Name: _____ Date: _____

Chapter 4 Review

For each type of question, the achievement level is indicated. Showing work is an important strategy in communicating your knowledge and ideas so please be thorough.

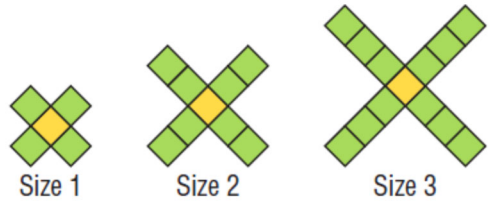
Learning Goal 4.1	I can generalize a pattern using linear relations.

Developing
a. Draw the next diagram in the pattern
Developing/Proficient
b. Describe the pattern in words. Is it linear?
Proficient/Extending
c. If the pattern is linear, write an equation to describe the pattern. Remember to define your variables carefully.

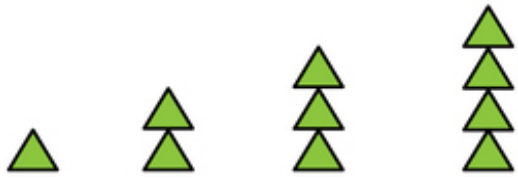
Maximum of Proficient

Continue the pattern.

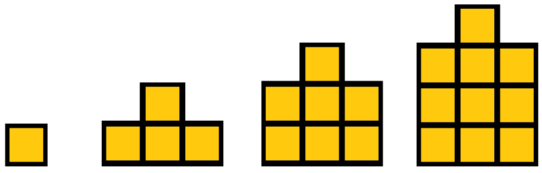
1.



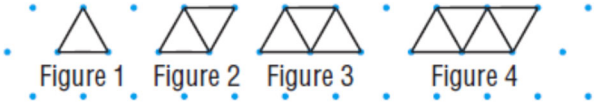
2.



3.



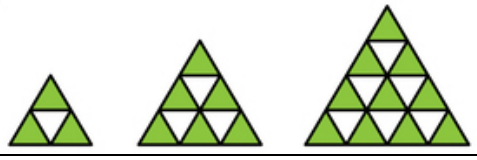
4.



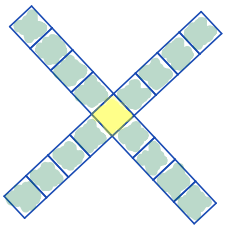
Maximum of Extending

5. Consider one chair to fit on each side the hexagon. For example, 6 chairs fit around 1 table, 10 chairs around 2 tables, etc. Find the pattern in the number of chairs.

6. Consider the number of small triangles. How is that number increasing. For example, there are 4 in the first, 9 in the second, etc.



7. Consider the number of hexagons in each diagram. How is that number increasing? For example, there is 1 in the first, 3 in the second, etc.

1. a. 

b. Add one square to each end of the x
↳ 4 new squares total
↳ it is linear

c. Let n be the figure number. and b be the number of boxes

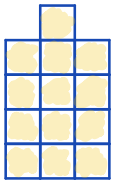
$b = 5 + 4(n-1)$
$= 1 + 4n$.

2. a. 

b. Add one triangle to the top of the 'tree'
↳ it is linear

c. Let n be the figure number and t be the number of triangles

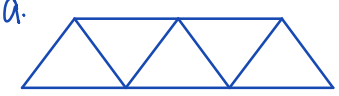
$t = 1 + (n-1)$
$= n$

3. a. 

b. Add a full level to the bottom of the tower
↳ 3 new squares total
↳ it is linear

c. Let n be the figure number and b be the number of boxes

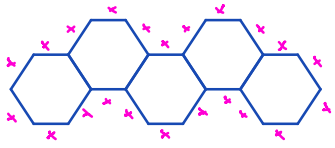
$b = 1 + 3(n-1)$
$= 3n - 2$

4. a. 

b. Add a triangle in the opposite orientation to the last one added.
↳ 1 new triangle
↳ it is linear

c. Let n be the figure number and t be the number of triangles.

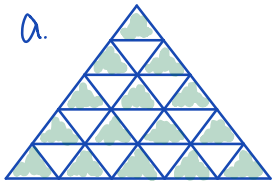
$t = 1 + (n-1)$
$= n$

5 a. 

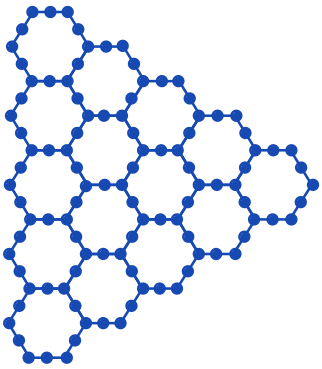
b. Adding a table removes one chair (from the old end) and adds 5 more (all the new edges).
↳ 4 chairs added
↳ it is linear

c. Let n be the figure number and c be the number of chairs.

$c = 6 + 4(n-1)$
$= 4n + 2$

6. a. 

b. Add a new row of triangles, each row is 2 triangles longer than the one before it.
↳ # of triangles added depends on the figure number
↳ not linear

7. a. 

b. The number of hexagons added is the same as the figure number
↳ # of hexagons depends on the figure number
↳ not linear

---

1. a. ... , 21, 23, ...

b. add 2 to the previous number

c. the 10th number is 27

d. $y = 2(x-1)+9$
$= 2x + 7$

e. $1 = 2x + 7$
$-7 \quad -7$
$\frac{-6}{2} = \frac{2x}{2}$
$x = -3$

2. a. ..., -5, -11, ...

b. Subtract 6 from the previous number

c. the 10th number is -23

d. $y = 31 - 6(x-1)$
$= 37 - 6x$

e. $-17 = 37 - 6x$
$-37 \quad -37$
$\frac{-54}{-6} = \frac{-6x}{-6}$
$x = 9$

3. a. ..., 26, 29, ...

