Grade 11 Essential
Unit F - Relations and Patterns

Work Book

Part 1

Solutions

GRADE 11 ESSENTIAL
UNIT F - RELATIONS AND PATTERNS
WORK BOOK

Name:_____
Date: _____

1. A relationship between two different variables can readily be graphed to show any pattern. A pattern allows us to make predictions. Where we have been, where we are going.

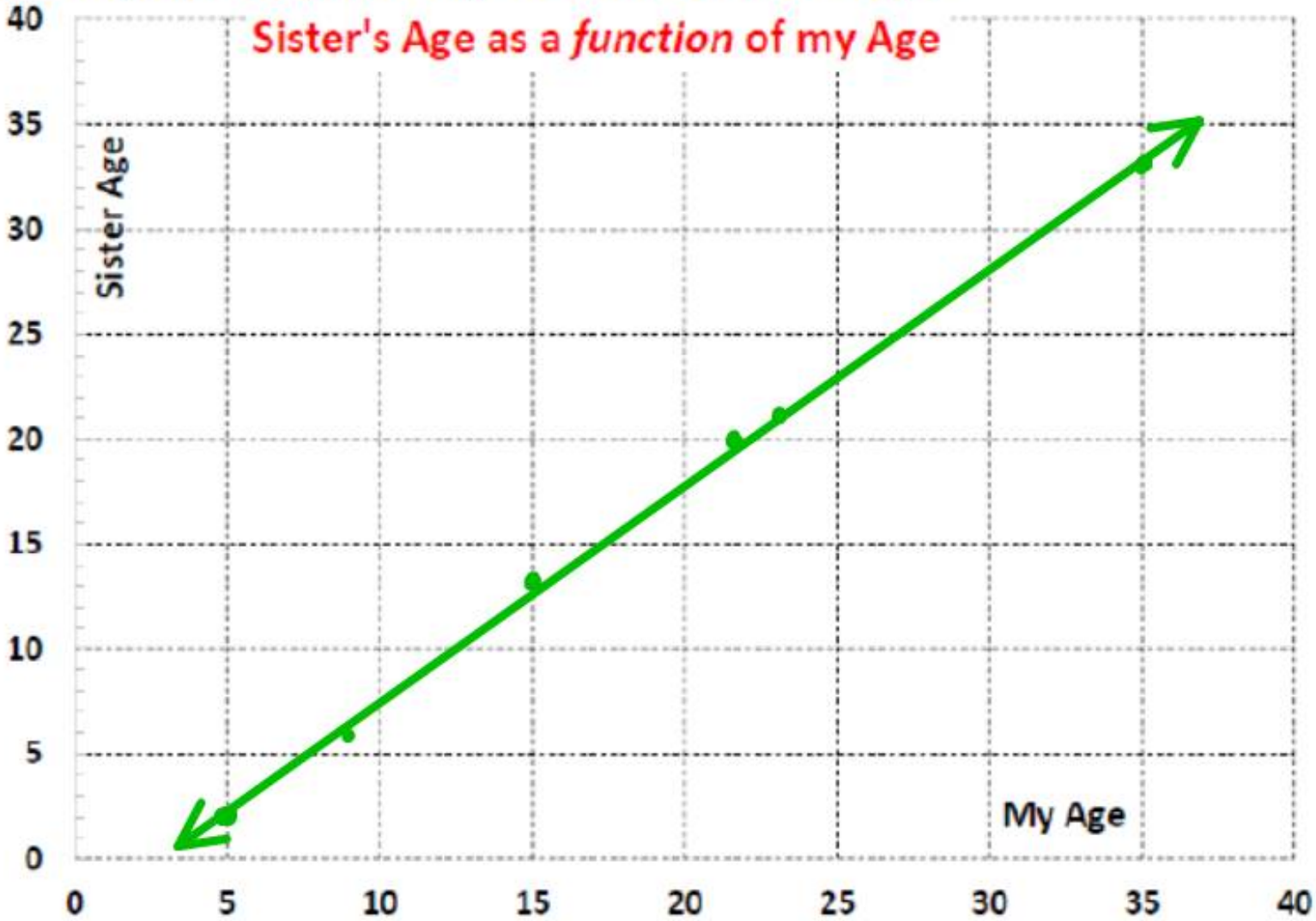
Relations and patterns occur every day of your life, multiple times! Hopefully you notice them! Lots of books in your backpack, it is heavier. The bus is slow, it will take longer to get to school. Study better, better mark. What goes up, must come down.

