Curriculum Outcomes:

(PR1) Generalize a pattern arising from a problem-solving context using linear equations and verify by substitution.

(PR2) Graph linear relations, analyze the graph and interpolate or extrapolate to solve problems.

Student Friendly: Looking at a graph or t-table and determining if they are linear or non-linear or discrete or continuous

Warm Up
Day 2

Determine if the following is linear or nonlinear and ***IF*** it is linear determine the equation

a)

x	y
-4	2
-1	4
2	6
5	7

+3, +2; +3, +2; +3, +1

Non linear

b)

x	y
-5	3
0	6
5	9
10	12

+5, +3; +5, +3; +5, +3

Linear

$y = \frac{\Delta y}{\Delta x} \pm \#$

$y = \frac{3}{5}x + 6$

c)

x	y
6	-5
8	-10
10	-15
12	-20

+2, -5; +2, -5; +2, -5

Linea

$y = -\frac{5}{2}x + 1$

$y = -\frac{5}{2}(6)$

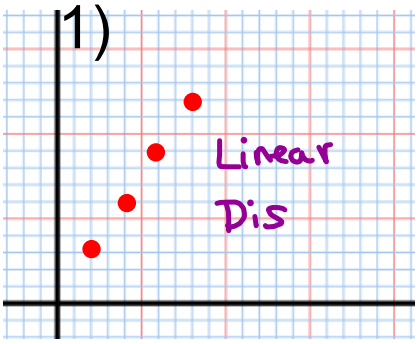
$= -\frac{30}{2}$

$= -15 + 10$

-5

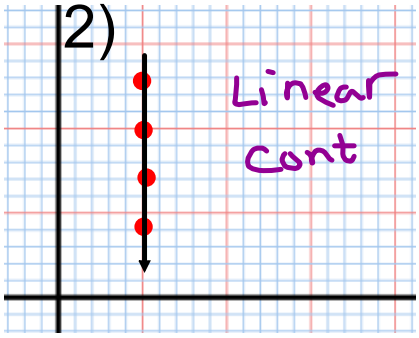
Warm Up

1)



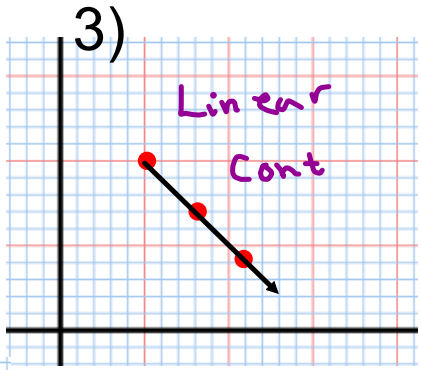
Discrete
or
Continuous??

2)

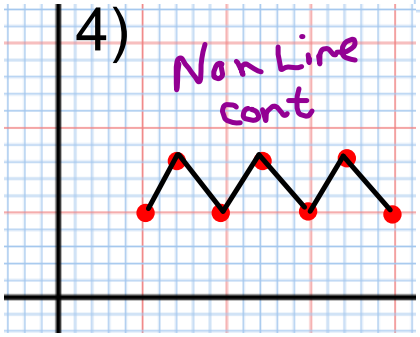


Linear
or
Nonlinear??

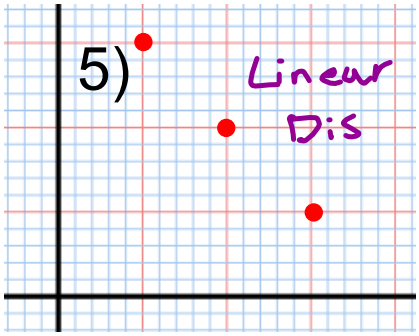
3)



4)

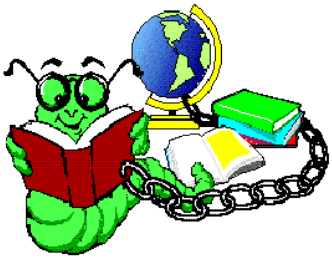


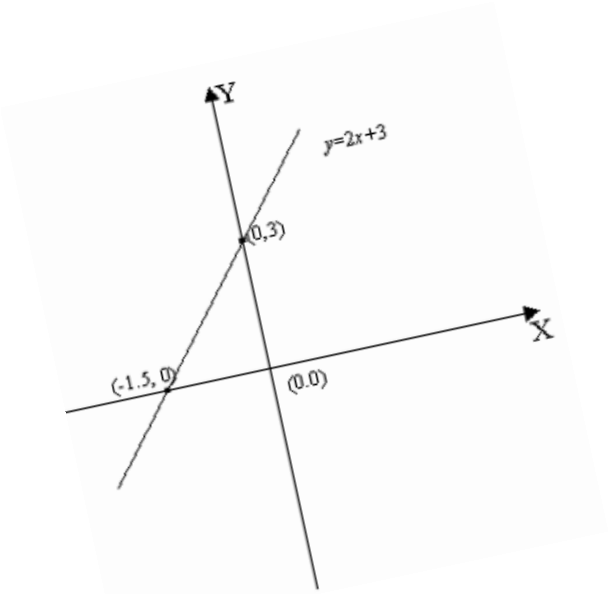
5)