b. Add 3 to the previous number.

c. the 10th value is 35

d. $y = 8 + 3(x-1)$
$= 3x + 5$

e. $41 = 3x + 5$
$-5 \quad -5$
$\frac{36}{3} = \frac{3x}{3}$
$x = 12$

4. a. ..., 51, 58, ...

b. Add 7 to the previous number

c. The 10th number is 72

d. $y = 7(x-1)+9$
$= 7x + 2$

e. $86 = 7x + 2$
$-2 \quad -2$
$\frac{84}{7} = \frac{7x}{7}$
$x = 12$

5. a. ..., 21, 24, ...

b. Add 3 to the previous number

c. The 10th number is 30

d. $y = 3(x-1)+3$
$= 3x$

e. $\frac{42}{3} = \frac{3x}{3}$
$x = 14$

6. a. ..., 8, 6, ...

b. Subtract 2 from the previous number

c. The 10th number is 2

d. $y = 20 - 2(x-1)$
$= 22 - 2x$

e. $42 = 22 - 2x$
$-22 \quad -22$
$\frac{20}{-2} = \frac{-2x}{-2}$
$x = -10$

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Chapter 4 Review

For each of the following patterns perform the following tasks.

1. $9, 11, 13, 15, 17, 19, \ldots$	2. $31, 25, 19, 13, 7, 1, \ldots$	3. $8, 11, 14, 17, 20, 23, \ldots$
4. $9, 16, 23, 30, 37, 44, \ldots$	5. $3, 6, 9, 12, 15, 18, \ldots$	6. $20, 18, 16, 14, 12, 10, \ldots$

Developing		
a. Find the next 2 numbers in the pattern		
Proficient		
b. Describe the pattern in words.		
c. Find the value of y when $x = 10$.		
Extending		
d. Write an equation to describe the pattern.		
e. Find the equation of x when		
1. $y = 1$	2. $y = -17$	3. $y = 40$
4. $y = 86$	5. $y = -18$	6. $y = 42$

Extending
A pizza with tomato sauce and cheese costs \$14.00. Each additional topping cost \$1.20. Create a table that shows the costs of a pizza for up to 4 additional toppings. Graph the data. Write an **equation** that relates the cost, C dollars, to the number of toppings, n. **Verify** your equation by substituting value(s) of n from the table. Suppose a pizza costs \$22.40. How many toppings were ordered? Show your work.

a.

t: # of toppings	c: Cost
0	14.00
1	15.20
2	16.40
3	17.60
4	18.80

c. $C = 14.00 + 1.20t$

$14.00 + 1.20(3)$

$= 14.00 + 3.60$

$= 17.60$ ✓

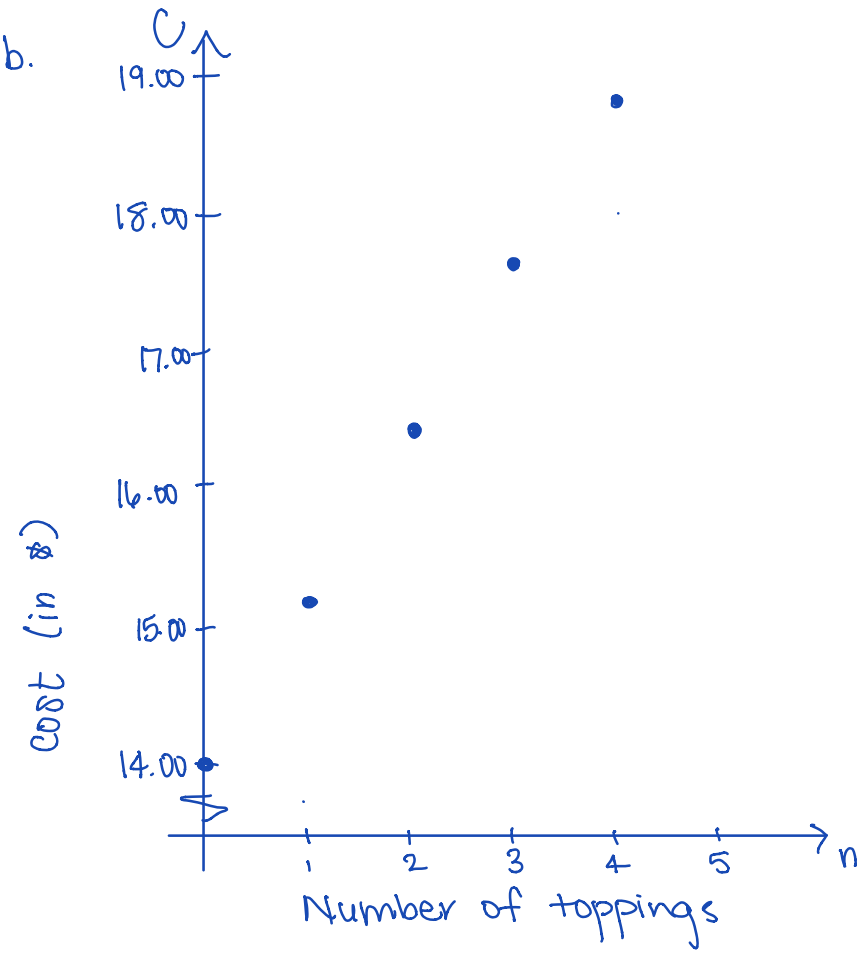
d. $22.40 = 14.00 + 1.20t$

$-14.00 \quad -14.00$

$\frac{8.40}{1.20} = \frac{1.20t}{1.20}$

$t = 7$ There were 7 toppings.

b.


C
19.00
18.00
17.00
16.00
15.00
14.00
cost (in $)
1
2
3
4
5
n
Number of toppings

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Chapter 4 Review

For each type of question, the achievement level is indicated. Showing work is an important strategy in communicating your knowledge and ideas so please be thorough.