2. Here is a simple pattern. Your sister is three years younger than you. Make a table of the relationship of the ages, what her age is depending on what age you select for yourself.

You	5	8	15	22	23	35
Sister	2	6	13			

You	5	8	15	22	23	35
Sister	2	6	13	20	21	33

Now make a graph of your age versus sisters age.



An interesting pattern! A line. A linear relationship.

Making Lines Using a T-Table

3. Complete the table for the given equation

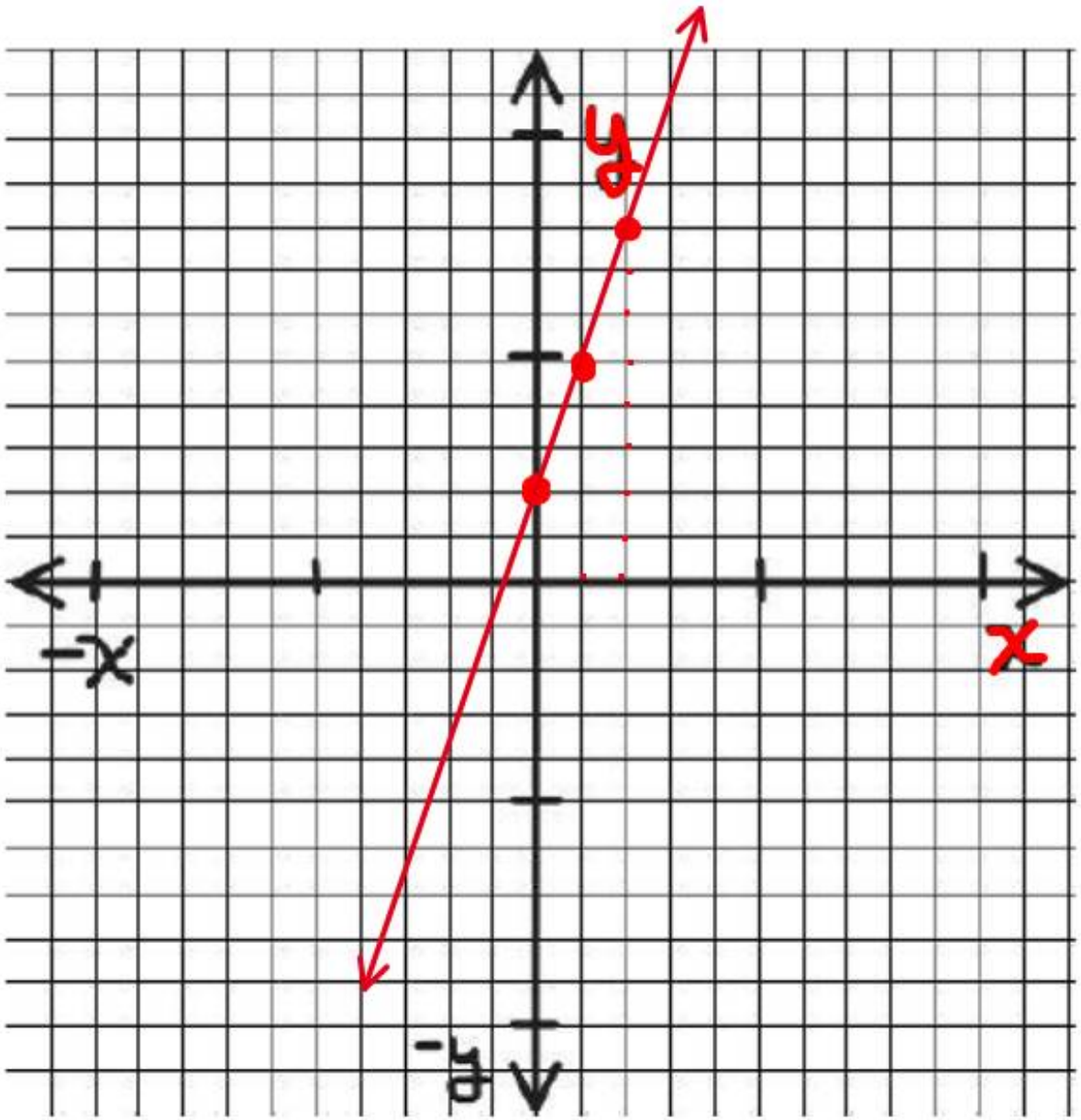
Equation:

$$y = 3x + 2$$

x	3(x) + 2	y
0	3(0) + 2	2
1	3(1) + 2	5
2	3·(2) + 2 =	8

Plot the points and neatly connect them.