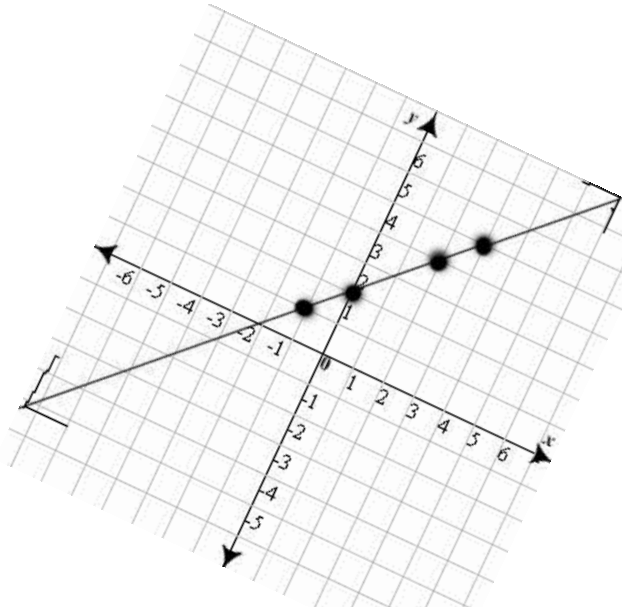


Section 4.2

Linear Relations

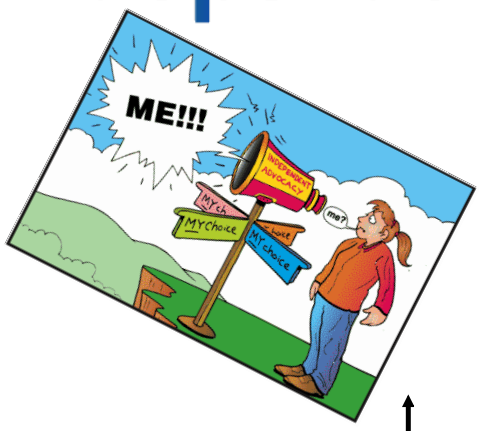






Dependent VS. Independent

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



___ is the dependent variable

___ is the independent variable

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

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

$$y = \frac{\Delta y}{\Delta x} x \pm b$$

$$y = 2x - 5$$

Linear Relation

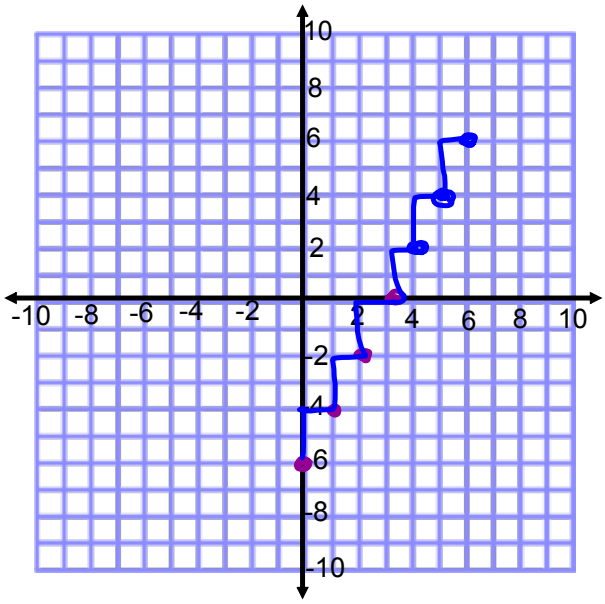
- is when the graph is a straight line
- a constant change in 'x' causes a constant change in 'y'

