

**Master 4.20**

**Extra Practice 1**

**Lesson 4.1: Writing Equations to Describe Patterns**

- In each equation, determine the value of  $A$  when  $n$  is 3.
  - $A = 2n + 1$
  - $A = 3n - 2$
  - $A = 4n + 3$
  - $A = 30 - 2n$
- The pattern in this table continues. Which equation below relates the figure number  $n$ , to the perimeter of the figure  $P$ ?

Figure Number, $n$	Perimeter, $P$
1	7
2	10
3	13
4	16

- $P = 3n + 7$
  - $P = 7n + 3$
  - $P = 3n + 4$
  - $n = 3P + 7$
- The pattern in each table below continues. For each table:
    - Describe the pattern that relates  $v$  to  $t$ .
    - Write an equation that relates  $v$  to  $t$ .
    - Verify your equation by substituting values from the table.

a)

Term Number, $t$	Term Value, $v$
1	8
2	13
3	18
4	23

b)

Term Number, $t$	Term Value, $v$
1	34
2	31
3	28
4	25

- Rachel takes care of homes during the summer while their owners are away on vacation. She charges \$8, plus \$2.50 a day.
  - Create a table that shows the charges when the owners are away for up to 5 days.
  - Write an equation that relates the charge,  $C$  dollars, to the number of days,  $n$ , that the owners are away.
  - What will the charge be when the owners are away for 14 days?
  - How many days were the owners away when the charge was \$33?

## Master 4.21

## Extra Practice 2

## Lesson 4.2: Linear Relations

1. For each table of values below:
- Does it represent a linear relation?
  - If the relation is not linear, explain how you know.
  - If the relation is linear, describe it.

a)

$x$	$y$
1	5
2	12
3	19
4	26
5	33

b)

$x$	$y$
1	1
3	3
5	7
7	13
9	21

c)

$x$	$y$
4	11
2	14
0	17
-2	20
-4	23

d)

$x$	$y$
-2	-12
-1	-5
0	0
1	3
2	4

2. Each table of values represents a linear relation. Complete each table. Explain your reasoning.

a)

$x$	$y$
1	
2	
3	14
4	18
5	

b)

$x$	$y$
1	
3	3
5	-1
7	
9	

c)

$x$	$y$
4	
2	14
0	19
-2	
-4	

3. Create a table of values for each linear relation and then graph the relation. Use values of  $x$  from  $-2$  to  $2$ .
- a)  $y = x + 4$       b)  $y = 2x + 1$       c)  $y = 5 - 2x$
4. A computer repair company charges \$80 for a service call, plus \$50 an hour for labour.
- Create a table to show the relation between the time in hours for the service call and the total cost.
  - Is this relation linear? Justify your answer.
  - Let  $n$  represent the time in hours for the service call and  $C$  represent the total cost in dollars. Write an equation that relates  $C$  and  $n$ .
  - How much will a 7-h service call cost?

## Master 4.22

## Extra Practice 3

## Lesson 4.3: Another Form of the Equation for a Linear Relation

1. Does each equation describe a vertical, a horizontal, or an oblique line?

Describe each vertical or horizontal line.

a)  $y = 4$

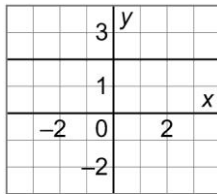
b)  $2x + 5 = 7$

c)  $2x - y = 6$

d)  $3y + 9 = 0$

2. Which equation below describes each graph?

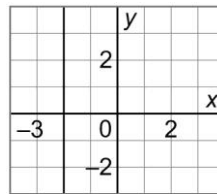
a)



i)  $x = 2$

iii)  $y = 2$

b)



ii)  $x = -2$

iv)  $y = -2$

3. The sum of two numbers is 8. Let  $x$  and  $y$  represent the two numbers.

a) Create a table for 5 different values of  $x$ .

b) Graph the data. Should you join the points?

c) Write an equation that relates  $x$  and  $y$ .

4. Graph each line. Explain your work.

a)  $x = 4$

b)  $2y = 6$

c)  $y - 2 = -6$

d)  $2x + 3 = 8$

5. For each equation below:

- Make a table for the given values of  $x$ .

- Graph the equation.

a)  $3x + y = 3$ ; for  $x = -2, 0, 2$

b)  $x - 2y = 8$ ; for  $x = -2, 0, 2$

6. a) Graph these equations on the same grid.

$$x + y = 6 \quad y = 1 \quad x - y = -6$$

b) Which shape is formed by these lines?