Learning Goal 4.2	I can graph and describe linear relations.

Given that slope-intercept form is $y = mx + b$,

Developing
a. What is the slope of the line?
b. What is the $y-$ intercept of the line?
Proficient/Extending
c. Graph the line.

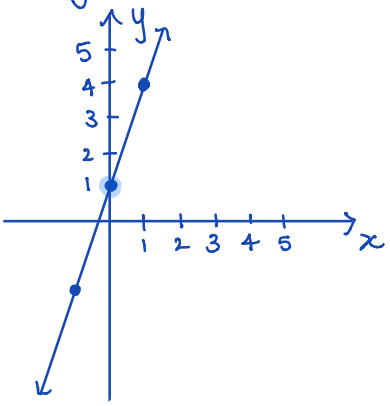
Proficient		
1. $y = 3x + 1$	2. $y = -2x + 5$	3. $y = x - 3$
4. $y = x$	5. $y = -x - 4$	6. $y = 2x - 1$
Extending		
7. $y = \frac{3}{2}x + 1$	8. $y = -\frac{1}{4}x + 2$	9. $y = \frac{4}{3}x + 4$
10. $y = -\frac{5}{3}x - 4$	11. $y = -\frac{12}{16}x$	12. $y = \frac{1}{6}x - 3$

Given that standard form is $ax + by = c$,

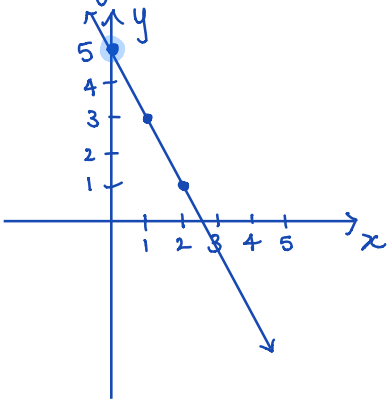
Proficient
a. What is the $x-$ intercept of the line?
b. What is the $y-$ intercept of the line?
Extending
c. Graph the line.

Extending		
1. $2x + 4y = 8$	2. $3x + y = 12$	3. $5x + 2y = 10$
4. $4x - 8y = 16$	5. $8x - 4y = -16$	6. $3x + y = -9$

