( )

Name: _____

Block: _____

Linear
Relations

Mrs. van der Vossen
Math 8

( )

Scores:

Part 1 =

Part 2 =

Part 3 =
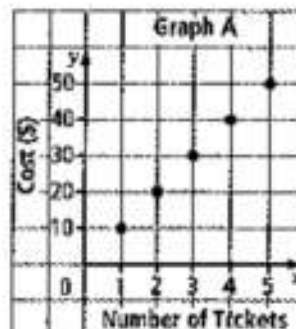
Total =

9.1 Analysing Graphs of Linear Relations

MathLinks 8, pages 332–341

Key Ideas Review

Use the graph at right to answer questions #1 to #4.

Graph A

1. Complete a table of values for the graph.

2. Circle the three factors that should be included to describe the pattern on a graph.
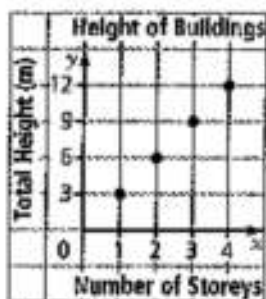
   a) where it starts   b) how it changes   c) slope of the line

   d) x-axis and y-axis titles   e) what it relates to

3. Does the graph above show a linear relation? How do you know?

   _____

   _____

4. Does it make sense to have values between those on the graph? Explain.

   _____

   _____

Practise and Apply

5. Complete the sentences to describe the graph below.

   Height of Buildings

   a) The height of a one-storey building is _____ m, a _____-storey building is 6 m high, a three-storey building is _____ m, ...
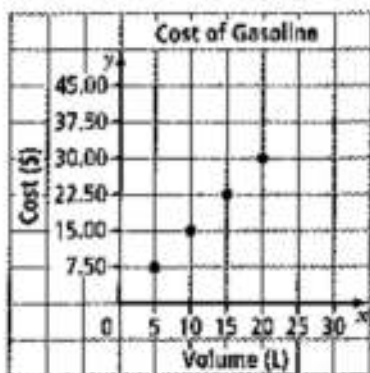
   b) The points appear to lie in a _____. The line shows a _____ relation.

   c) The graph shows that to move from one point to the next, you go _____ unit horizontally, and _____ units vertically.

   d) Complete the table of values for this graph.

	1	2	3	4		10
	3				15	

Name: _____   **Date:** _____

6. The graph shows the cost of gasoline based on the volume of gas.

a) Does the graph show a linear relation? Explain.

_____

_____

_____

b) The graph shows that for every five units horizontally, you go

_____ units vertically.

c) Complete the table of values from the graph.
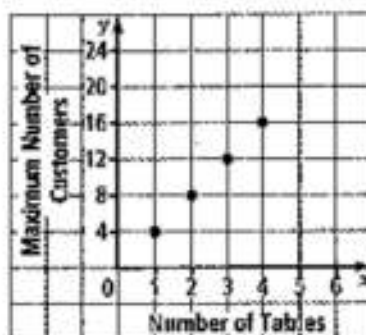
Volume (L)	Cost ($)
5	7.50

d) Would it be reasonable to include a point for 7 L? Explain.

_____

_____

_____

e) What is the cost of gasoline per litre?

f) If the graph continued, what would be the cost of

25 L?

30 L?

7. The graph shows the maximum number of customers based on the number of tables in the restaurant.

a) Title the graph.

b) Describe the patterns on the graph. Does the graph show a linear relation?

_____

_____

_____

c) Complete the table of values for the graph.

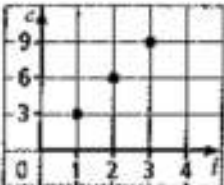|	1			4	5	6
	4	8				

Patterns in a Table of Values

MathLinks 8, pages 342–351

Key Ideas Review

Match the terms in column B to a representation of a linear relation in column A.

A	B
1. (*l*, 3*l*)	**a)** table of values
2. The cost in dollars is 3*l*, where *l* is the length in metres.	**b)** graph
3.	**c)** words
4. The cost in dollars is three times the length in metres.	**d)** ordered pair
5.	**e)** expression

3.

