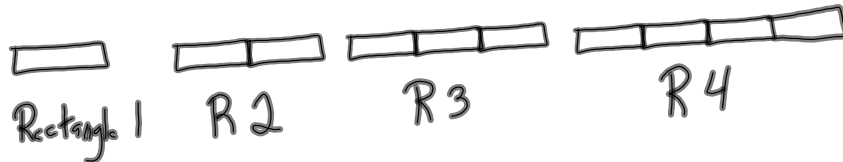


Section 4.2: Linear Relations

Note: Continue with patterns and equations and apply them graphically.

Example: Consider the following pattern of rectangles:



*Create a table showing the relationship btw rectangle # & exterior sides.

Rectangle Number, n	Exterior Sides, E
1	4
2	6
3	8
4	10

$$\text{Eqn: } E = 2n + 2$$

Q1: What is the # of exterior sides for Rectangle?

$$\text{Ans) } E = 2n + 2$$

$$E = 2(20) + 2$$

$$E = 40 + 2$$

$$E = 42$$

Q2: What rectangle # has 72 exterior sides?

$$\text{Ans) } E = 2n + 2$$

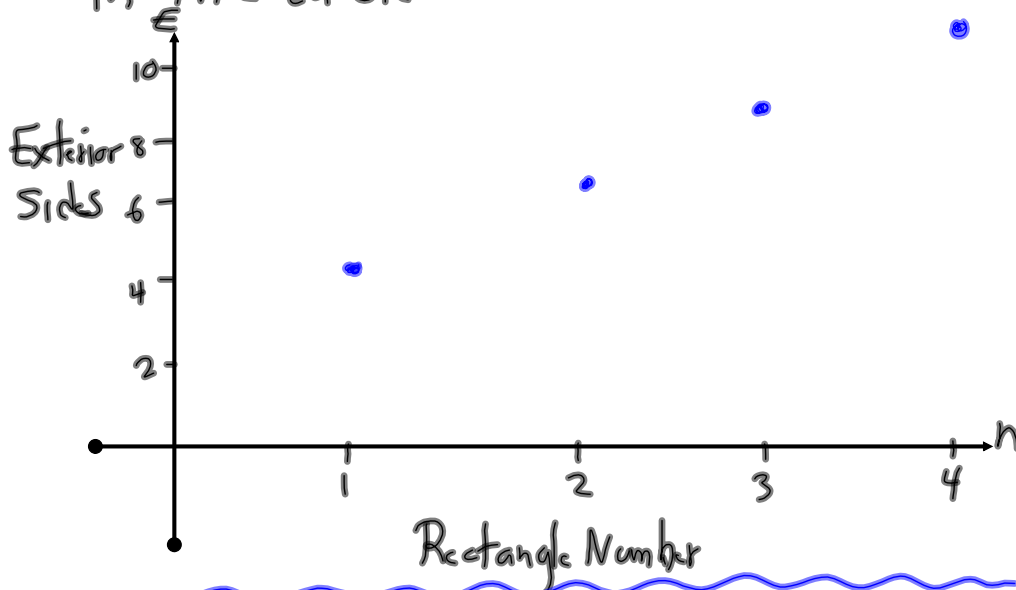
$$72 = 2n + 2$$

$$72 - 2 = 2n + 2 - 2$$

$$\frac{70}{2} = \frac{2n}{2}$$

$$- \quad n$$

* Sketch a graph of the information given in the table.



Note: Discrete vs Continuous Data

① Discrete Data → Numbers that do not contain fractions or decimals.
(ex) Rectangle Number.

② Continuous Data → Numbers that can contain fractions or decimals.

(ex) Time, Temperature, Money etc..

Note #2: If the data is discrete, do not join the points in a graph.

If the data is continuous, join the points

Note #3: If the data comes ^{from} a table not associated with any word problem, assume the data is continuous.
(Join the points)

