



A local company offers a cell phone plan that has a fixed cost per month and a cost related to the number of text messages sent. The fixed cost is \$20 and each message sent cost 15 cents.

i) Write an equation that relates the total cost,  $C$ , to the number of text messages sent,  $t$ .

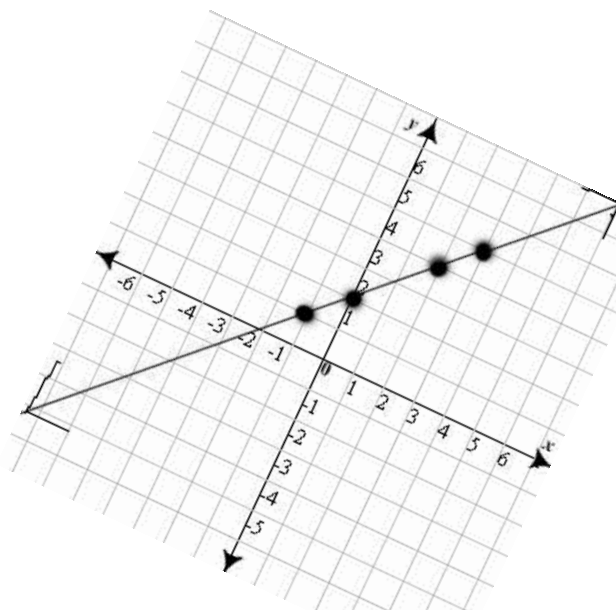
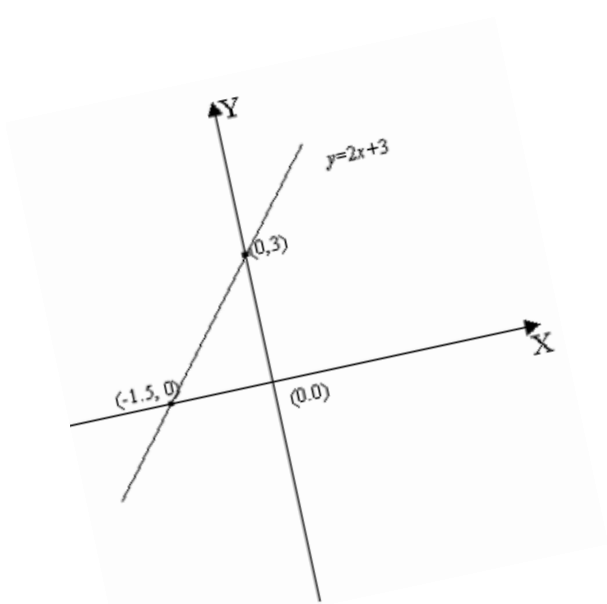
$$C = 0.15t + 20$$

ii) How much would your bill be if you sent 123 text messages in one month?

$$\begin{aligned} C &= 0.15t + 20 \\ &= 0.15(123) + 20 \\ &= 18.45 + 20 \\ &= 38.45 \end{aligned}$$

# Section 4.2

## Linear Relations



**Remember ME**

Let's look at it again.

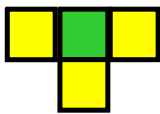


Figure 1

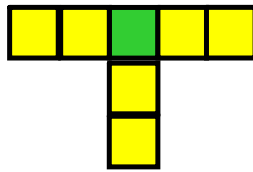


Figure 2

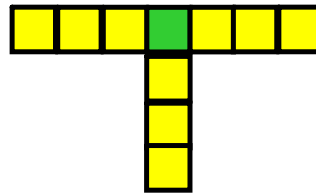


Figure 3

Figure #	# of Blocks
<u>1</u>	4
<u>2</u>	7
<u>3</u>	10
6	19
10	31

$3f + 1$

THUS

Write an equation that relates the number of blocks,  $n$ , to the figure number,  $f$ .

$$n = 3f + 1$$

$$n = 3(6) + 1 = 19$$

$$n = 3(10) + 1 = 31$$

**Remember ME**

Let's look at it again.