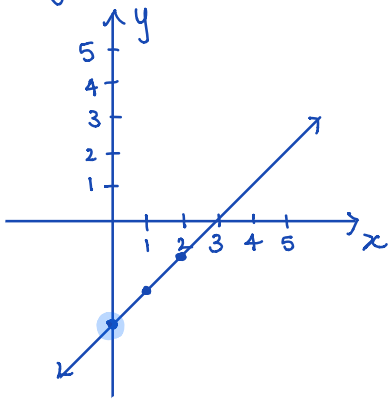
1. slope, $m = 3$
y-int, $b = 1$



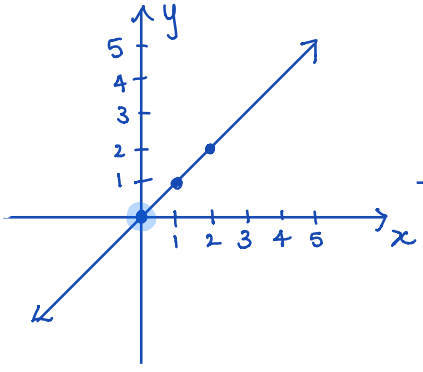
2. slope, $m = -2$
y-int $b = 5$



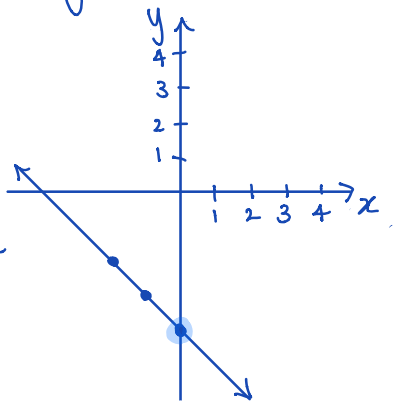
3. slope, $m = 1$
y-int, $b = -3$



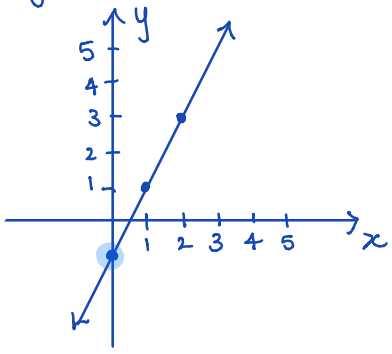
4. slope, $m = 1$
y-int, $b = 0$



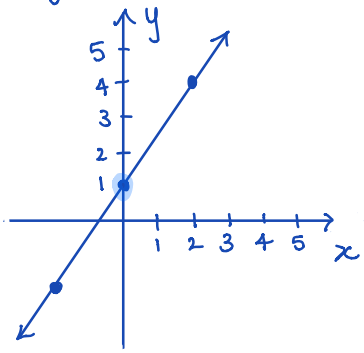
5. slope, $m = -1$
y-int, $b = -4$



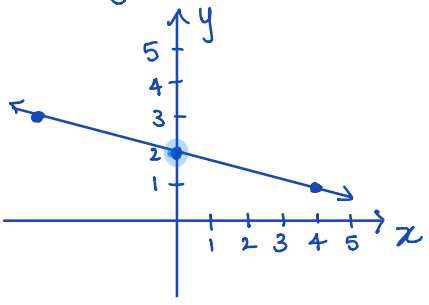
6. slope, $m = 2$
y-int, $b = -1$



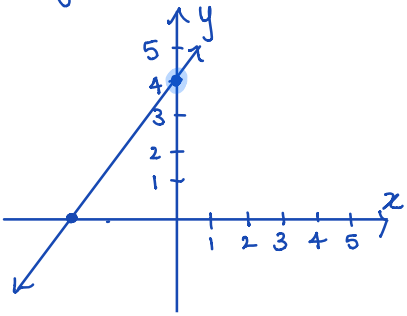
7. slope, $m = 3/2$
y-int, $b = 1$



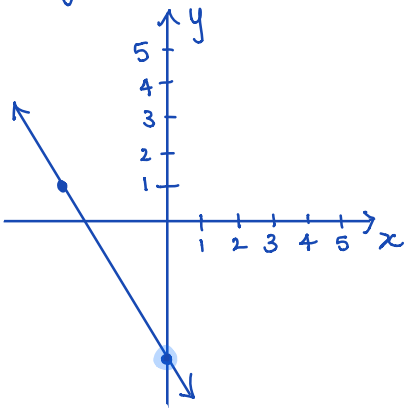
8. slope, $m = -1/4$
y-int, $b = 2$



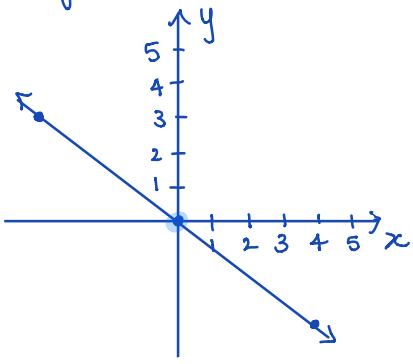
9. slope, $m = 4/3$
y-int, $b = 4$



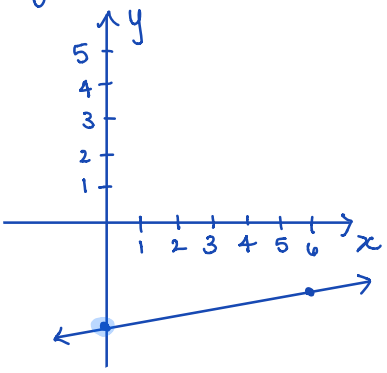
10. Slope, $m = -5/3$
y-int, $b = -4$



11. Slope, $m = -12/16 = -3/4$
y-int, $b = 0$



12. Slope, $m = 1/6$
y-int, $b = -3$



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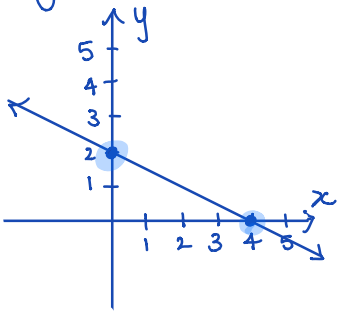
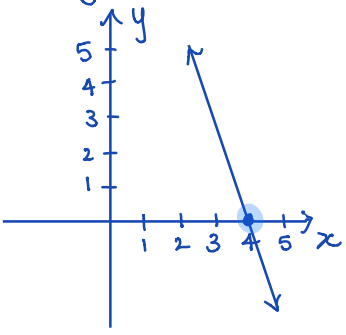
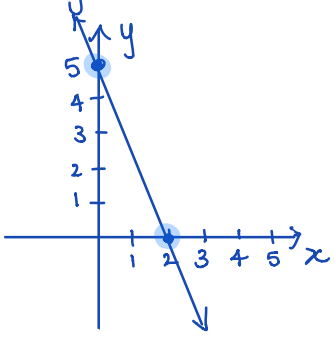
1. x-int = 4
y-int. = 2



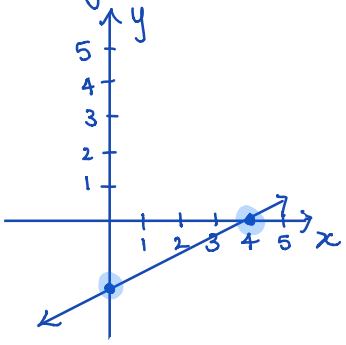
2. x-int = 4
y-int = 12



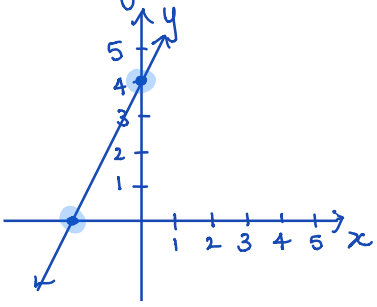
3. x-int = 2
y-int = 5



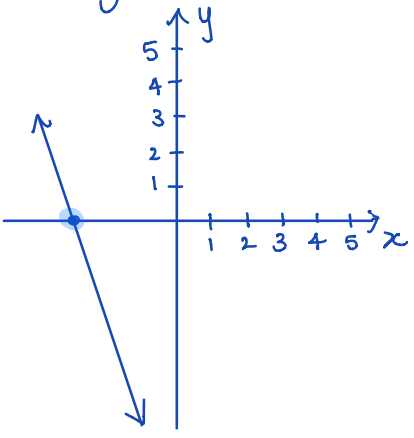
4. x-int = 4
y-int = -2



5. x-int = -2
y-int = 4



6. x-int = -3
y-int = -9



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Chapter 4 Review

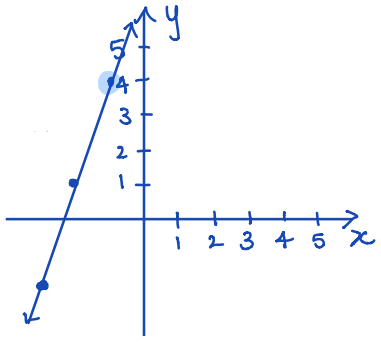
Given that slope-point form is $y - y_1 = m(x - x_1)$,

Developing
a. What is the slope of the line?
Proficient
b. What point does the line pass through?
Extending
c. Graph the line.