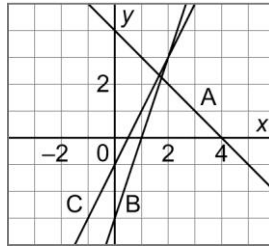
**Master 4.23**

**Extra Practice 4**

**Lesson 4.4: Matching Equations and Graphs**

1. Match each equation with a graph on this grid.

- a)  $y = 2x - 1$
- b)  $y = -x + 4$
- c)  $y = 3x - 3$



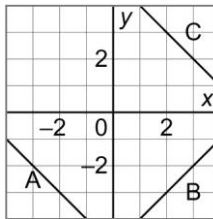
2. Match each equation with a graph on this grid.

- a)  $y = -1$
- b)  $0 = -x + 1$
- c)  $2 = 2x - 3$



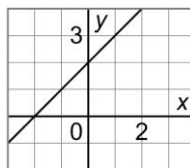
3. Match each equation with a graph on this grid. Justify your answers.

- a)  $x + y = 5$
- b)  $x - y = 5$
- c)  $x + y = -5$



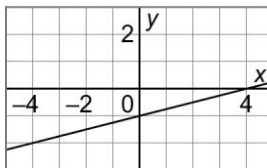
4. Which equation describes this graph? Justify your answers.

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



5. Which equation describes this graph? Justify your answers.

- a)  $x - y = 4$
- b)  $x - 4y = 4$
- c)  $4x - y = 1$

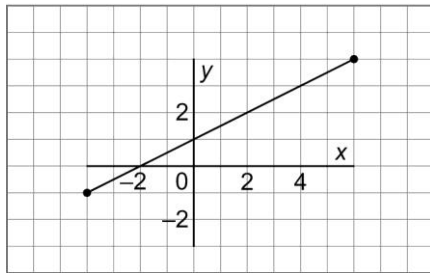


**Master 4.24**

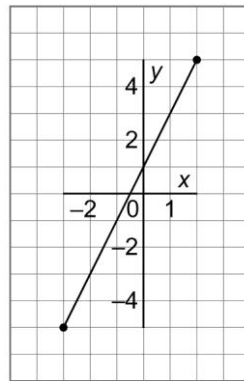
**Extra Practice 5**

**Lesson 4.5: Using Graphs to Estimate Values**

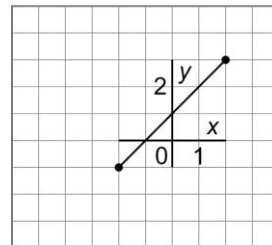
1. This graph represents a linear relation.
  - a) Determine the value of  $x$  for each value of  $y$ .
    - i)  $y = 1$                       ii)  $y = 3$
    - iii)  $y = 0$
  - b) Determine the value of  $y$  for each value of  $x$ .
    - i)  $x = 2$                       ii)  $x = 8$
    - iii)  $x = -6$



2. This graph represents a linear relation.
  - a) Determine the value of  $x$  for each value of  $y$ .
    - i)  $y = 3$                       ii)  $y = -2$
    - iii)  $y = 7$
  - b) Determine the value of  $y$  for each value of  $x$ .
    - i)  $x = 0$                       ii)  $x = -2$
    - iii)  $x = -4$

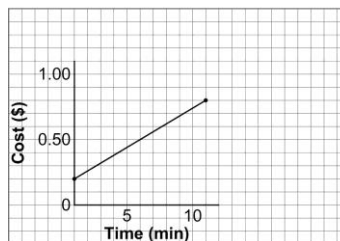


3. This graph represents a linear relation.
  - a) Determine the value of  $x$  for each value of  $y$ .
    - i)  $y = 2$                       ii)  $y = 0$
    - iii)  $y = 5$
  - b) Determine the value of  $y$  for each value of  $x$ .
    - i)  $x = 0$                       ii)  $x = 3$
    - iii)  $x = -5$



4. The graph shows how the cost of a long distance call changes with the time for the call.
  - a) Estimate the cost of a 7-min call.  
Is this interpolation or extrapolation? Explain.
  - b) The cost of a call was \$1.00.  
Estimate the time for the call.
  - c) The cost of a call was \$1.50.  
Estimate the time for the call.