two points make a line

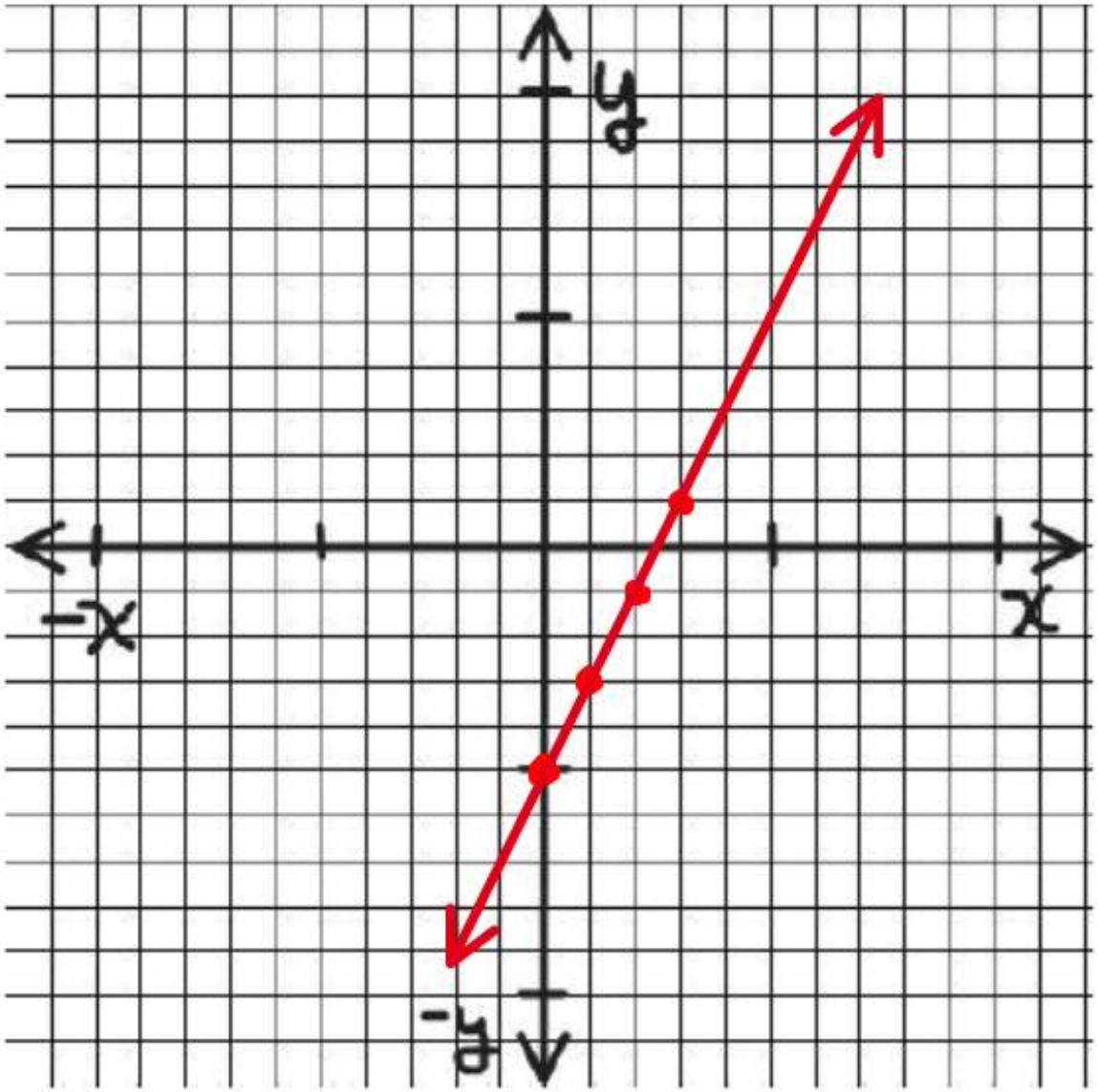


4. Complete the table for the given equation

Equation: $y = 2x - 5$

recipe to make a y

x	2(x) – 5	y
0	2(0) – 5	–5
1	2·(1)–5	–3
2	2·(2)–5 =	–1
3	2(3)–5 =	+1



Plot the points and neatly connect them.

(technically you only need two points to make a line, but an extra one makes sure you did not mess it up)

2-5 = -3 3 less than zero

See a pattern?