0	1	2	3
0	3	6	9

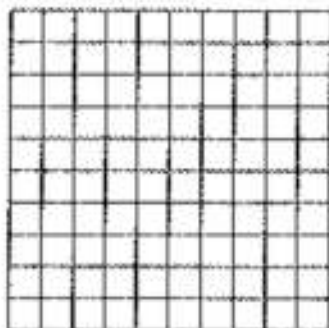**6.** Circle the words that correctly complete each statement.
You can tell that the relationship in #3 is linear because

- Each consecutive value for *c* changes by (the same/a different) amount.
- Each consecutive value for *l* changes by (the same/a different) amount.

Practise and Apply

7. Graph the ordered pairs in the table of values.

2	7
4	9
6	11
8	13

8. Circle the table(s) of values that show a linear relation. Explain your answer.

a)

2	7
4	9
6	11
8	13

b)

3	8
6	12
9	15
12	19

_____

_____

_____

9. The table of values represents a linear relation.

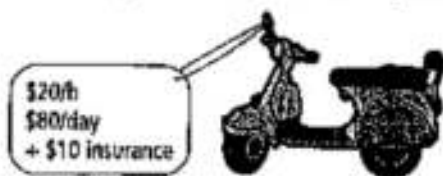| x	0	1	2	3	4	5
d	0	3	6	9	12	15

a) Graph the ordered pairs.
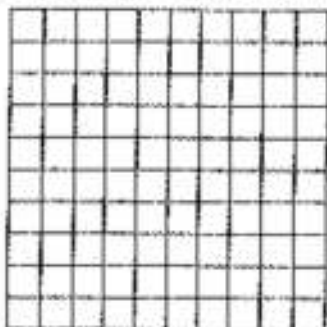
b) What is the difference in value for consecutive x-values?

c) What is the difference in value for consecutive d-values?

d) The d-value is _____ times the x-value.

e) Write an expression for d in terms of x.

10. For what number of hours is it cheaper to rent by the day rather than by the hour? Show your work.
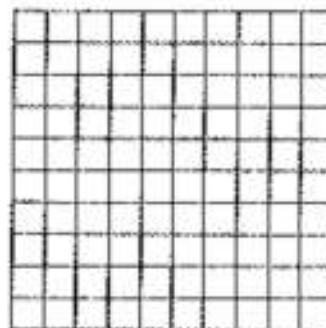
$20/h
$80/day
+ $10 insurance

11. The following pattern of triangles continues. The side of each triangle is 2 cm.

a) Complete the table of values to show the relationship between the number of triangles and the perimeter of each figure.

Number of triangles	1	2	3	4
Perimeter (cm)	6	8		

b) Draw a graph from the table of values.

c) Describe the relationship shown on the graph.

_____

_____

_____

d) What is an expression for the perimeter in terms of the number of triangles? Explain what the variables mean.

e) If the pattern continues, what is the perimeter when there are 30 triangles? Show your thinking.

9.3 Linear Relationships

MathLinks 8, pages 352–359

Key Ideas Review

For #1 and #2, unscramble the letters to form a word that correctly completes the statement.

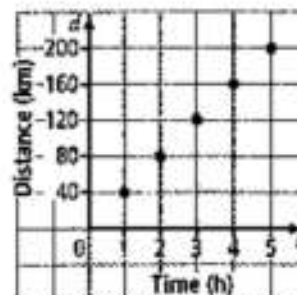1. a) You can graph a linear _____ represented by
      AEILNORT

   a(n) _____ or a(n) _____.
         AFLMORU   AEIUNOQT

   b) First, make a table of _____.
                              AELUVS

      Check that the values in the table are _____.
                                               AABEELNORS

   c) Then, graph using the _____ pairs in the table.
                              EEDDORR

	d
0	0
1	40
2	80
3	120
4	160
5	200

2. Whenever possible, choose variables that are meaningful.
   For example, d for _____ and t
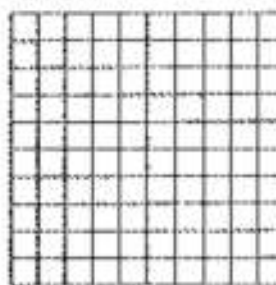   AECDISTN

   for _____.
        EITM

Practise and Apply

3. The amount of water used by a garden hose can be represented as V = 20t, where V is the volume of water in litres, and t is the time in minutes.

   a) Complete the table of values.

t	V
0	0
1	20
3	
4	
5	

   b) Graph the ordered pairs.

   c) Is it reasonable to have points between the ones on the graph? Explain.

