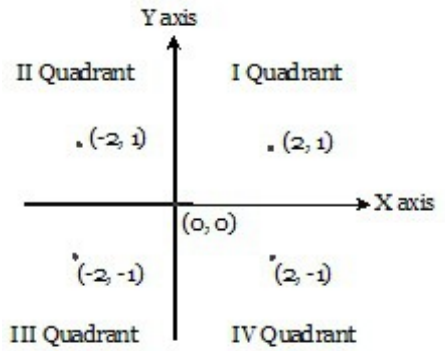
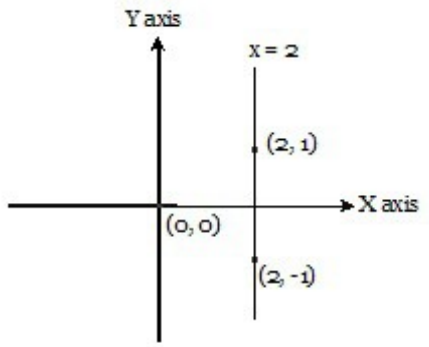
One thing that I would like to suggest to increase speed in Arithmetic is Multiplication Tables. Much to my dad's chagrin, I am still a little lost when confronted with 16×7 or 17×8 or 18 × 7 (I know the last two are 126 and 136 but in what order, I am not sure) but rest I can pretty much manage. And many a times, while solving little toughies, I have blessed my dad for his incessant reproach regarding tables in days yonder.

Now, the one thing that I would like to suggest to increase speed in Coordinate Geometry and Algebra is learning how to draw graphs. Know how to draw a line from its equation in under ten seconds and you shall solve the related question in under a minute. For now, take my word for it and go ahead.

This is what the xy coordinate axis looks like:

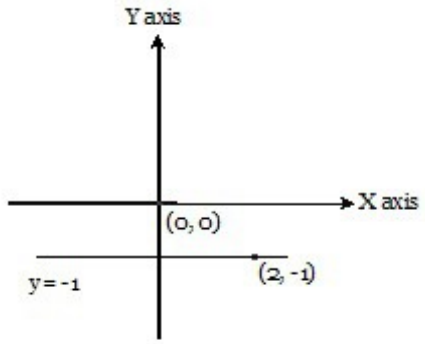


If we were to draw the line x = 2 this is what it would look like:



On this line, at every point, x coordinate is 2. y coordinate varies from point to point.

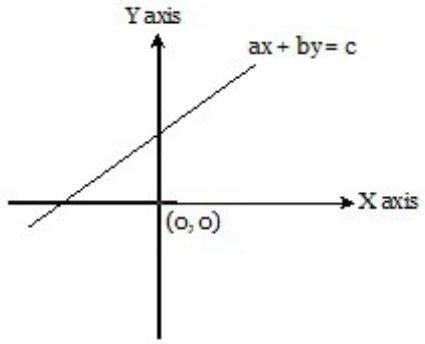
Similarly, y = -1 is as shown:



Taking a cue from above, can you tell me, how you would draw y = 0? Of course it is the X-axis. Where is y = 0? At every point of the X axis!

And then the equation of y axis must be … yes, x = 0.

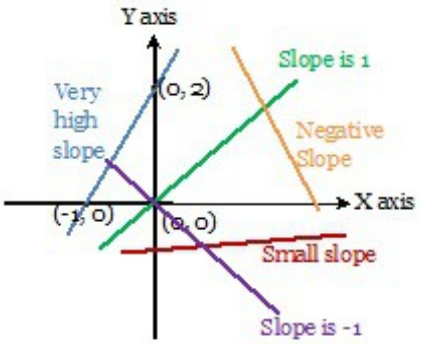
But usually the kind of lines we need to draw, look something like this:



Any given line on the xy plane can be uniquely described using two characteristics – the line's slope and a point through which the line passes.

Slope of a line:

The slope of the line is just a measure of how tilted it is. As x increases, if y increases much more, the line becomes more titled. Look at the blue line below. When x increased by 1 (from -1 to 0), y increased by 2 (from 0 to 2) so the line has a slope of 2. The green line below has a slope of 1. When x increases by 1 unit, y also increases by 1 unit. On the other hand, the red line has a very small slope. When x increases by 1 unit, y increases by very little. So what about the orange line? There, when x increases, y decreases! Of course the slope is negative there. The purple line has a slope of -1. When x increases by 1 unit, y decreases by 1 unit. So we see that when you go from left to right (à), if the line is going up, its slope is positive; if it is going down, its slope is negative.



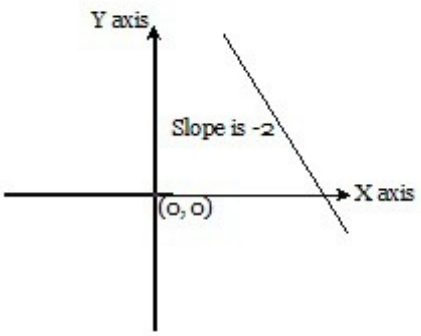
A Point on the line:

The second characteristic that defines a line is a point through which it passes. This could be expressed in many ways: y intercept, x intercept or (x, y)

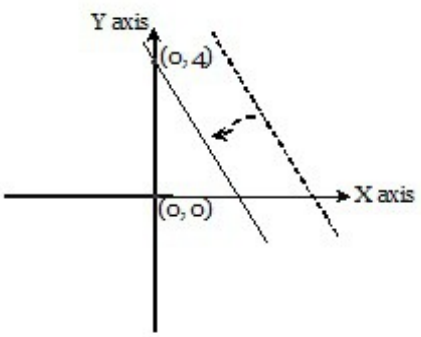
When I say y intercept of a line is 4, it just means that it passes through (0, 4) i.e. it cuts the y axis at point 4. When I say the x intercept of a line is -2, it just means the line passes through (-2, 0) i.e. it cuts the x axis at point -2. Or I could simply say that the line passes through (1, 6). If I have any one of these and the slope, I can draw a unique line. Let's try it.

Given that the slope of a line is -2 and its y intercept is 4, how will you draw the line?

First of all, since slope is -2, the line will look something like this



Now, since it cuts the y axis at 4, the line can be drawn like this:



So do the questions tell you that slope is -2 and y intercept is 4? At GMAC, they don't really like you that much! What they generally give is the equation of a line, say 2x + y – 4 = 0. You will re-arrange this equation to get y = -2x + 4 (Remember y = mx + b where m is the slope and b is the y intercept?). You get -2 as the slope and 4 as the y intercept.

Any equation can be put in this format.

3x + 4y -6 = 0. Re-arrange to get y = -3x/4 + 6/4. Slope = -3/4 and y intercept = 3/2.

Soon, we will discuss another quick method of drawing a line given its equation.