5. Complete the table for the given equation

1÷2 if you don't like fractions

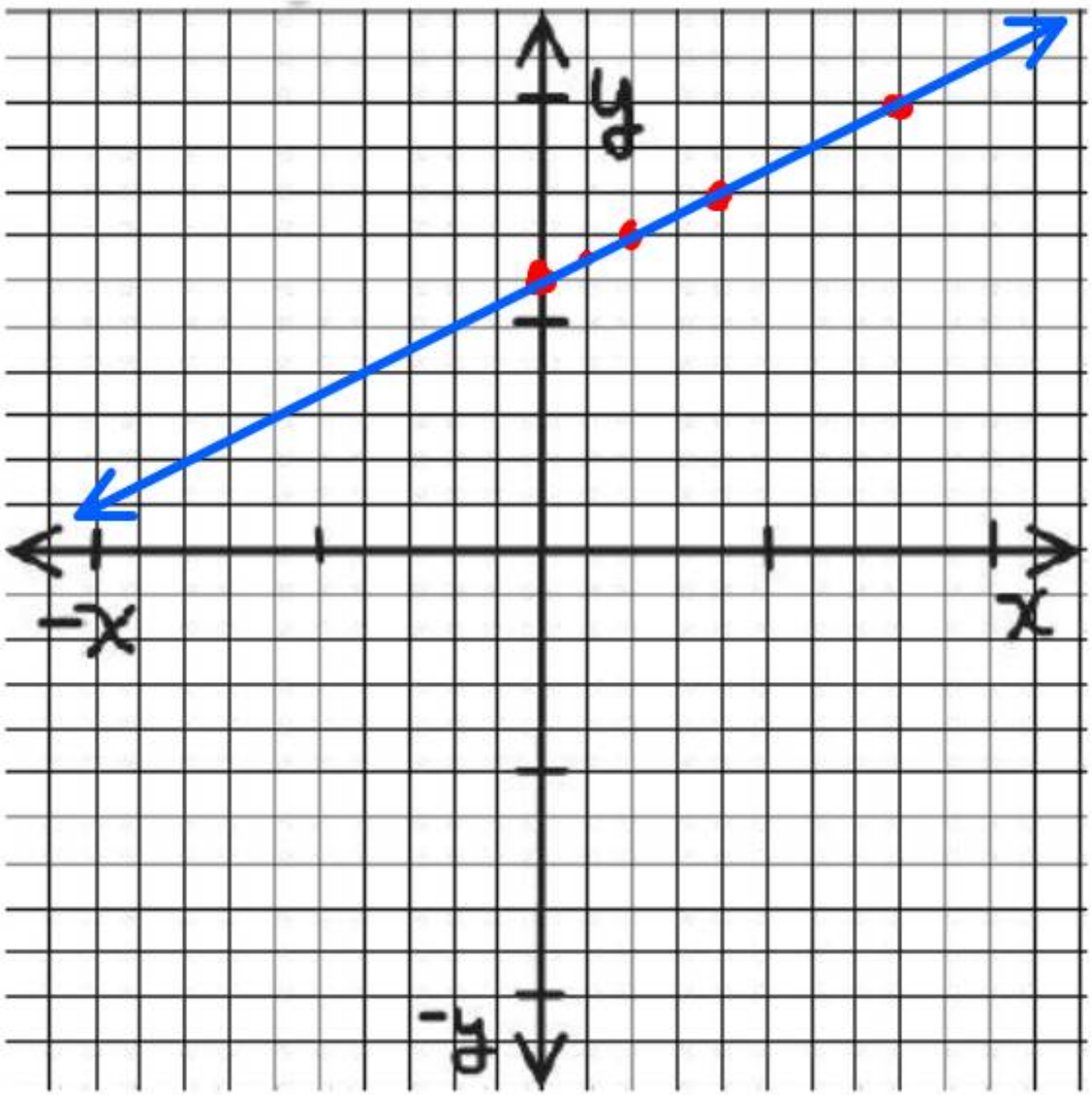
Equation:

$$y = \frac{1}{2}x + 6$$

x	$y = \frac{1}{2}x + 6$	y
0	$y = \frac{1}{2}(0) + 6$	6
1	$y = \frac{1}{2}(1) + 6$	6.5
2	$\frac{1}{2} \cdot 2 + 6$	7
4	$\frac{1}{2} \cdot 4 + 6 = 8$	
8	$\frac{1}{2} \cdot 8 + 6 = 10$	

Plot the points and neatly connect them.