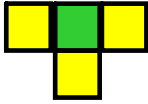


Figure 1

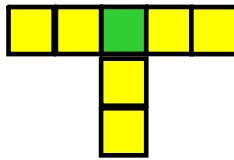


Figure 2

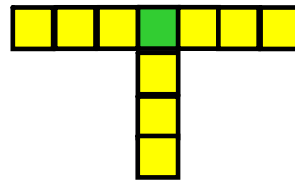
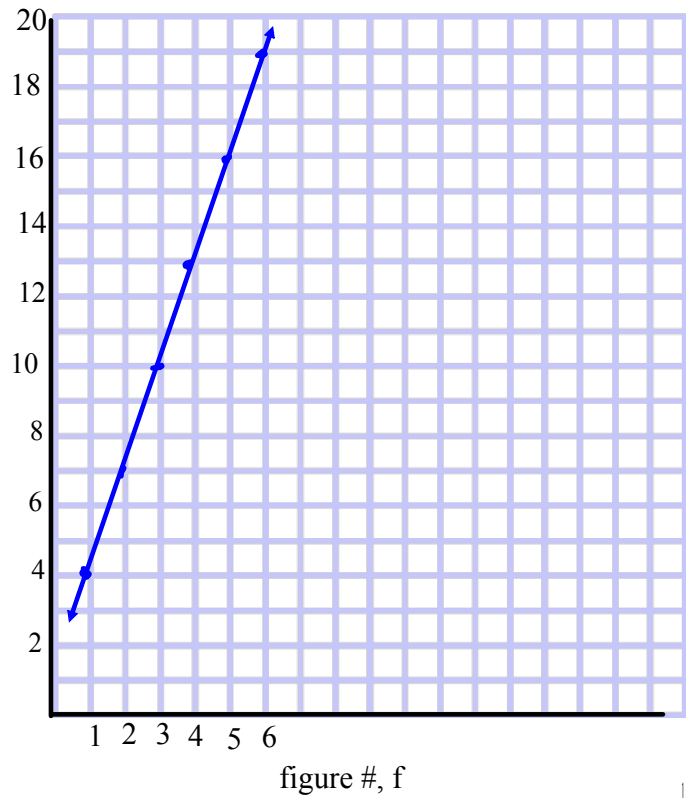


Figure 3

Figure #	# of Blocks
1	4
2	7
3	10
4	13
5	16
6	19
	$3f + 1$

*Handwritten notes: Blue arrows on the left indicate an increase of +1 for each figure number. Blue arrows on the right indicate an increase of +3 for each block count.*



THUS

For figure  $f$ , the number of blocks will be  $3f + 1$

If  $n$  is the number of blocks then the equation is:  $n = 3f + 1$

What changes the value of  $n$ ???

So the value of \_\_\_\_\_ depends on the value of \_\_\_\_\_.

# Dependent VS. Independent

If the equation is:  $P = 2n + 4$

P is the dependent variable

n is the independent variable



Dependent variable is always plotted on vertical axis (y-axis) ↓

Independent variable is always plotted on the horizontal axis (x-axis) ←→

### Linear Relation

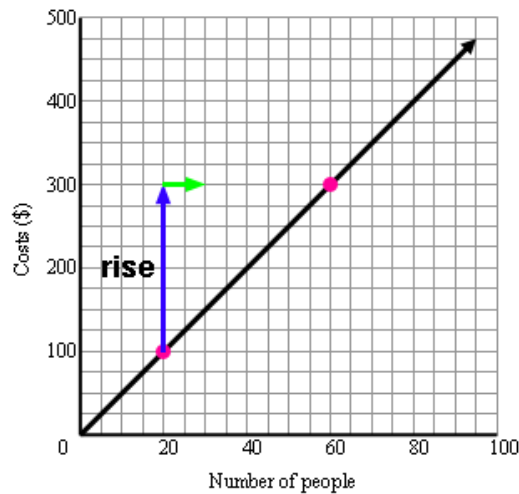
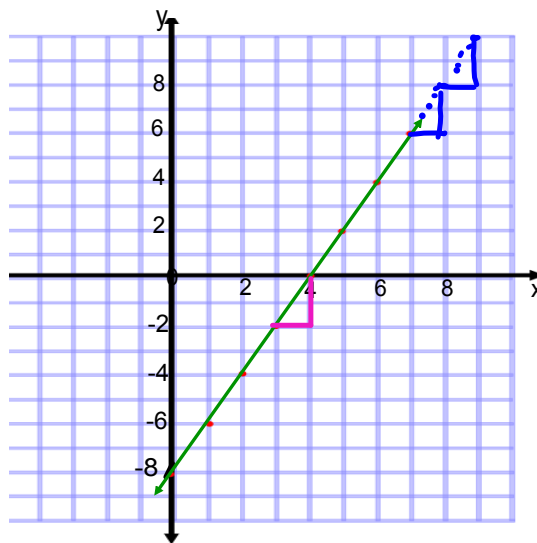
- is when the graph is a straight line
- a constant change in 'x' causes a constant change in 'y'



