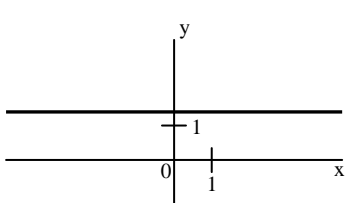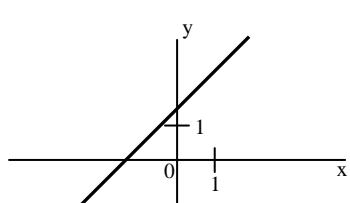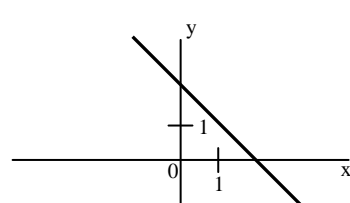# Math Worksheet 4 – LINEAR FUNCTION

Basic formula: $y = ax + b$

$a =$ gradient, $a = \dfrac{y_2 - y_1}{x_2 - x_1}$

b- interception with *y-axis*

a = 0	a > 0	a < 0
- Domain = R - Range = {b} - It's one to many, - It's not one to one and therefore it's not increasing neither decreasing - Bounded - In each point $x \in R$ there is maximum and minimum	- Domain = R - Range = R - It's one to one - It's increasing - Not bounded above, neither bounded below - It has no maximum neither minimum	- Domain = R - Range = R - It's one to one - It's decreasing - Not bounded above, neither bounded below - It has no maximum neither minimum

EXAMPLE 1:

Points A[-2, 2] and B[-1, -4] are given. Find the equation of the linear function, draw the graph and find Domain and Range of the function.

Solution:

$a = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{-4 - 2}{-1 - 2} = \dfrac{-6}{-3} = 2$ so I can write y = ax+b → y = 2x+b

To find the "b" we can substitute the coordinates of any given point. I'm going to substitute point B [-1, -4]
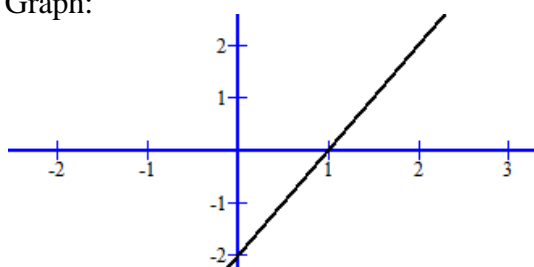
y=2x+b

-4 =2.(-1) +b

-4 = -2 + b   /+2

-2 = b

So now I can write the equation of the function: y=ax +b → y = 2x -2

Graph:

D(f) = R
R(f) = R
Increasing
Not bounded
No min, no max

Exercises 1

State whether each equation or function is linear. Explain.

1. $y = 3x$

2. $-\dfrac{3}{x} + y = 15$

3. $y = -2 + 5x$

4. $x = y + 8$

5. $2x + y = 10$

6. $g(x) = 8$

7. $h(x) = \sqrt{x} + 3$

8. $y = 4x^2$

Write each equation in standard form. Identify A, B, and C.
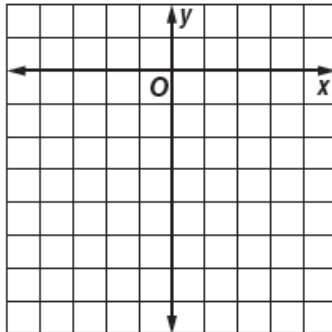
9. $y = x$

10. $y = 5x + 1$
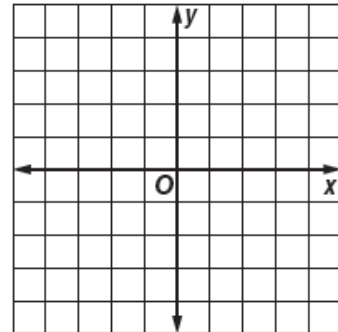
11. $2x = 4 - 7y$

12. $3x = -2y - 2$

13. $5y - 9 = 0$

14. $-6y + 14 = 8x$

Find the *x*-intercept and the *y*-intercept of the graph of each equation. Then graph the equation using the intercepts.
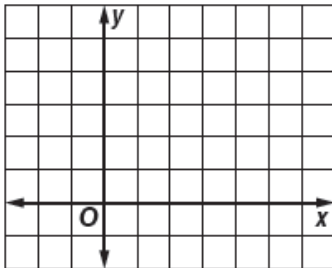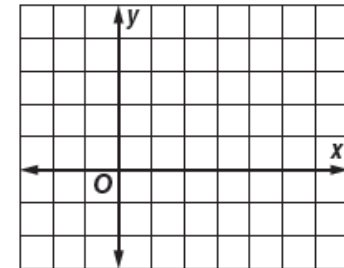
15. $y = 3x - 6$

16. $y = -2x$

17. $x + y = 5$

18. $2x + 5y = 10$

Exercises 2

Find the slope of the line that passes through each pair of points.

1. $(1, 5), (-1, -3)$ **2.** $(0, 2), (3, 0)$ **3.** $(1, 9), (0, 6)$

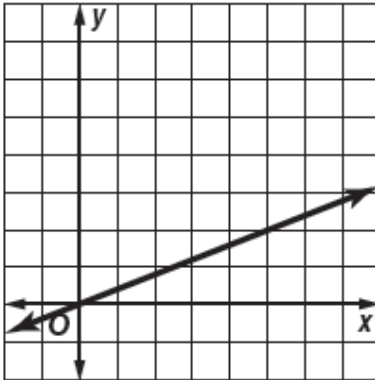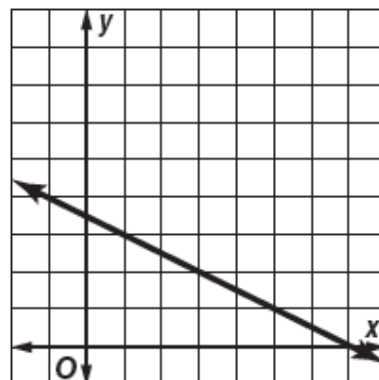**4.** $(8, -5), (4, -2)$ **5.** $(-3, 5), (-3, -1)$ **6.** $(-2, -2), (10, -2)$

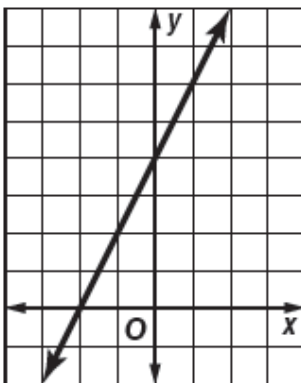Find the equation of the linear function from the following graphs.

7.

8.

9.

10.