* *You can pick whatever x you want, but zero is pretty easy!*



Get points far enough apart to make a nice stable line

6. Complete the table for the given equation

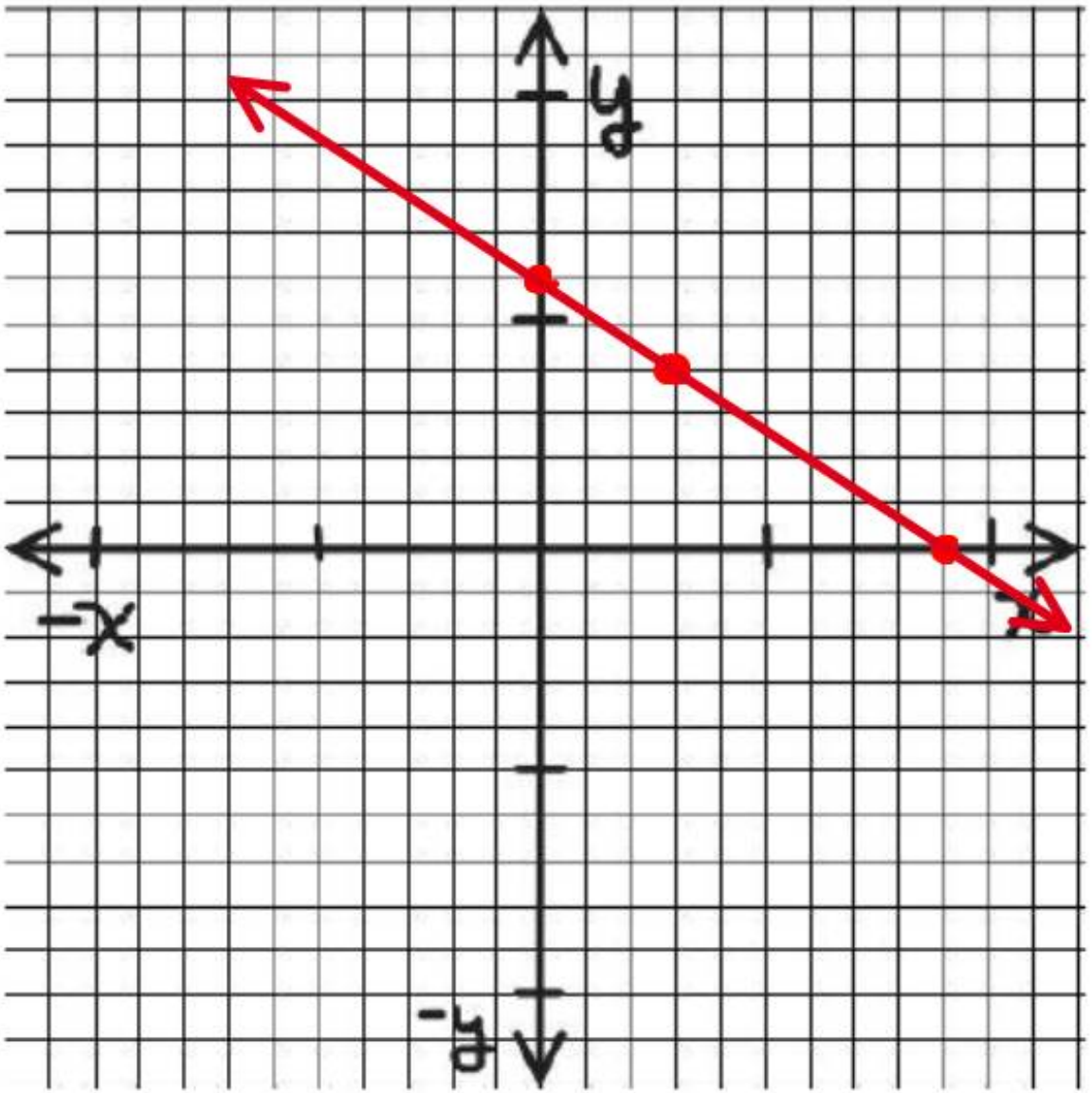
negative 2/3

-2÷3

Equation:

$$y = -\frac{2}{3}x + 6$$

x	$y = \frac{-2}{3}x + 6$	y
0	$y = \frac{-2}{3}(0) + 6$	6
3	$y = -\frac{2}{3}(3) + 6$	4
9	$-2/3 \cdot (9) + 6$	0
	9 easily ÷ by 3	



Plot the points and neatly connect them.

You can pick whatever x you want, but zero is pretty easy! But notice that picking multiples of 3 here made nice easy values to plot!

