GRAPHING LINEAR FUNCTIONS

Definitions

Definition 1

The graph of a function f is the set of all points whose coordinates (x, y) satisfy the equation $y = f(x)$.

Definition 2

$f(x) = y = ax + b$, with a and b being real numbers, is called a linear function, involving two variables x and y.
Neither x nor y is raised to any power other than 1.
Neither x nor y appears in any denominator.
No term contains a product of x and y.

Graphing

recall:

$$y = ax + b$$

a: slope; b: y-intercept

The graph of a linear function is a straight line.

To graph a linear function by plotting points, locate two points whose coordinates satisfy the equation and connect them with a straight line.

To locate each point, select some convenient value for x. (Any value will do because the domain is the set of all real numbers.), then substitute this value into the function, and then solve for y.

Example : Graph $y = -2x + 1$.

$f(x) = y = -2x + 1$ is a linear function, therefore its graph will be a straight line.

We locate the first point :

We select $x = 0$ as a convenient value for x. (we can write "$let\ x = 0$")
We substitute into the function in order to find y:

$y = -2 \times 0 + 1$

$y = 1$

Thus $(0,1)$ is a point on the graph of our function.

We repeat the procedure to find a second point :

Let $x = 3$.

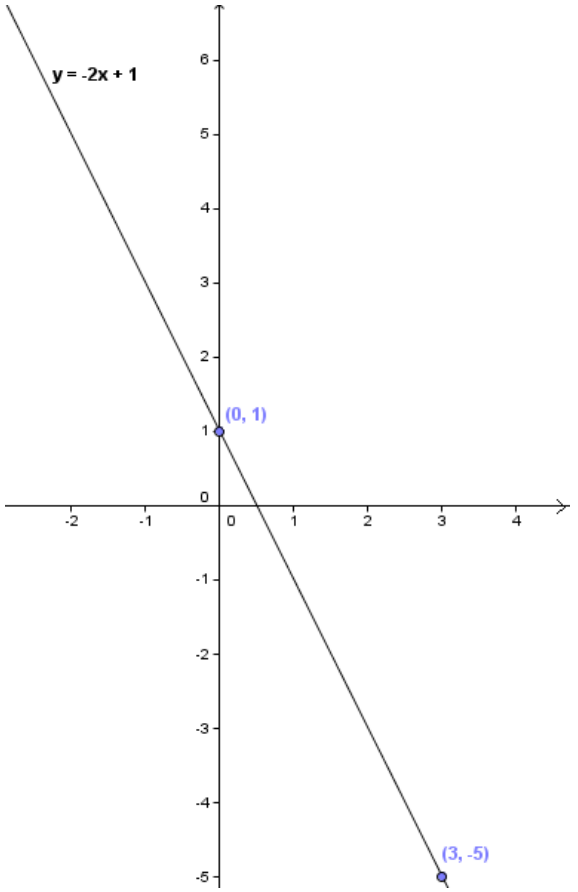
Then $y = -2 \times 3 + 1$

$y = -5$

Thus $(3, -5)$ is a second point on the graph.

x	0	3
y	1	−5

We then plot the two points and connect them with a straight line :