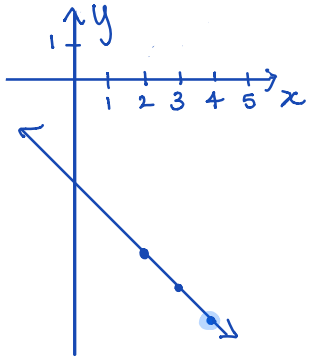
Proficient		
1. $y - 4 = 3(x + 1)$	2. $y + 7 = -(x - 4)$	3. $y + 1 = -(x - 3)$
4. $y - 8 = -\frac{4}{3}(x - 7)$	5. $y + 2 = -\frac{2}{7}(x + 5)$	6. $y - 6 = \frac{2}{5}(x - 1)$
7. $y + 3 = -\frac{4}{5}(x + 1)$	8. $y + 1 = -\frac{1}{6}(x - 1)$	9. $y + 5 = \frac{7}{3}(x - 6)$

Proficient		
Graph the following lines.		
1. $y = 3$	2. $y = -2$	3. $y = -3$
4. $y + 5 = 0$	5. $y + 8 = 0$	6. $y - 1 = 0$
7. $x = 3$	8. $x = -2$	9. $x = -3$
10. $x + 5 = 0$	11. $x + 8 = 0$	12. $x - 1 = 0$

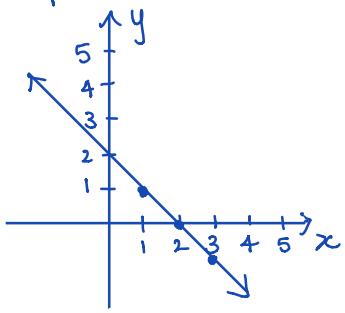
1. slope, $m = 3$
point $(-1, 4)$



2. slope, $m = -1$
point $(4, -7)$

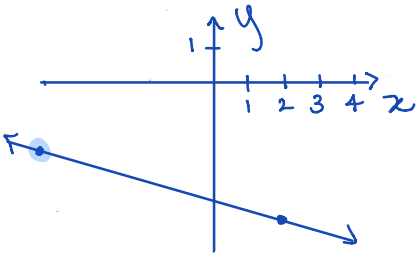


3. slope, $m = -1$
point $(3, -1)$

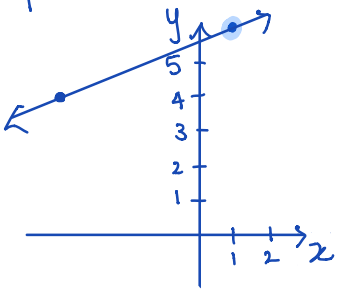


4. slope, $m = -4/3$
point $(7, 8)$

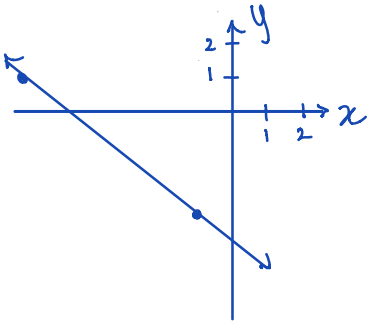
5. slope, $m = -2/7$
point $(-5, -2)$



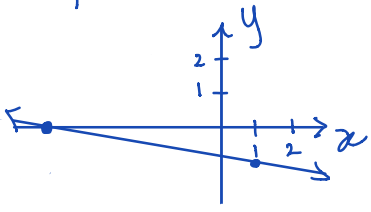
6. slope, $m = 2/5$
point $(1, 6)$



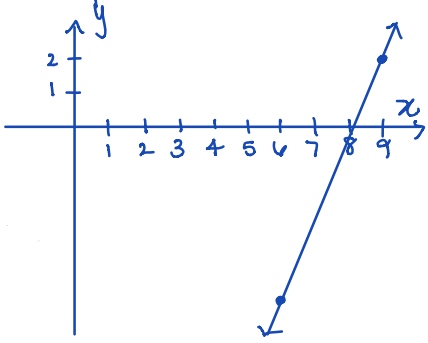
7. slope, $m = -4/5$
point $(-1, -3)$



8. slope, $m = -1/6$
point $(1, -1)$



9. slope, $m = 7/3$
point $(6, -5)$



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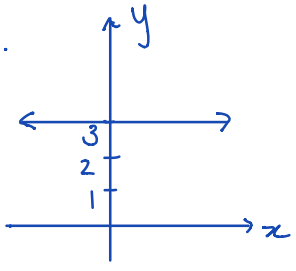

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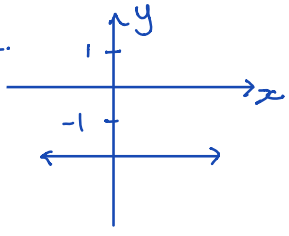

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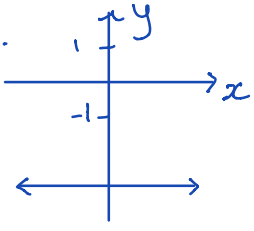

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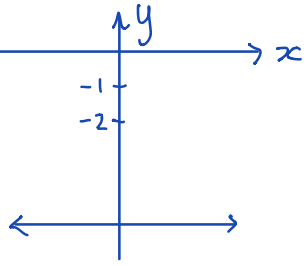

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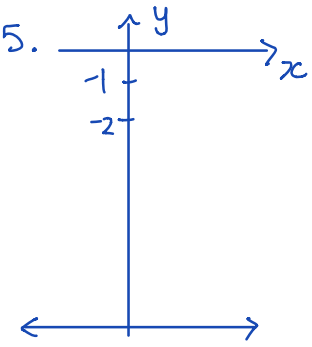

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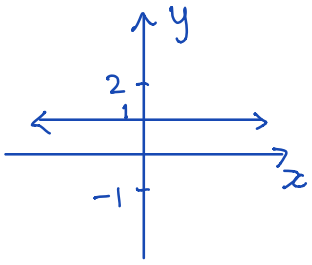

