Date: (KEY)

9.2 Notes: Patterns in a Table of Values

Alvin is cooking a turkey in a very old oven, and needs to heat the turkey to an internal temperature of 250 degrees. For absolutely no reason at all, he decides to make a table of values comparing how long it takes to reach different temperatures:

(0,0)

X represents the amount of time in minutes
Y represents the temperature in degrees

X	Y
0	0
1	50
2	100
3	150
4	200

Graph the ordered pairs:
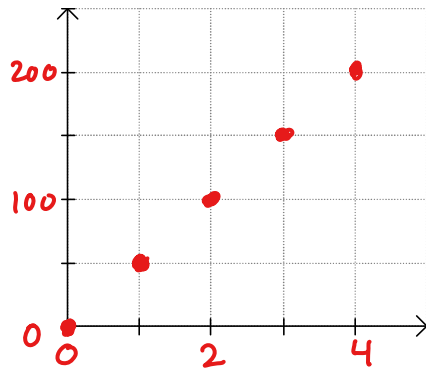
Does this represent a linear relationship?

yes

Because the points are all in a straight line.

What is the relationship between X and Y?
The relationship can be represented in 4 ways:

1. words: increasing by 50°C per minute

2. table: see above

3. graph: see above

4. equation: $y = 50x + 0$

$$y = 50x$$

A variable is:

an unknown number, represented as a letter

(e.g. x)

An expression is:

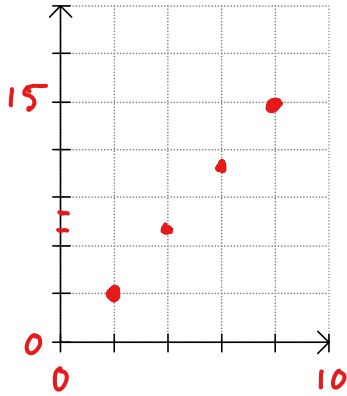A math "phrase" combining numbers, variables, and operations

(e.g. $2x + 7$)

How can you tell if a table represents a linear relationship? → *graph it.*
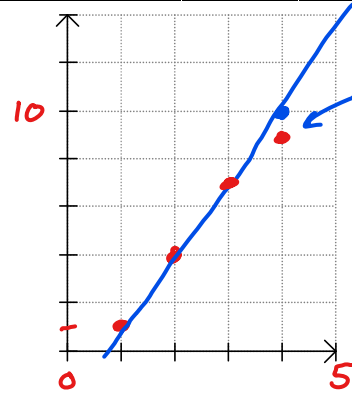*Are the points on a straight line?*

Relationship A

X	2	4	6	8
Y	3	7	11	15

Relationship B

X	1	2	3	4
Y	1	4	7	9

linear

misses (4,9)
nonlinear

Is there a way to tell if a table represents a linear relationship WITHOUT graphing?

Think about how you can describe the relationship in words:

Does it "go up" by the same amount every time?

You can tell if a table represents a linear relationship by:

examining the table ⇒ does the data increase by the same amount every time?

Problem:
Wendy is buying shirts. The company charges $60 for the first shirt, and $15 for each extra shirt. Complete the table:

# of shirts	1	2	3	4	. . .
Cost	60	75	90	105	. . .

+15   +15   +15

Is this a linear relationship? How do you know?

Yes. It goes up by $15 every time.

Equation:
$$C = 15s + 45$$
$$C = 15(12) + 45$$
$$C = \$225$$

How much should 12 shirts cost?

11 jumps

So: $x = 60 + 11(15)$ → $x = \$225$

Does this represent a linear relationship?

Yes!

proof: add a column to the table:

x	2	3	4	5	6
y	6	10	14	18	22

	+1	+2	+1	
X	2	3	5	6
Y	6	10	18	22

+4   +8   +4

$\dfrac{4}{1}$ $\dfrac{8}{2}$ $\dfrac{4}{1}$

4   4   4

What happens if you try to plot it on a graph?

The points are on a straight line.
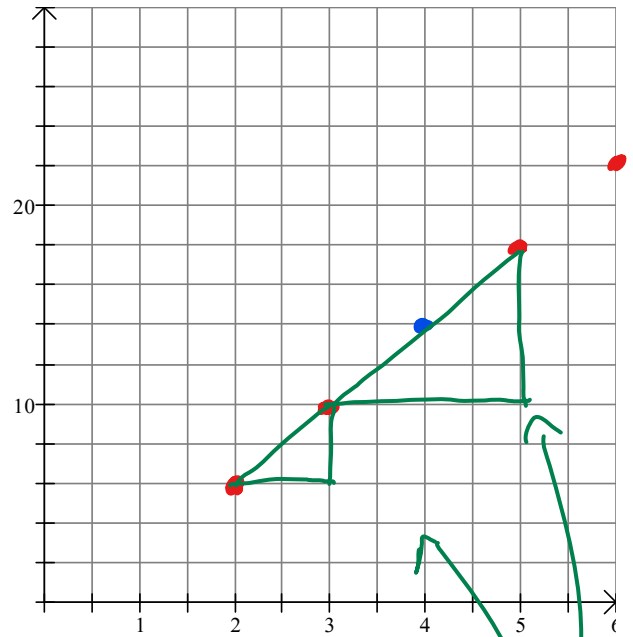
There is a consistent pattern, but ...

there is a missing point

the triangles are similar