$-\frac{2}{3} \cdot 9^3 + 6 = -2 \cdot 3 + 6$

$= -6 + 6 = 0$

7. Complete the table for the given equation

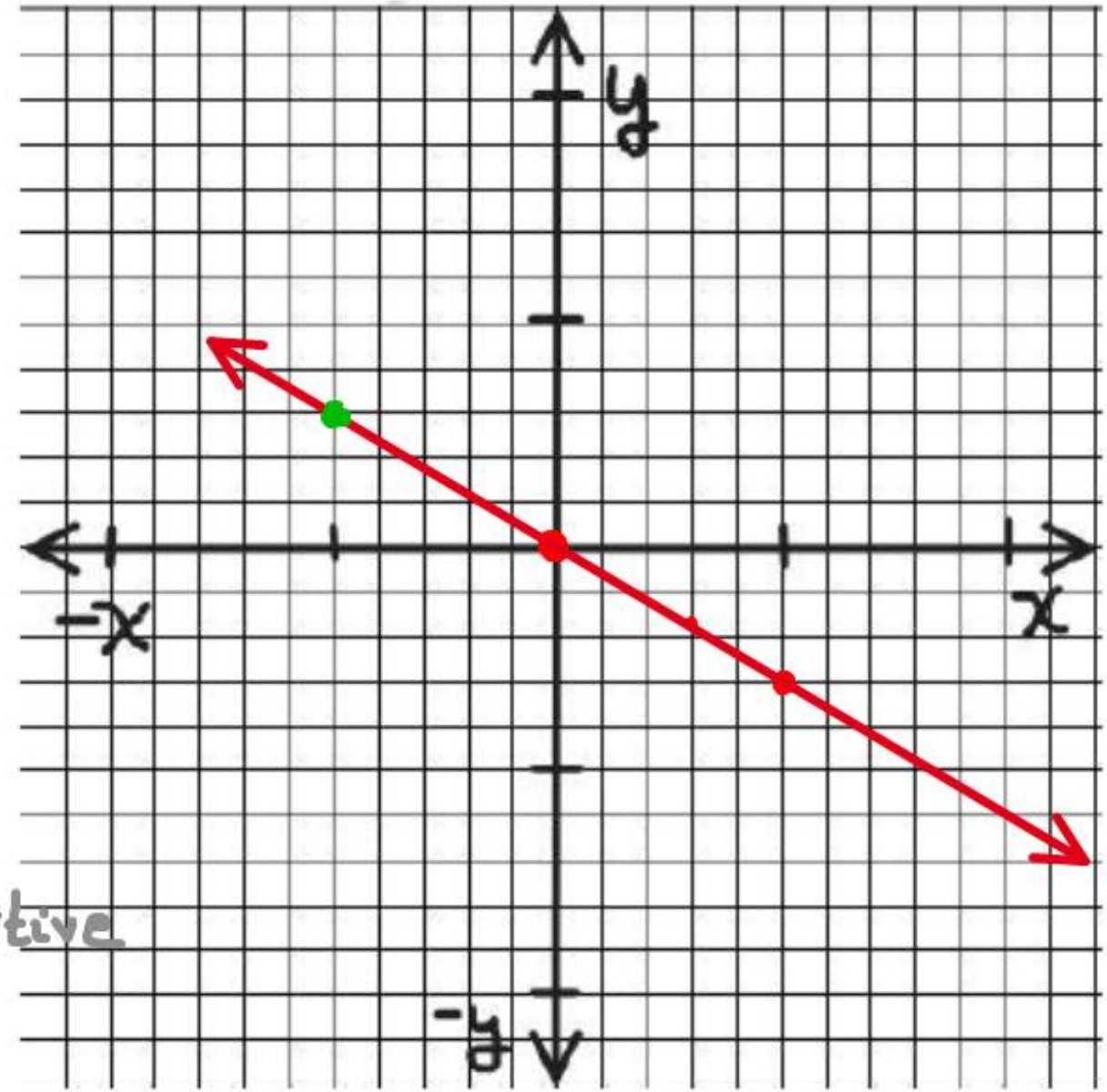
Equation:

$$y = -\frac{3}{5}x$$

x	$y = \frac{-3}{5}x$	y
0	$y = -\frac{3}{5}(0)$	0
3	$y = -\frac{3}{5}(3)$	-1.8
5	$-3/5 \cdot 5$	$= -3$
-5	$-3/5 \cdot (-5)$	$= +3$

a negative negative = positive

Plot the points and neatly connect them.



$-3/5 \cdot 3 = -9/5 = -1.8$

But notice that picking multiples of 5 here made nice easy values to plot!

