MATH 1023 COLLEGE ALGEBRA — Worksheet 1 — Name:
PROF. PAUL BAILEY — February 6, 2004

Every vertical line can be expressed by a unique equation of the form $x = c$, where c is a constant. Such lines have undefined slope (or, one may say that the slope is ∞).

Every other line has can be expressed by a unique equation of the form $y = mx + b$. This is called *slope-intercept form*, where m is the slope and b is the y-value of the y intercept.

Problem 1. Analyze each of the following lines as follows:

(a) find the $y = mx + b$ or $x = c$ form of the line;

(b) identify the following aspects of the line:

- **(i)** slope (if any)
- **(ii)** y-intercept (if any)
- **(iii)** x-intercept (if any)

(c) sketch the graph of the line

(1) $y = x$;

(2) $y = 2x - 2$;

(3) $2x - 3y = 6$;

(4) $y = 0$.

(5) $-7y = 49 - 14x$;

(6) $y = 3$;

(7) $y = -\frac{2}{3}x + 3$;

(8) $-2x = 4$;

(9) $8x + 4y = 16$;

(10) $\frac{x}{y} = 2$.

Example 1. Analyse the line $3x + 6y = 9$.

Solution.
(a) First we must solve for y. Subtract $3x$ from both sides to get $6y = -3x + 9$. Divide by 6 to get

$$\boxed{y = -\frac{1}{2}x + \frac{3}{2}}.$$

(b) The slope is the number in front of the x when the equation is in slope-intercept form. In this case, the slope is $-\frac{1}{2}$. This is negative, so the graph goes down.

The y-intercept is the point where the line intersects the y-axis. This is obtained by plugging in 0 for x, and solving for y. In this case, we obtain $y = \frac{3}{2}$. The the y-intercept is the point $(0, \frac{3}{2})$.

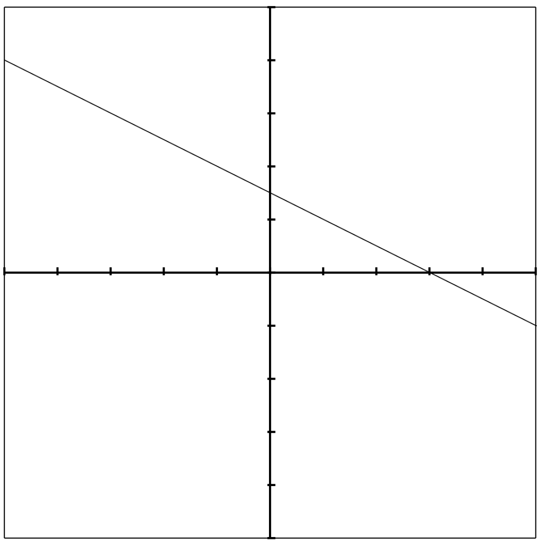
The x-intercept is the point where the line intersects the x-axis. This is obtained by plugging in 0 for y and solving for x. In this case, we obtain $x = 3$. Thus the x-intercept is the point $(3, 0)$.

(i) the slope is $-\frac{1}{2}$

(ii) the y-intercept is $(0, \frac{3}{2})$

(iii) the x-intercept is $(3, 0)$

(c) Sketch:



$\square$