Cost of Long Distance Calls



**Master 4.25**

**Extra Practice Sample Answers**

**Extra Practice 1 – Master 4.20**

**Lesson 4.1**

1. a) 7      b) 7  
c) 15      d) 24
2. The correct equation is  $P = 3n + 4$ .
3. a) i) The first term is 8 and as  $t$  increases by 1,  $v$  increases by 5.  
ii)  $v = 5t + 3$   
b) i) The first term is 34 and as  $t$  increases by 1,  $v$  decreases by 3.  
ii)  $v = 37 - 3t$

4. a)

Number of Days Away, $n$	Charge, $C$ (\$)
1	10.50
2	13.00
3	15.50
4	18.00
5	20.50

- b)  $C = 2.5n + 8$
- c) \$43
- d) 10 days

**Extra Practice 2 – Master 4.21**

**Lesson 4.2**

1. a) i) Yes  
iii) As  $x$  increases by 1,  $y$  increases by 7.  
b) i) No  
ii) As  $x$  increases by 2,  $y$  does not increase by a constant number.  
c) i) Yes  
iii) As  $x$  decreases by 2,  $y$  increases by 3.  
d) i) No  
ii) As  $x$  increases by 1,  $y$  does not increase by a constant number.

2.

a)	<table border="1"><tr><td><math>x</math></td><td><math>y</math></td></tr><tr><td>1</td><td>6</td></tr><tr><td>2</td><td>10</td></tr><tr><td>3</td><td>14</td></tr><tr><td>4</td><td>18</td></tr><tr><td>5</td><td>22</td></tr></table>	$x$	$y$	1	6	2	10	3	14	4	18	5	22
$x$	$y$												
1	6												
2	10												
3	14												
4	18												
5	22												

b)	<table border="1"><tr><td><math>x</math></td><td><math>y</math></td></tr><tr><td>1</td><td>7</td></tr><tr><td>3</td><td>3</td></tr><tr><td>5</td><td>-1</td></tr><tr><td>7</td><td>-5</td></tr><tr><td>9</td><td>-9</td></tr></table>	$x$	$y$	1	7	3	3	5	-1	7	-5	9	-9
$x$	$y$												
1	7												
3	3												
5	-1												
7	-5												
9	-9												

c)	<table border="1"><tr><td><math>x</math></td><td><math>y</math></td></tr><tr><td>4</td><td>9</td></tr><tr><td>2</td><td>14</td></tr><tr><td>0</td><td>19</td></tr><tr><td>-2</td><td>24</td></tr><tr><td>-4</td><td>29</td></tr></table>	$x$	$y$	4	9	2	14	0	19	-2	24	-4	29
$x$	$y$												
4	9												
2	14												
0	19												
-2	24												
-4	29												

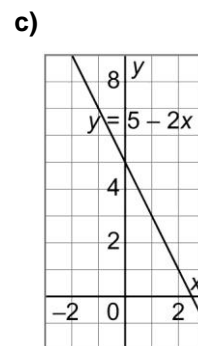
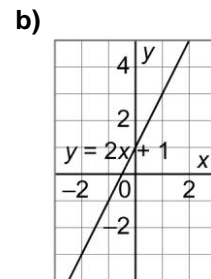
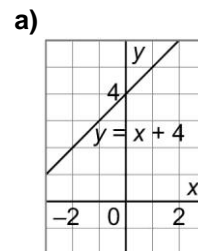
- a) As  $x$  increases by 1,  $y$  increases by 4.
- b) As  $x$  increases by 2,  $y$  decreases by 4.
- c) As  $x$  decreases by 2,  $y$  increases by 5.

3.

a)	<table border="1"><tr><td><math>x</math></td><td><math>y</math></td></tr><tr><td>-2</td><td>2</td></tr><tr><td>-1</td><td>3</td></tr><tr><td>0</td><td>4</td></tr><tr><td>1</td><td>5</td></tr><tr><td>2</td><td>6</td></tr></table>	$x$	$y$	-2	2	-1	3	0	4	1	5	2	6
$x$	$y$												
-2	2												
-1	3												
0	4												
1	5												
2	6												