8. Complete the table for the given equation

no 'x'. A constant 4

Equation:

$y = 4$

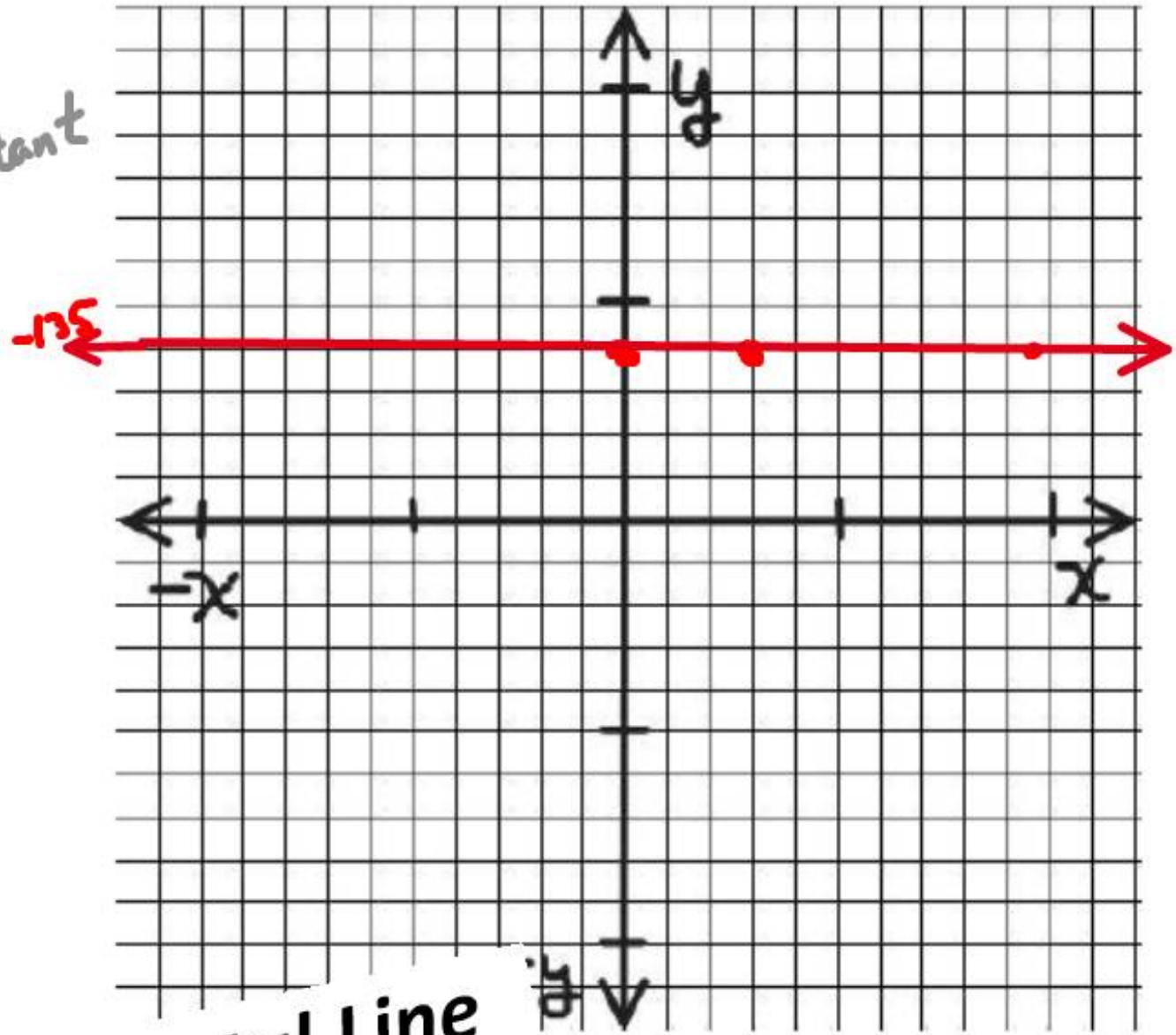
x	$y = 4$	y
0	$y = 4$	4
3	$y = 4$	4
9.66		4
−135		4

Plot the points and neatly connect them.

A horizontal line! Does not matter what the x is!