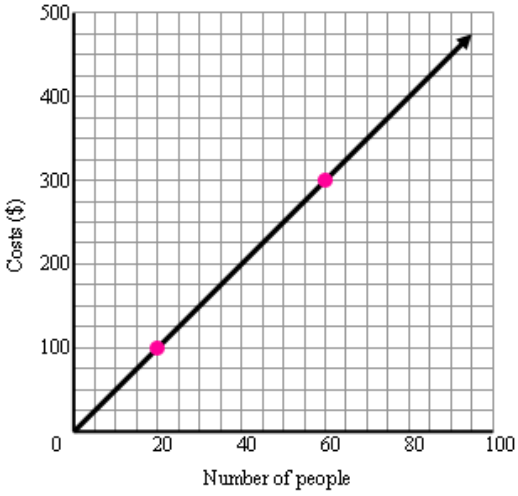
Table of Values

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

$\Delta x = 1$ $\Delta y = 2$

$\frac{\Delta y}{\Delta x} = \frac{2}{1}$ ↑ →





Concrete vs. Discrete

x value ↓ ← can you have decimals

Discrete : Unconnected

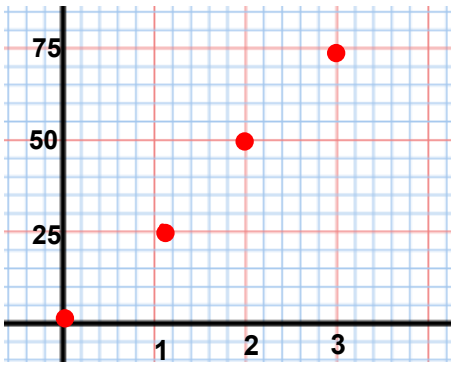
Continuous: Connected

Cost of video games

Number of Video games	Cost, C($)
1	25
~~1.5~~	
2	50
3	75

Can you buy 1.5 video games?

So would you connect the dots???

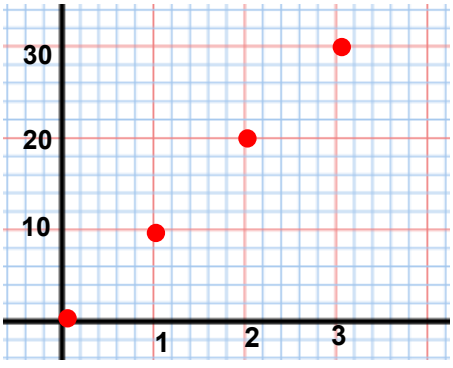


Babysitting Job

Number of Hours	Earnings, C($)
1	10
1.5 →	15
2	20
3	30

Can you work 1.5 hours?

So would you connect the dots???



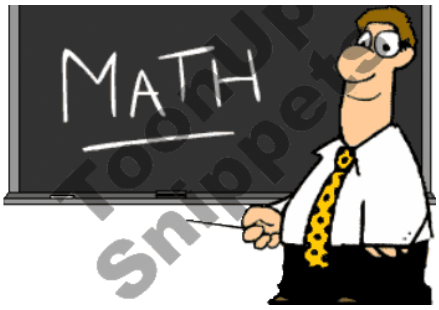
SECTION 4.2: LINEAR RELATIONS

VOCABULARY:

1. **DISCRETE DATA: Data that does NOT have an infinite number of values between whole numbers; in graphs containing discrete data, points are NOT joined together to signify this. (Think NO fractions and NO decimals.)**
   examples: number of people, number of squares

2. **CONTINUOUS DATA: Data that has an infinite number of values between whole numbers; in graphs containing continuous data, points are joined together to signify this. (Think fractions and decimals.)**
   examples: heights, distances, times, temperature, speed

$y = \frac{\Delta y}{\Delta x} x \pm b$



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

$\Delta x = 1$

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

x	y	$\Delta y = -2$
~~-2~~		
-1	9	-2
0	7	-2
1	5	
~~2~~		

We have to do some work!