b)	<table border="1"><tr><td><math>x</math></td><td><math>y</math></td></tr><tr><td>-2</td><td>-3</td></tr><tr><td>-1</td><td>-1</td></tr><tr><td>0</td><td>1</td></tr><tr><td>1</td><td>3</td></tr><tr><td>2</td><td>5</td></tr></table>	$x$	$y$	-2	-3	-1	-1	0	1	1	3	2	5
$x$	$y$												
-2	-3												
-1	-1												
0	1												
1	3												
2	5												

c)	<table border="1"><tr><td><math>x</math></td><td><math>y</math></td></tr><tr><td>-2</td><td>9</td></tr><tr><td>-1</td><td>7</td></tr><tr><td>0</td><td>5</td></tr><tr><td>1</td><td>3</td></tr><tr><td>2</td><td>1</td></tr></table>	$x$	$y$	-2	9	-1	7	0	5	1	3	2	1
$x$	$y$												
-2	9												
-1	7												
0	5												
1	3												
2	1												



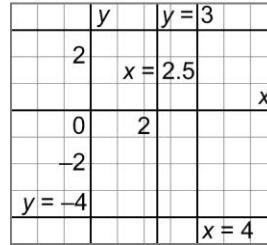
**Master 4.26**

**Extra Practice Sample Answers**

4. a)

Time, $n$ hours	Total Cost, $C$ (\$)
1	130
2	180
3	230
4	280

- b) Yes, as the time in hours increases by 1, the total cost increases by \$50.  
 c)  $C = 50n + 80$   
 d) \$430



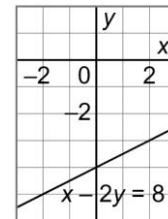
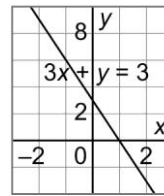
5.

a)  $3x + y = 3$

x	y
-2	9
0	3
2	-3

b)  $x - 2y = 8$

x	y
-2	-5
0	-4
2	-3



**Extra Practice 3 – Master 4.22**

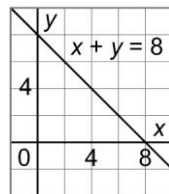
**Lesson 4.3**

1. a) The graph is a horizontal line that intersects the  $y$ -axis at 4.  
 b) The graph is a vertical line that intersects the  $x$ -axis at 1.  
 c) The graph is an oblique line.  
 d) The graph is a horizontal line that intersects the  $y$ -axis at  $-3$ .

2. a)  $y = 2$                       b)  $x = -2$

3. a) Tables may vary.

x	y
0	8
2	6
4	4
6	2
8	0



- b) Yes, the points should be joined because  $x$  and  $y$  can have any value between the plotted points.  
 c)  $x + y = 8$

4. a) A vertical line that intersects the  $x$ -axis at 4  
 b) A horizontal line that intersects the  $y$ -axis at 3  
 c) A horizontal line that intersects the  $y$ -axis at  $-4$   
 d) A vertical line that intersects the  $x$ -axis at 2.5

6.

a)  $x + y = 6$

x	y
0	6
2	4
4	2

$x - y = -6$

x	y
-4	2
-2	4
0	6

- b) An isosceles triangle

**Extra Practice 4 – Master 4.23**

**Lesson 4.4**

1. a) Graph C                      b) Graph A                      c) Graph B  
 2. a) Graph C                      b) Graph A                      c) Graph B

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**Extra Practice 4 continued...**

3. Students should make tables of values, or choose points on each line, then substitute coordinates in each equation.  
a) Graph C                      b) Graph B  
c) Graph A
4. Students should make tables of values, or choose points on each line, then substitute coordinates in each equation.  
 $y = x + 2$
5.  $x - 4y = 4$

**Extra Practice 5 – Master 4.24****Lesson 4.5**

1. a) i)  $x = 0$                       ii)  $x = 4$   
      iii)  $x = -2$   
      b) i)  $y = 2$                       ii)  $y = 5$   
      iii)  $y = -2$
2. a) i)  $x = 1$                       ii)  $x = -1.5$   
      iii)  $x = 3$   
      b) i)  $y = 1$                       ii)  $y = -3$   
      iii)  $y = -7$
3. a) i)  $x = 1$                       ii)  $x = -1$   
      iii)  $x = 4$   
      b) i)  $y = 1$                       ii)  $y = 4$   
      iii)  $y = -4$
4. a) Approximately \$0.56. This is interpolation because I am reading a data point that lies between the plotted points.  
      b) Approximately 13 min  
      c) Approximately 22 min