The y IS 4

"horizon"



A Horizontal Line

y = a constant amount is horizontal line

9. Complete the table for the given equation

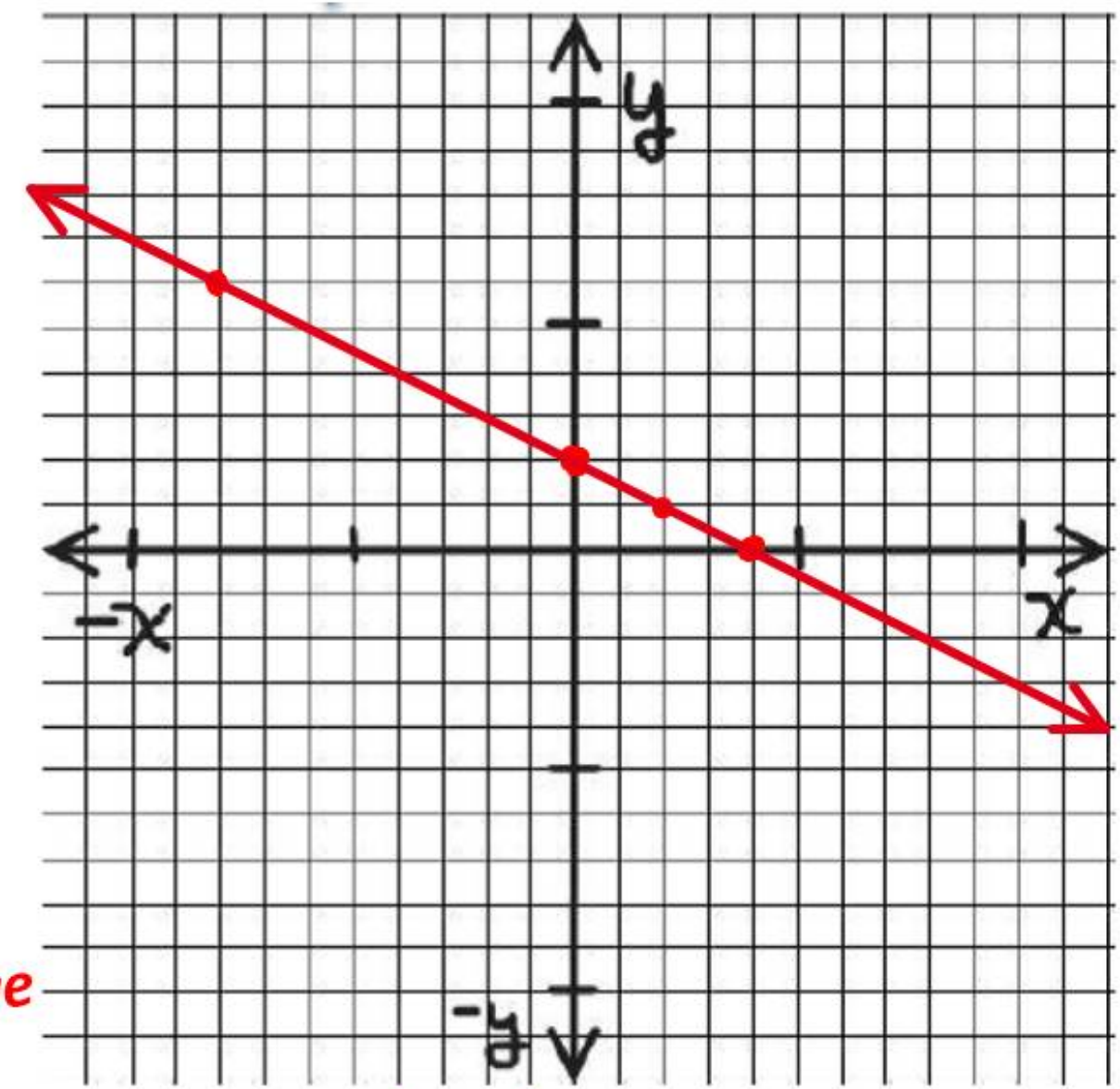
Written a slightly different way. Still a line

Equation: $y = \frac{4-x}{2}$

x	$\frac{(4-x)}{2}$	y
0	$(4-0) \div 2 = 4/2$	2
2	$(4-2)/2 = 1$	1
4	$(4-4)/2 = 0$	0
−8	$4+(+8)/2 = 6$	6

12/2

Plot the points and neatly connect them.



Subtracting a negative; same as adding a positive

Anytime you have dividing shown like this $\frac{(\text{Something})}{(\text{Something})}$

make sure you calculate it like this

If you are not comfortable with negative amounts; see the teacher now!

or at least make sure you know how to do them on your calculator

→ $-6 + -6 + -6 = -18$

→ 6 below zero take away 8 more is 14 below zero

→ taking away negative things is same as adding good things!

Check out Part 2