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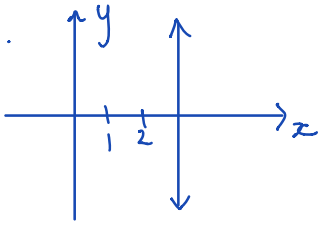

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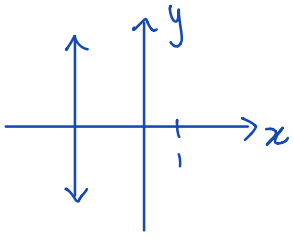

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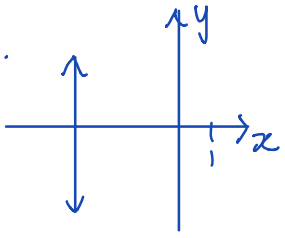

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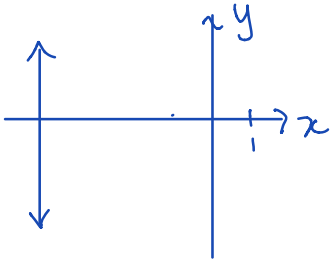

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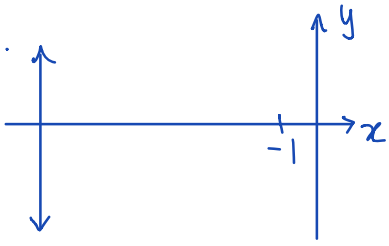

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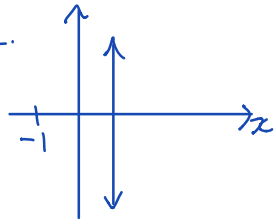


Name: _____ Date: _____

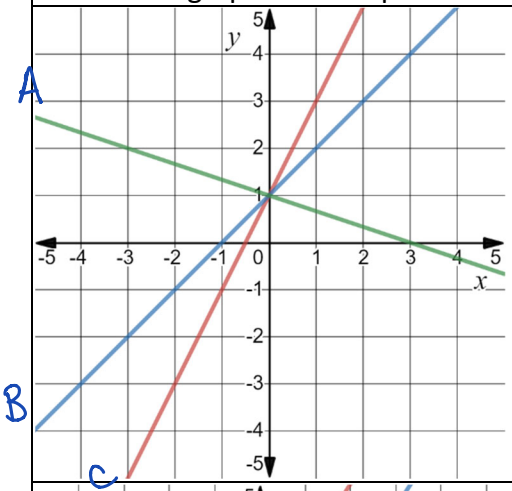
Chapter 4 Review

For each type of question, the achievement level is indicated. Showing work is an important strategy in communicating your knowledge and ideas so please be thorough.

Learning Goal 4.3	I can write an equation to represent a graph.

Developing

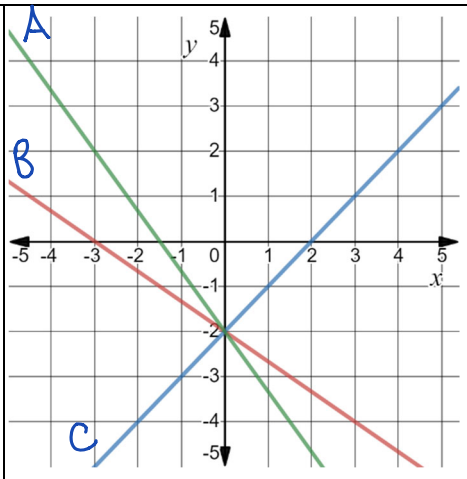
Match the graph to the equation.