$x = -1$

$y = -2x + 7$

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

$y = 2 + 7$

$y = 9$

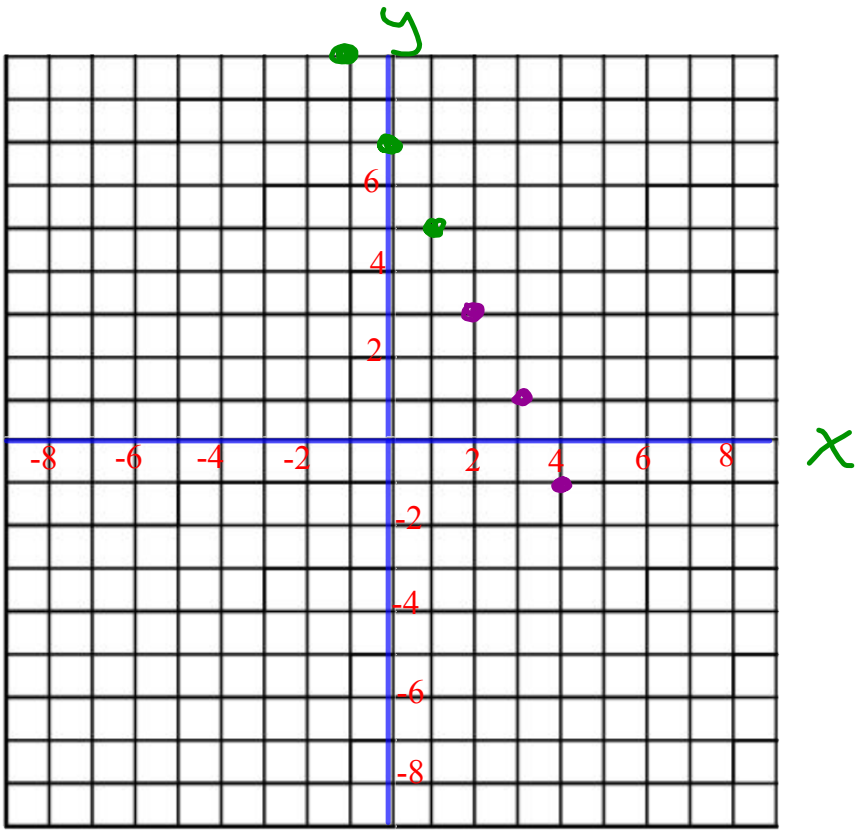
$x = 0$

$y = -2x + 7$

$y = -2(0) + 7$

$y = 0 + 7$

$y = 7$



$\frac{\Delta y}{\Delta x} = \frac{-2}{1}$ ↓ →

Choose Numbers that are easy to work with

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

$\Delta x = 3$

x	y	$\Delta y = 2$
-3	-1	+2
0	1	+2
3	3	+2
6	5	

$x = -3$

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

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

$y = -2 + 1$

$y = -1$

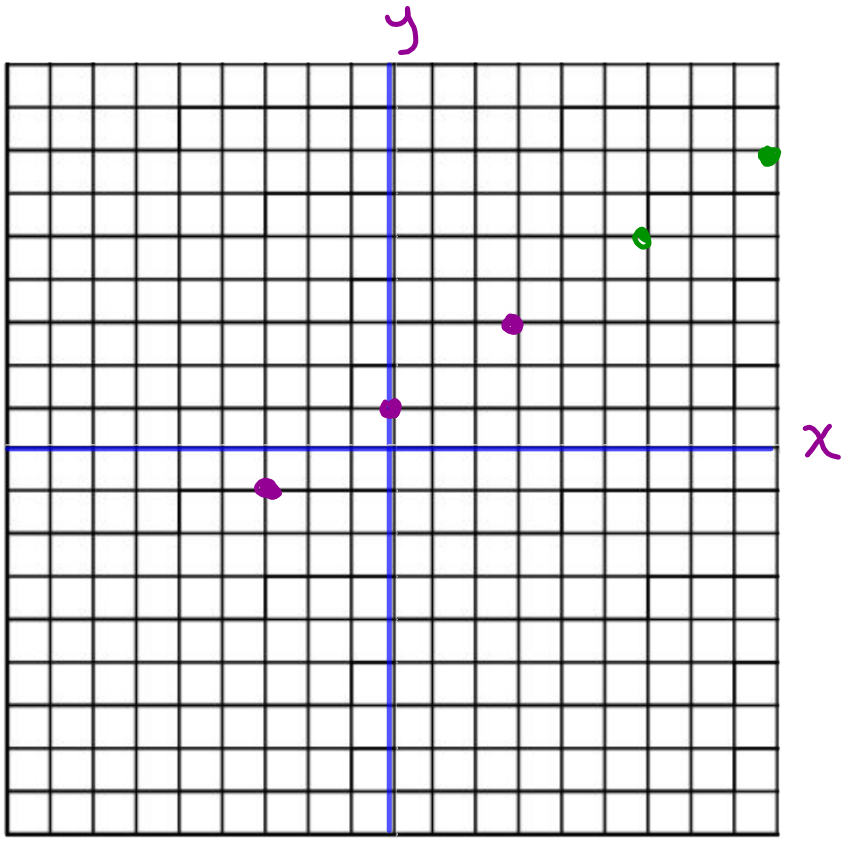
$x = 0$

$y = \frac{2}{3}(0) + 1$

$y = \frac{0}{3} + 1$

$y = 0 + 1$

$y = 1$



$y = \frac{\Delta y}{\Delta x} x \pm b$

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

