$

$y = x + 5$

Written in words: _____

_____

Ordered Pairs: _____

5. *Complete the equation for each relation.*

a)

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

$x + y = \square$

b)

x	y
3	5
2	4
1	3
0	2
−1	1

$y =$ _____

6. **a)** School T-shirts cost $30 each.
Complete the table.

Number of T-shirts	Cost ($)
1	30
2	
3	
4	

Rough Work:

30
× 2
___

b) Describe the pattern in the cost column.

_____

c) Complete the equation to find the cost.

$C = \square \times n$

Let n = number of T-shirts.

d) Use your equation to find the cost of 10 T-shirts.

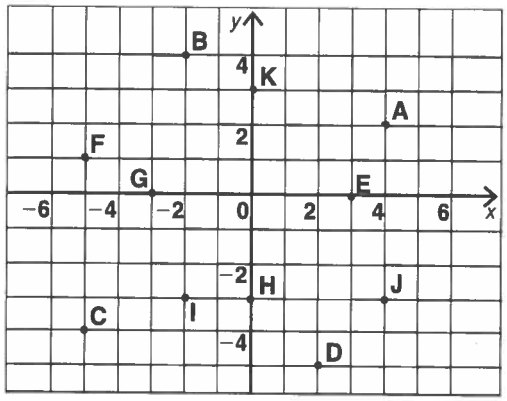
Formula

Substitute

Multiply

Sentence: _____

7. Write the **ordered pair** for each letter on the grid.



A(4, 2) _____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

8. **a)** **Plot** the points on the grid and **join** them in order.

A(−2, 1), B(−2, −1), C(4, −1), D(4, 1)

Draw and label the axes.

b) **Name** the figure.

_____

c) **Find** the **area**.

_____

_____

_____

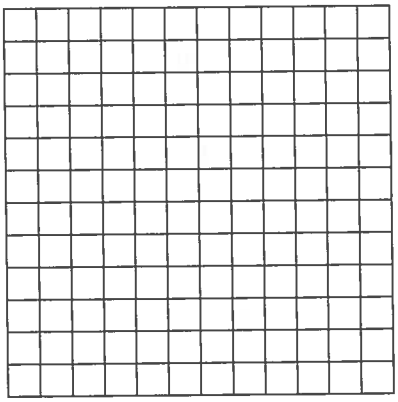
9. Find 5 ordered pairs for the relation. **Complete** the table and then, **draw** the graph.

$x + y = 7$

Find 5 ordered pairs.

x	y

Rough Work:



Problem Solving: Using the Strategies

Show all your work on looseleaf!

Understand the Problem → Think of a Plan → Carry Out the Plan → Look Back

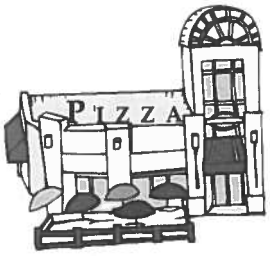
1. If you multiply a number by 2 and add 3, the result is 19. What is the number?

Guess and check!

Guess!

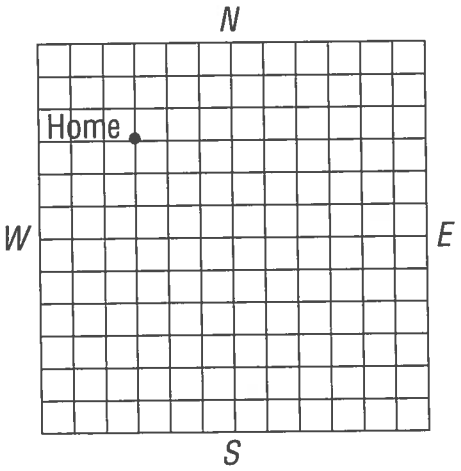
Number	Result of (Number × 2) + 3	Does the result = 20?
4	$(4 \times 2) + 3 =$ ☐	Too low

2. At a pizza restaurant, there are only 3 different toppings — ham, mushrooms, and green peppers. How many different kinds of pizza can be made using these toppings?



List them.

3. Rosalyn went for a walk. From her home, she walked 2 blocks east, 3 blocks south, 1 block west, and 1 block north. What is the shortest way she could take to get home?



4. The graph shows

   i) the number of blocks from the school to the homes of 4 students

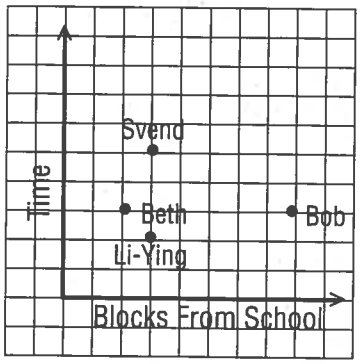
   and

   ii) the time it takes for the students to get to school.

   a) Who lives closest to school?

   b) Who has the farthest to go to school?

   c) Which students live the same distance from school?



5. Use each of the digits 1, 2, 3, and 4 only once to make the smallest possible sum.

☐☐ + ☐☐ = ?

DATA BANK

Use the Data Bank on page 365 of your MATHPOWER™ student text.

1. a) Write as a ratio the height of Della Falls to the height of Virginia Falls.

☐ : ☐

   b) Change the **ratio** to a **fraction** and **reduce**.

2. Which provinces have the **greatest** percent of **Canada's fresh water**?

Math Zapper

Complete each **magic square** so that the sum of each column, row, and diagonal is the same.

a)

4		
	5	7
		6

Adds to 15.

b)

	1	
	5	
4	9	

Adds to ☐.

c)

Adds to ☐.

8		4
6	10	
16		