$y = 2x + 1$ C

$y = x + 1$ B

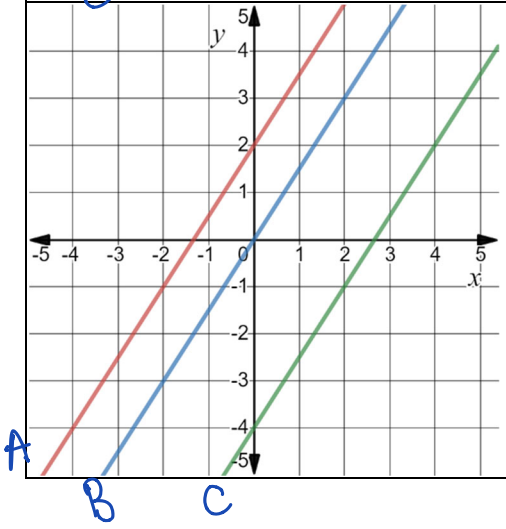
$y = -\frac{1}{3}x + 1$ A



$y = -\frac{2}{3}x - 2$ B

$y = x - 2$ C

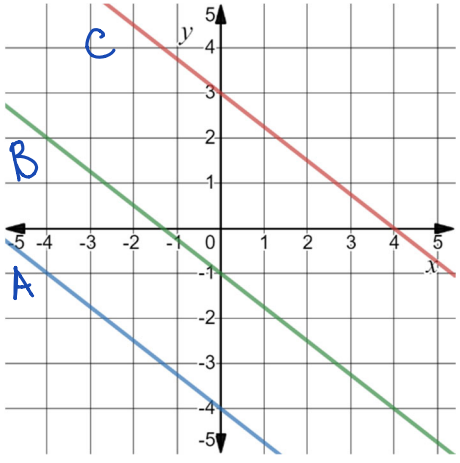
$y = -\frac{4}{3}x - 2$ A



$y = \frac{3}{2}x + 2$ A

$y = \frac{3}{2}x - 4$ C

$y = \frac{3}{2}x$ B



$y = -\frac{3}{4}x - 4$ A

$y = -\frac{3}{4}x - 1$ B

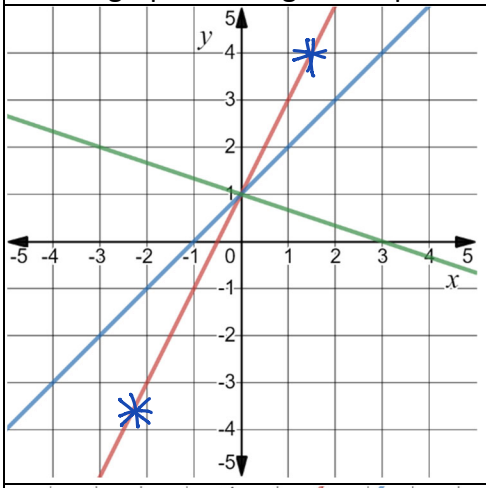
$y = -\frac{3}{4}x + 3$ C

Name: _____ Date: _____

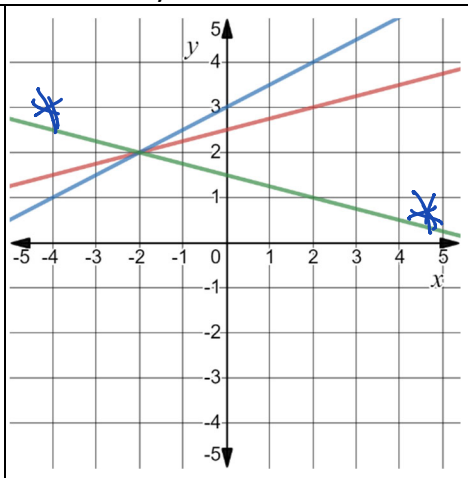
Chapter 4 Review

Proficient

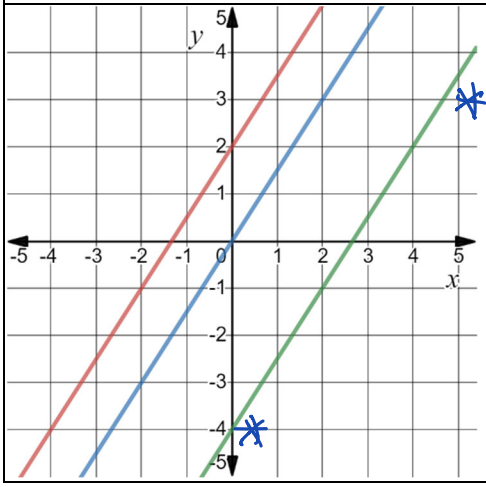
Which graph on the grid is represented by the equation? Justify.



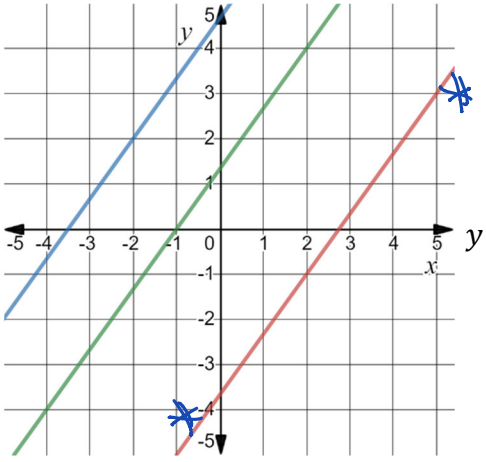
$y = 2x + 1$



$y - 2 = -\frac{1}{4}(x + 2)$



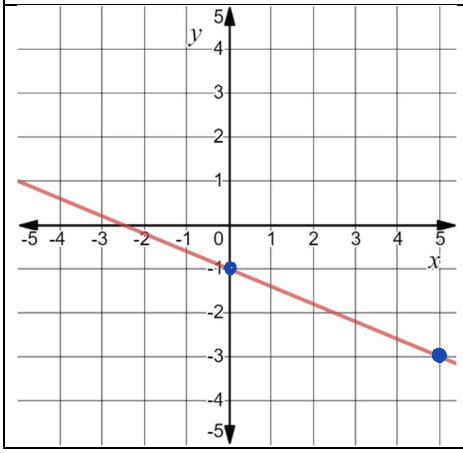
$y = \frac{3}{2}x - 4$



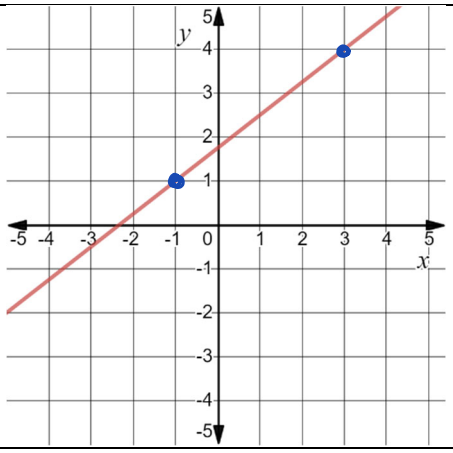
$y + 1 = -\frac{4}{3}(x - 2)$

Extending

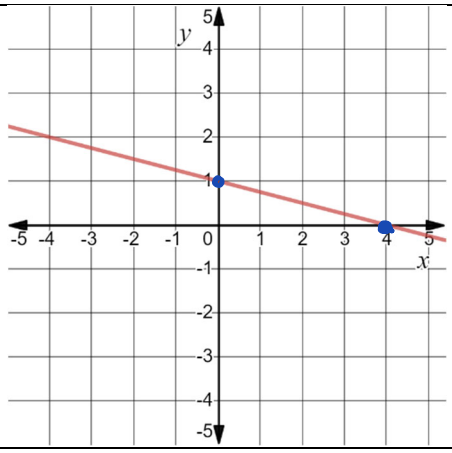
What is the equation of the graph in slope-intercept form?



What is the equation of the graph in slope-point form?



Extra Extending What is the equation of the graph in standard form?



Remember you have lots of examples of this on the Kill The Zombie Sheet 2!