$\Delta x = 2 \quad \Delta y = 1$

x	y
-2	2
0	3
2	4

$+2 \; (-2 \to 0) \; +1$

$+2 \; (0 \to 2) \; +1$

$x = -2$

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

$y = \frac{-2}{2} + 3$

$y = -1 + 3$

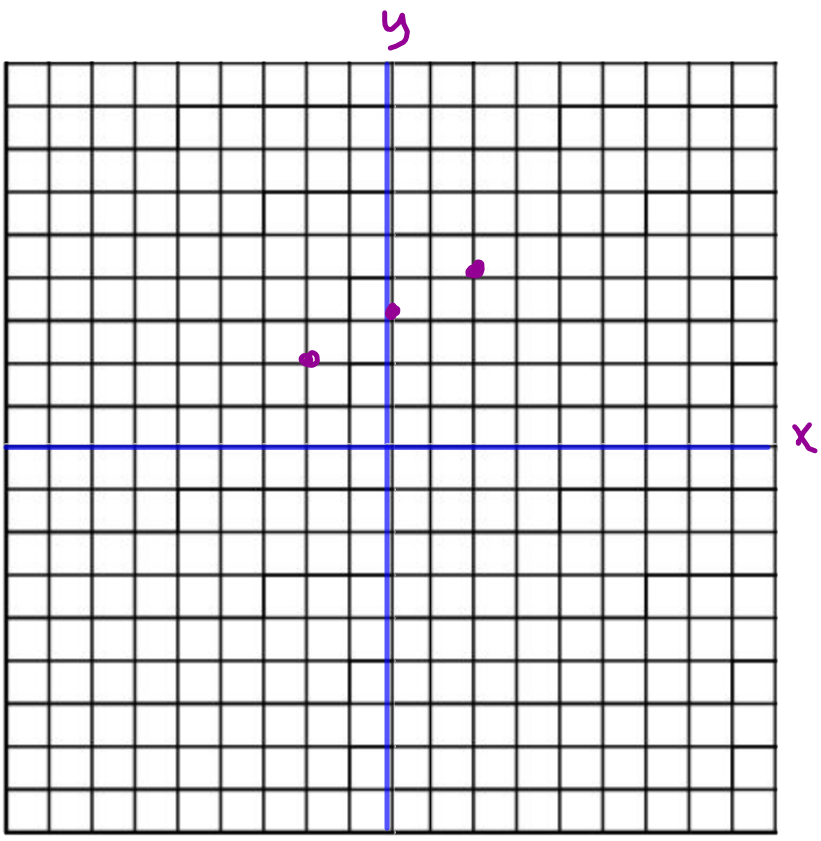
$y = 2$

$x = 0$

$y = \frac{1}{2}(0) + 3$

$y = 0 + 3$

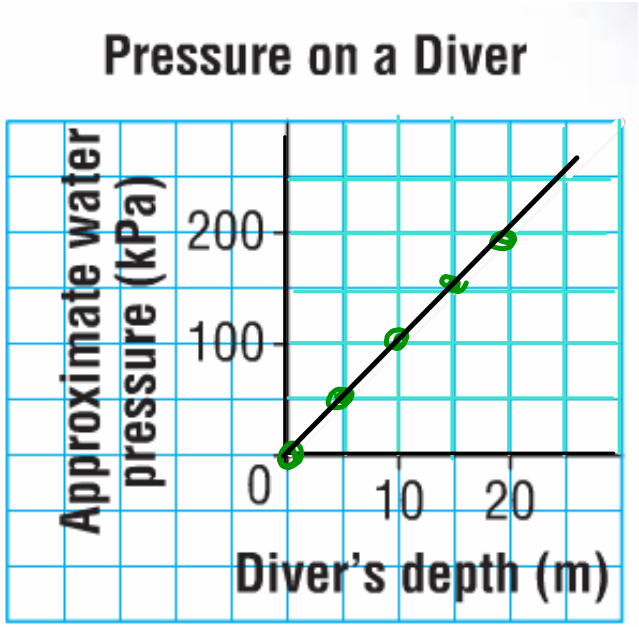
$y = 3$



Example: Please turn to page 164 in *MMS9*.

When a scuba diver goes under water, the weight of the water exerts pressure on the diver.

Diver's Depth (m)	Approximate Water Pressure (kiloPascals)
0	0
5	50
10	100
15	150
20	200



What pattern do you see in the table?

$y = \frac{50}{5}x \pm \#$

$y = 10x$

What pattern do you see in the graph?

Class/Homework

Homework

Page 171 - 173

4, 5

7 ad,

8 a-e

9 a,c

#10 a,c,e

#11,