   _____
   _____
   _____

4. The use of computers is free in most libraries, but most libraries charge for using the printer. The cost of printing can be represented by $C = 15p$, where C is the cost in cents, and p is the number of pages printed.

a) Complete the table of values.

p	0	1	2	3	4	5
C						

b) Graph the ordered pairs.
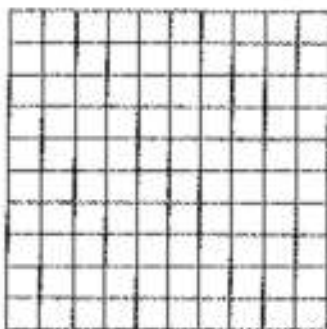
c) Is it reasonable to have points between the ones on the graph? Explain.

_____

_____

_____

5. Evaluate each equation using the given value. Show your thinking.

a) $y = 3x - 1$ when $x = 5$

b) $y = 4x + 1$ when $x = -3$

c) $y = -x$ when $x = -4$

6. Complete the table of values for each equation using $x = -2, -1, 0, 1, 2$.
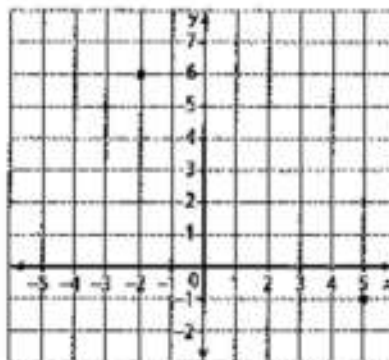
a) $y = 4x + 1$

x					
y					

b) $y = -5x$

x					
y					

c) $y = 3 - x$

x					
y					

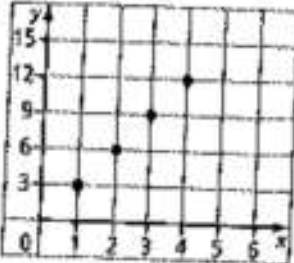**7.** This graph represents part of the linear relation $y = -x + 4$.

a) What are the coordinates for the point that lies on the y-axis?

b) What is the y-coordinate when $x = 3$?

c) For the point $(-10, y)$, what is the value of y?

Vocabulary Link

Draw a line from the example in column A to the correct term in column B. Then, find each term in the word search.

A		B
1. $C = \pi d$, where C is the circumference and d is the diameter of a circle.		a) equation

2.

Hieght (m)	0	150	300	450	600	750
Temperature (°C)	20					

b) expression

3. A pattern formed by two sets of numbers.

c) formula

4.

d) linear relation

e) relationship

f) table of values

g) variable

5. $y = 4x$

6. $6c - 2$

7. An unknown number, c.

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N I V B V M J H A G V Y U U R A T E V G
T R S N W L U L Z Y X R K Z G E E I O Z
E A U E V H U T E C F S F O F Z Q R Z G
I L B Q R M D X L U C F S N N L U S P T
Z Y P L R O U E E R Q L W U Z Q A O I U
E Q D O E G M L T K N F C E V W T D L M
X V F U T O B P B W M K Q I T F I L U S
P M Y I C A F B J S U Z L E N Y O V U V
R M G Z I W E V Y H O W F J B D N L H C
E A L R E B H K A T V K S O C V E K G Z
S F A T Q X K J P L Y R M A U A F F K U
S V Z O C W K F C S U C V E J P G N L V
I A D N E I L Q D I X E S N E N X U G W
O S E V L E R N U W X B S D D S G B S B
N J L I N E A R R E L A T I O N K C R E
W T J R E L A T I O N S H I P Z F P O E
M T J K M N G L Y P S H Q M K S O T X J
A N T N P G W W U N L T M N S W R Z E D
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