

Date: _____

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:

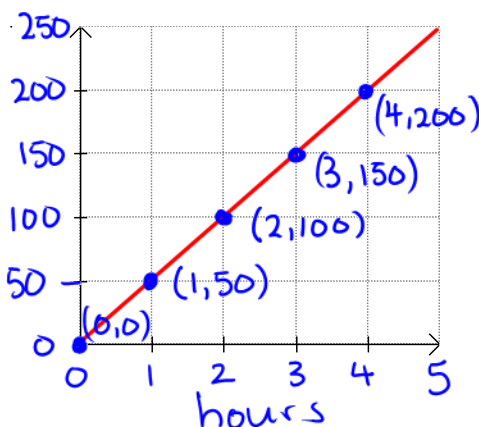
X represents the amount of time in ~~minutes~~ ^{hours}

Y represents the temperature in degrees

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

8

Graph the ordered pairs:



Does this represent a linear relationship?

- dots connect to make a line
- graph: right 1 and up 1
- numbers : hours increase +1
temp increase +50

What is the relationship between X and Y?

The relationship can be represented in 3 ways:

1. words : every time the hours increase by 1
the temperature increases by 50

2. math expression : if the first number is "x" the
temperature is 50 times "x"

$$y = 50 \cdot x$$

3. an ordered pair (2,100), (1,50), (3,150)

$$(x, 50 \cdot x)$$

$$(4, 4 \cdot 50)$$

← whatever the first number is,
you times it by 50 to find
the second number.

A variable is: a letter that
takes the place of a number
that you don't know yet.

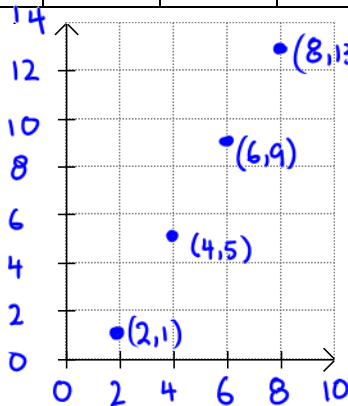
An expression is: a rule that
lets you find out another
number if someone tells you
what your variable equals.

How can you tell if a table represents a linear relationship?

How can you tell whether a table makes a linear relationship

Relationship A

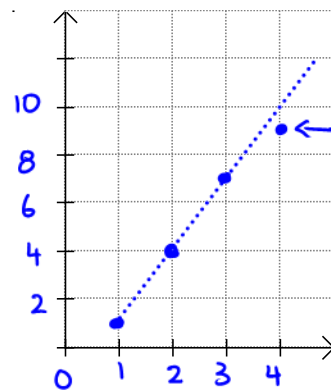
X	2	4	6	8
Y	3 1	7 5	11 9	15 13



does make a line
* does not have to go through (0,0)

Relationship B

X	1	2	3	4
Y	1	4	7	9



← not on the line.

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

Think about how you can describe the relationship in words:

what is the pattern for first number AND

what is the pattern for the second number.

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

seeing if both numbers keep following the same pattern.

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

Is this a linear relationship? How do you know?

every time you have +1 shirts the cost is +15.

How much should 12 shirts cost?

* could keep extending table $\frac{5}{120} \mid \frac{6}{135} \mid \frac{7}{150} \mid \dots$

1 shirt = 60, need 11 more shirts

$$= 11 \times 15 + 60$$

$$= \$225$$

p 348 # 4, 6, 8, 10, 13, 15, 16, 18

Does this represent a linear relationship?

X	2	3	5	6
Y	6	10	18	22

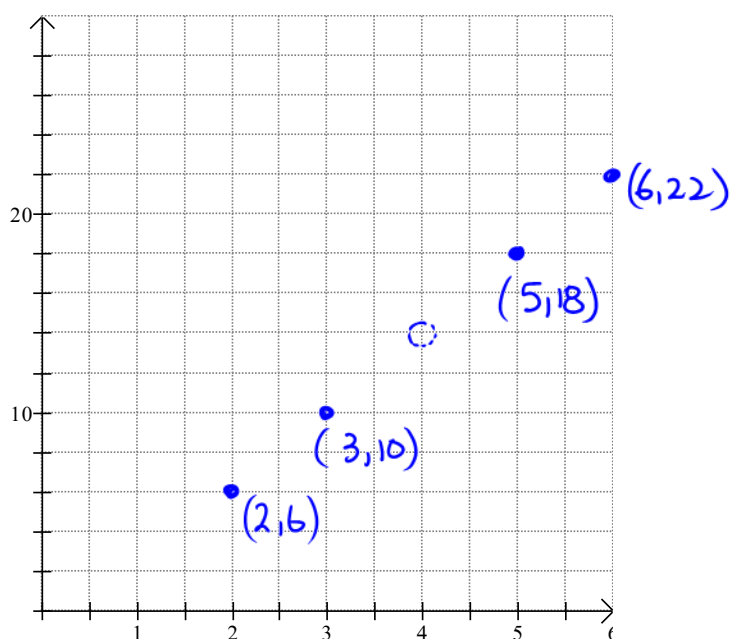
$\xrightarrow{+1}$ $\xrightarrow{+2}$ $\xrightarrow{+1}$
 $\xrightarrow{+4}$ $\xrightarrow{+8}$ $\xrightarrow{+4}$

be careful,
sometimes a number
is just missing from
table

\Rightarrow look at the rates
of increase

$$\frac{+4}{+1} \quad \frac{+8}{+2} \quad \frac{+4}{+1}$$

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



There is a consistent pattern, but ...