Table of Values

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

+1 (next to x column), +2 (next to y column)



# Concrete vs. Discrete

Discrete : Unconnected  pizza toppings

Concrete: Connected  age



Think about the two situations



Cost of video games

Number of Video games	Cost, C(\$)
1	25
2	50
3	75

Can you buy 1.5 video games?

So would you connect the dots???

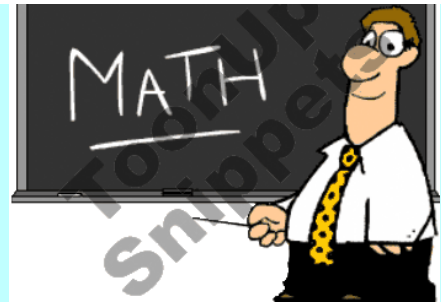
Babysitting Job

Number of Hours	Earnings, C(\$)
1	10
2	20
3	30

Can you work 1.5 hours?

So would you connect the dots???

A relationship has the equation:  $y = 7 - 2x$



a) Create a table of values for the relation for values -2 to 2.

x	y
-2	11
-1	9
0	7
1	5
2	3

We have to do some work!

for  $x = -2$

$$y = 7 - 2(x)$$

$$y = 7 - 2(-2)$$

$$y = 7 - (-4)$$

$$y = 11$$

$$y = 7 - 2(x)$$

$$= 7 - 2(-1)$$

$$= 7 + 2$$

$$= 9$$

$$y = 7 - 2(0)$$

$$= 7$$

$$y = 7 - 2(1)$$

$$= 7 - 2$$

$$= 5$$

$$y = 7 - 2(2)$$

$$= 7 - 4$$

$$= 3$$



Choose Numbers that are easy to work with

$$y = \frac{2}{3}x + 1$$

$$y = \frac{2}{3}(-6) + 1$$

x	y
-6	-3
-3	-1
0	1
3	3
6	5

$$= -4 + 1$$

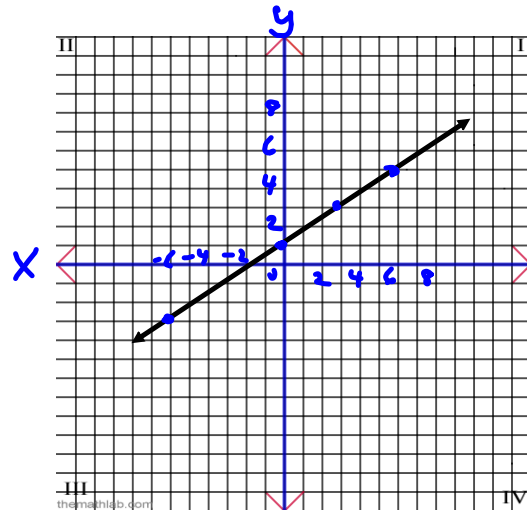
$$= -3$$

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

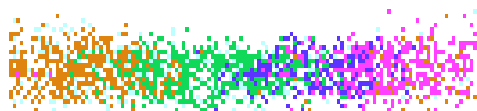
$$= -2 + 1$$

$$= -1$$

$$y = \frac{2}{3}(0) + 1 \quad \left. \begin{array}{l} y = \frac{2}{3}(3) + 1 \\ = 2 + 1 \\ = 3 \end{array} \right\} \begin{array}{l} y = \frac{2}{3}(6) + 1 \\ = 4 + 1 \\ = 5 \end{array}$$



# Class/Homework



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