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9.3 Linear Relationships

Communicate the Ideas

1. A store sells hats for $10 each. Let h describe the number of hats.
The formula $S = 10h$ shows the amount of money collected in sales, S.

a) Can negative integers be used for the values of h? Give 1 reason for your answer.

_____

b) Can whole numbers be used for the values of h? Give 1 reason for your answer.

_____

2. a) Name the point that is 3 units to the right of the origin. (_____, _____)

b) Name the point that is 4 units to the left of the origin. (_____, _____)

c) What do you notice about these 2 points? _____

d) Is this true for all points that lie on the x-axis? Give 1 reason for your answer.

_____

Check Your Understanding

Practise

3. Find the value of each equation.

a) $y = 5x - 3$ when $x = 6$

$y = 5($_____$) - 3$ ← Substitute →

$y =$ _____ $- 3$ ← Multiply →

$y =$ _____

b) $y = 3x + 2$ when $x = -4$

$y = 3($_____$) + 2$

$y =$ _____ $+ 2$

$y =$ _____

c) $y = x - 8$ when $x = 5$

d) $y = -5x$ when $x = -2$

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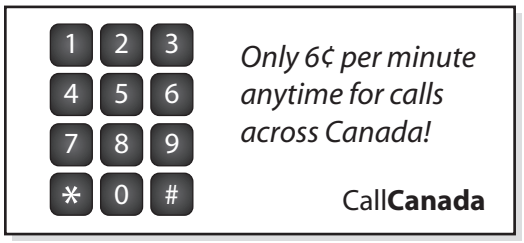
4. Use the formula $C = 6t$ to describe a long-distance telephone plan, where C is the cost in cents and t is the time in minutes.



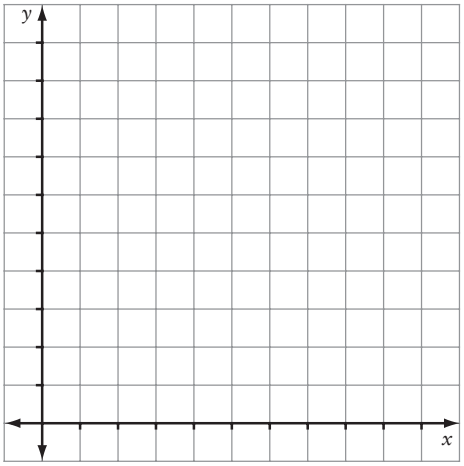
a) Make a table of values.
Use at least 4 whole number values for t.

t	C
1	

Let $t = 1$
$C = 6t$
$C = 6(1)$

$C =$ _____

b) Graph the ordered pairs from your table of values.



c) If you round part minutes up to the next whole minute, is it possible to have points between the ones on your graph? Explain.

_____

_____

_____

_____

_____

5. Complete each table of values.

a) $y = 3x + 2$

x	y
–2	
0	
2	
4	

Let $y = -2$
$y = 3(-2) + 2$

$y =$ _____ $+ 2$

$y =$ _____

Let $y = 0$

Let $y = 2$

Let $y = 4$

b) $y = -4x$

x	y
–2	
0	
2	
4	

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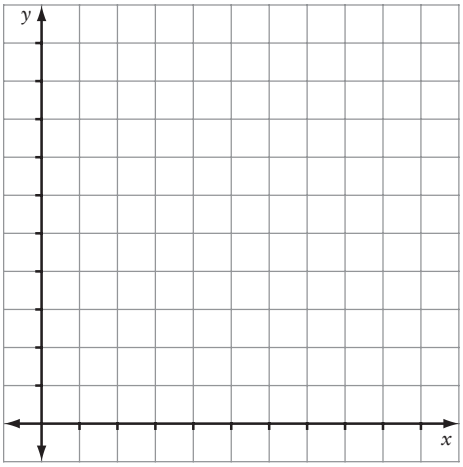
6. An animal shelter pays you $5 for each dog you walk.
Use the formula $M = 5d$ to relate the money you make to the number of dogs you walk.
M is the money you make and d is the number of dogs you walk.

a) Make a table of values.

d				
M				

b) Graph the ordered pairs.



7. For each equation, find the value of y in the ordered pair $(2.5, y)$.

a) $y = 3x + 2$

$y = 3(2.5) + 2$ ← Substitute →

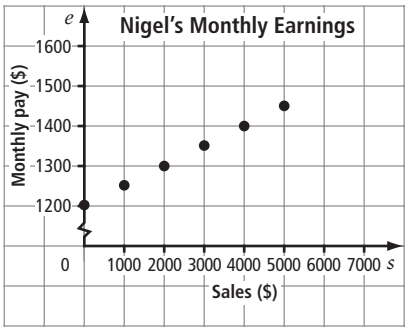
$y =$ _____ + 2 ← Multiply →

$y =$ _____

b) $y = x - 5$

Apply

8. The graph shows Nigel's monthly pay.



A break in the *y*-axis means the length of the axis has been shortened. It can be shown as

a) If Nigel does not make any sales, what is his monthly pay? _____

b) Nigel has sales of $4000 in 1 month. How much does he make? _____

c) Nigel earns $1300 in 1 month. What are his sales? _____

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9. You are given part of a table of values for a linear relation.

x	–3	–2	–1	0	1	2
y				6	8	10

a) How could you find the missing y-coordinates?

_____

b) Complete the table.

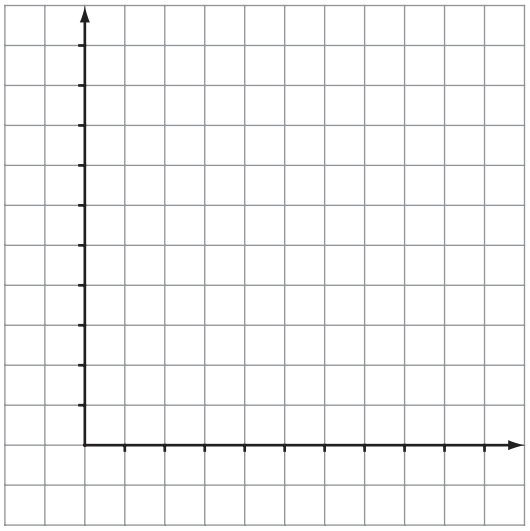
10. You can buy work gloves from a web site.
Use the formula $C = 5g + 2$ to find the price.
C is the cost in dollars and g is the number of pairs of gloves.

a) Complete the table of values using whole numbers.

g	C

b) Graph the ordered pairs.

To draw a graph:
- ❒ Label each axis using g and C.
- ❒ Describe each axis.
- ❒ Mark the intervals on each axis.
- ❒ Give the graph a title.
- ❒ Plot the points.



c) Is this a linear relation? Circle YES or NO.
Give 1 reason for your answer.

_____

_____

_____

d) Are other points possible between the ones on your graph? Circle YES or NO.
Give 1 reason for your answer.

_____

_____