$y = -\frac{2}{5}x - 1$ $y - 4 = \frac{3}{4}(x - 3)$ $x + 4y = 4$

Name: _____ Date: _____

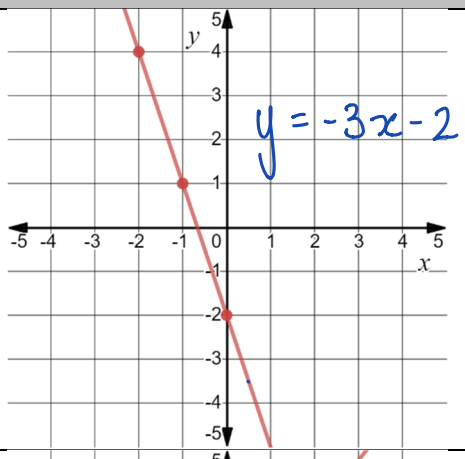
Chapter 4 Review

For each type of question, the achievement level is indicated. Showing work is an important strategy in communicating your knowledge and ideas so please be thorough.

Learning Goal 4.4	I can interpolate or extrapolate to solve problems.

Use the graph of the linear relation to answer the following questions.

Proficient



a. Determine the value of x when $y = 3$. Is this interpolation or extrapolation?

$x \doteq -1.5$

b. Determine the value of y when $x = 0.5$. Is this interpolation or extrapolation?

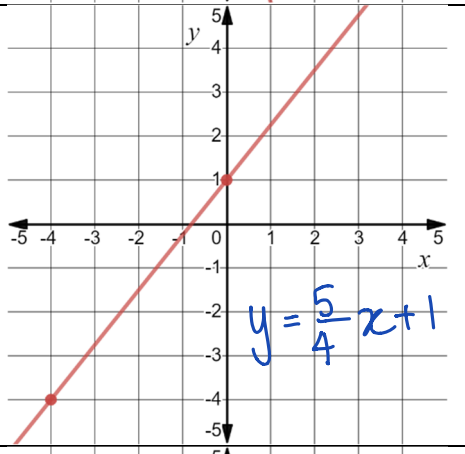
$y \doteq -3.5$

c. Determine the value of x when $y = 7$. Is this interpolation or extrapolation?

$x \doteq -3$

d. Determine the value of y when $x = 2$. Is this interpolation or extrapolation?

$y \doteq -8$



a. Determine the value of x when $y = 3$. Is this interpolation or extrapolation?

$x \doteq 1.5$

b. Determine the value of y when $x = -3$. Is this interpolation or extrapolation?

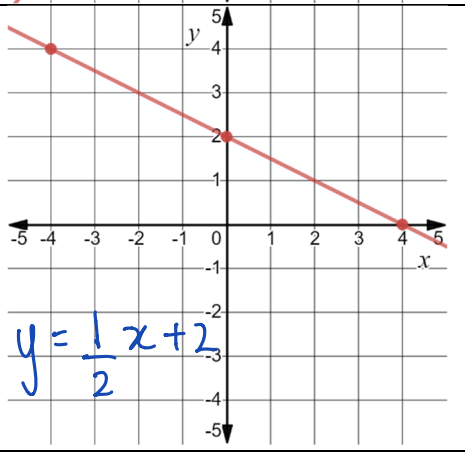
$y \doteq -2.5$

c. Determine the value of x when $y = 7$. Is this interpolation or extrapolation?

$x \doteq 5$

d. Determine the value of y when $x = 5$. Is this interpolation or extrapolation?

$y \doteq 7$



e. Determine the value of x when $y = 3$. Is this interpolation or extrapolation?

$x \doteq -2$

f. Determine the value of y when $x = -3$. Is this interpolation or extrapolation?

$y \doteq 3.5$

g. Determine the value of x when $y = 7$. Is this interpolation or extrapolation?

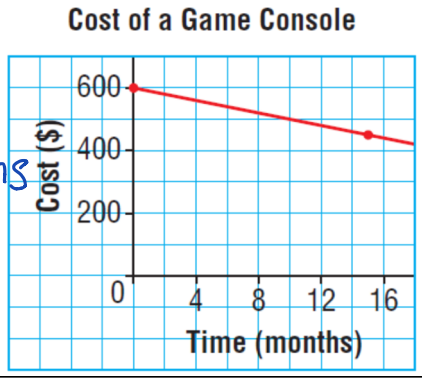
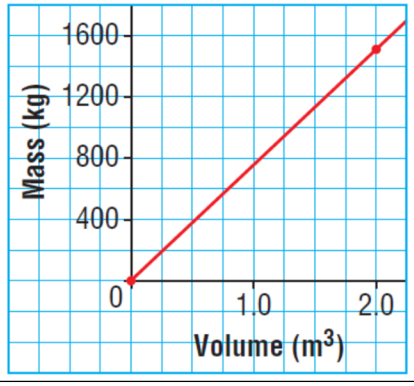
$x \doteq 10$

h. Determine the value of y when $x = 7$. Is this interpolation or extrapolation?

$y \doteq 5.5$

Name: _____ Date: _____

Chapter 4 Review

Extending	
This graph shows how the price of a new game console changes with time. Use the graph. a. Estimate the cost of the game console 5 months after it is released. $550 b. How many months is it until the console costs $500? 10 months c. Estimate the price of the console one year after it was released. ~ $490	
This graph shows how the mass of wheat changes with its volume. Use the graph. a. Estimate the volume of 2000 kg of wheat. ~ 2.6 m^3 b. Estimate the mass of 2.5 m^3 of wheat. ~ 1900 kg	
Louie and Ben are driving from Medicine Hat to Winnipeg. The graph shows the distance travelled and the distance yet to go. a. About how far is it from Medicine Hat to Winnipeg? ~ 1050 km b. When Louie and Ben have travelled 450 km, about how far do they still have to go? ~ 600 km