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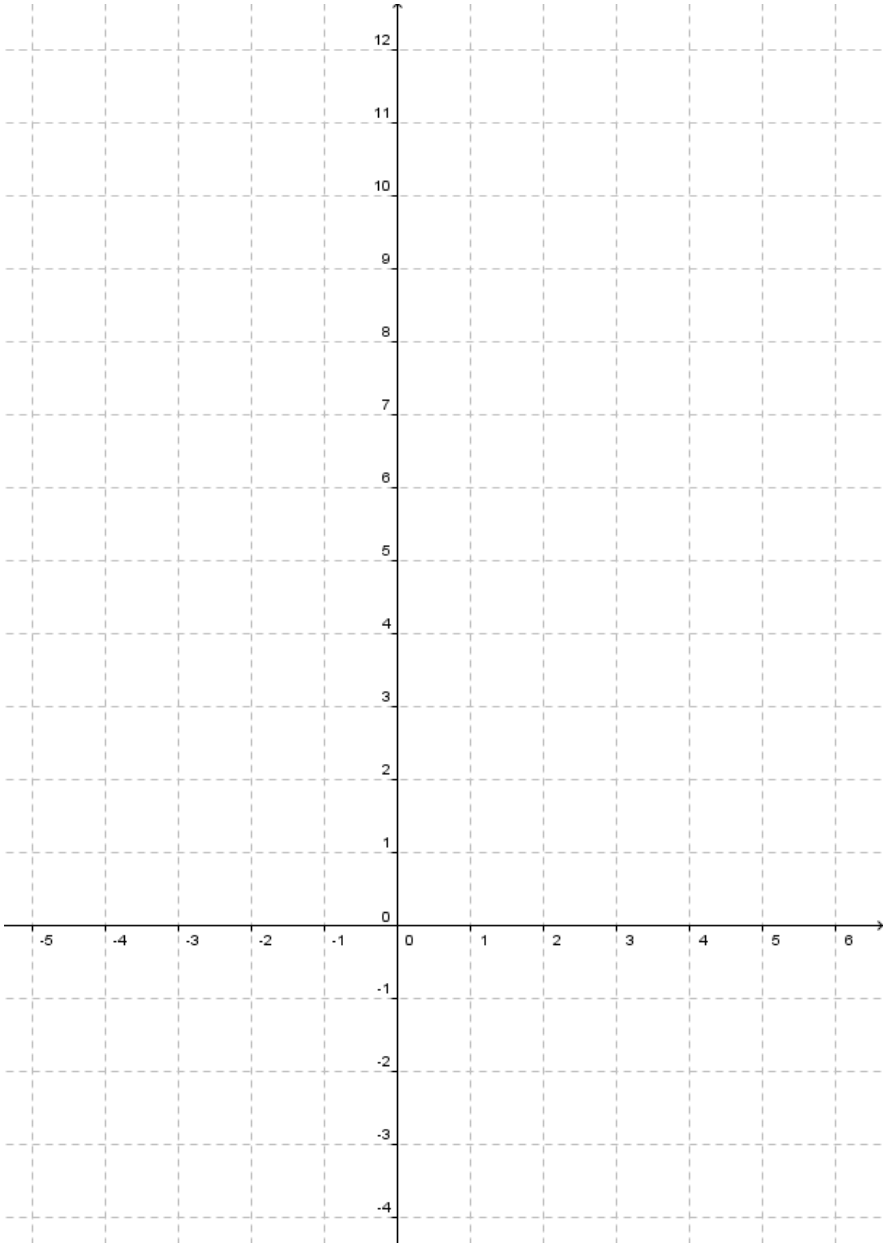
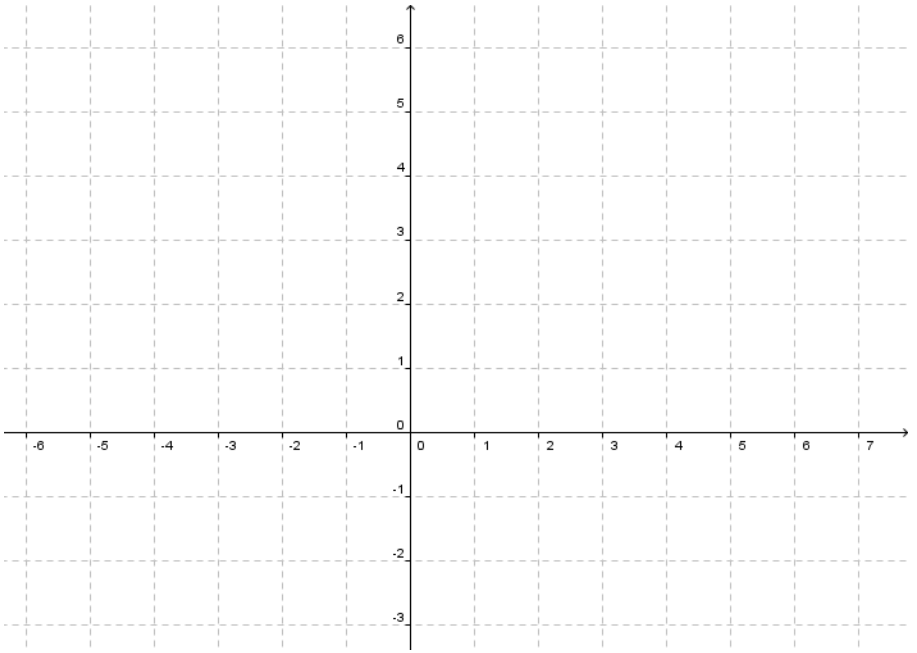
Exercises

1 Graph $y = 3x + 2$.



2 Graph $y = -x + 1$.



3 Graph $y = -4$.