Example #2: Consider the equation

$$y = 3x - 5$$

Dependent Variable

Independent Variable

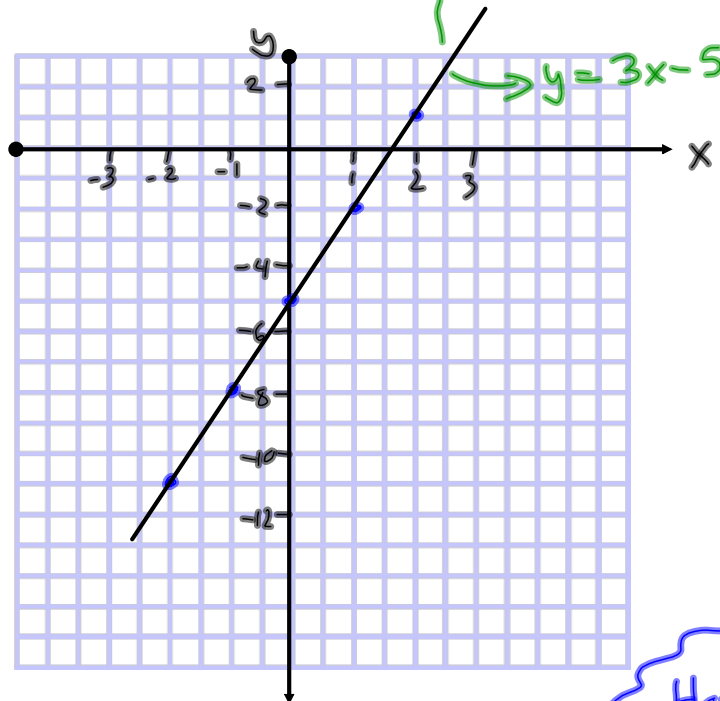
* Create a table of values using -2, -1, 0, 1, 2 for x

x	y
-2	-11
-1	-8
0	-5
1	-2
2	1

* Substitute the x-values into the equation, and solve for y.

$$\begin{aligned} x = -2 : y &= 3x - 5 \\ y &= 3(-2) - 5 \\ y &= -6 - 5 \\ y &= -11 \end{aligned}$$

$$\begin{aligned} x = -1 : y &= 3x - 5 \\ y &= 3(-1) - 5 \\ y &= -3 - 5 \\ y &= -8 \end{aligned}$$



Homework:
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#4, 5

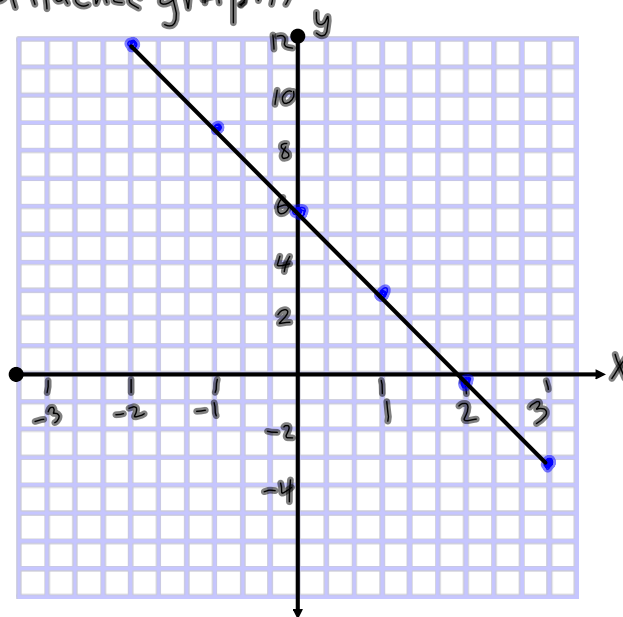
Example 3: A relation has the equation:
 $y = 6 - 3x$

$$y = 5 + 2x$$

(A) Create a table of values using the x-values from -3 to +3

x	y
-3	15
-2	12
-1	9
0	6
1	3
2	0
3	-3

(B) Make a sketch from the data in the table
 (See attached graph)



(C) Do you join the points? Why?

Ans) Since we do not know what the variables x and y represent, assume the data is continuous. ∴ Join Points.

(D) What type of relation is this?

Ans) Linear Relation.

Ex #4: The student council at MMC is holding a dance next week. The profit is four times the number of students who attend minus \$200 for the cost of music.

(A) Write an equation that relates the profit to the # of students who attend. P

ANS) $P = 4n - 200$

(B) Create a table if 0, 50, or 100 people attend

Number of Students, n	Profit (\$), P
0	-200
50	0
100	200

Workings: $P = 4n - 200$

$$\begin{array}{l}
 (1) \ P = 4n - 200 \\
 \left. \begin{array}{l}
 P = 4(0) - 200 \\
 P = 0 - 200 \\
 P = -\$200
 \end{array} \right\} \\
 \left. \begin{array}{l}
 (2) \ P = 4n - 200 \\
 P = 4(50) - 200 \\
 P = 200 - 200 \\
 P = \$0
 \end{array} \right\} \\
 \left. \begin{array}{l}
 (3) \ P = 4n - 200 \\
 P = 4(100) - 200 \\
 P = 400 - 200 \\
 P = \$200
 \end{array} \right\}
 \end{array}$$

(c) Create a graph of this situation:

