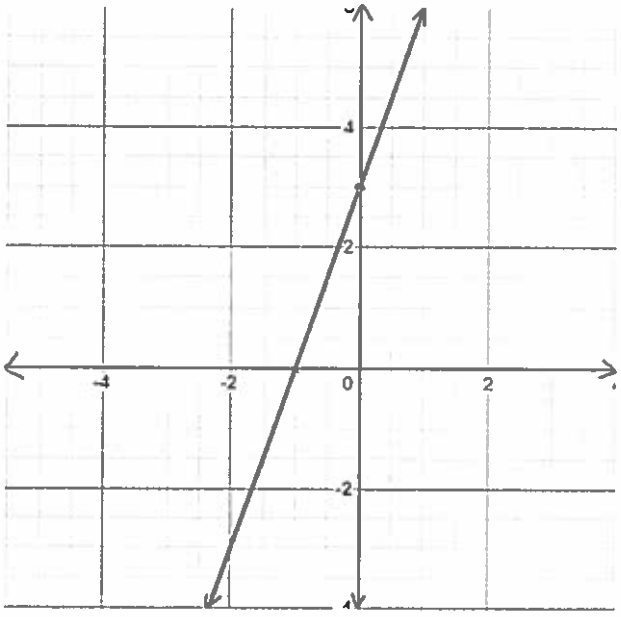
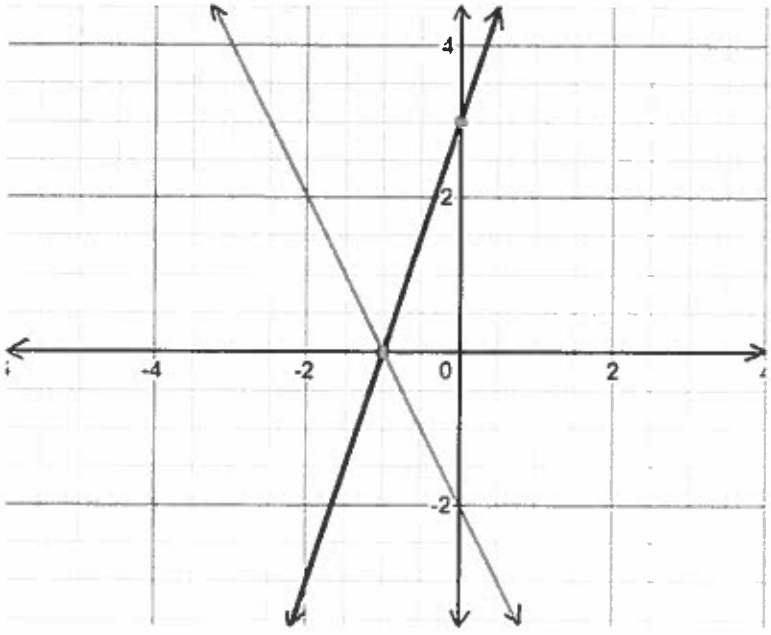
Systems of Linear Equations (solved by graphing)

Ex 1.

Solve by graphing: $y = 3x + 3$

$y = -2x - 2$

- Start with graphing $y = 3x + 3$
- 

- All points on this line satisfy $y = 3x + 3$
- Now graph $y = -2x - 2$
- 

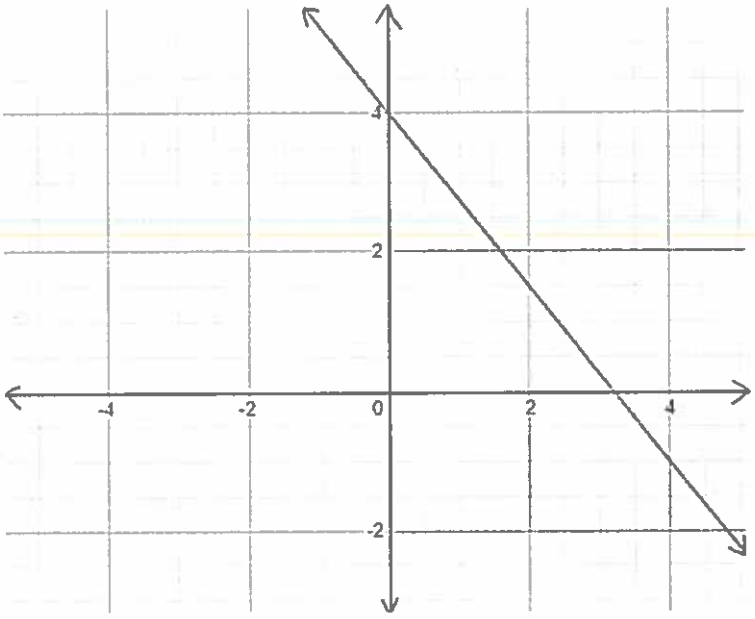
- All points on the new line satisfy $y = -2x - 2$

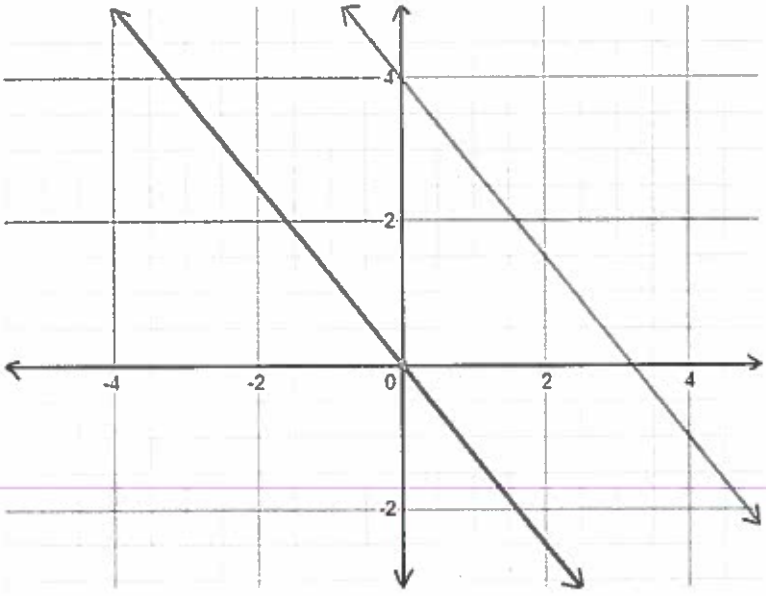
- The point of intersection is the only point that satisfies both $y = 3x + 3$ and $y = -2x - 2$ there for it is the solution
- The solution is $(-1, 0)$

Ex 2.

Solve by graphing: $y = -\frac{5}{4}x + 4$

$y = -\frac{5}{4}x$

- First, notice that these lines have the same slope
- That means these two lines are going in the same direction
- Graph for $y = -\frac{5}{4}x + 4$
- 

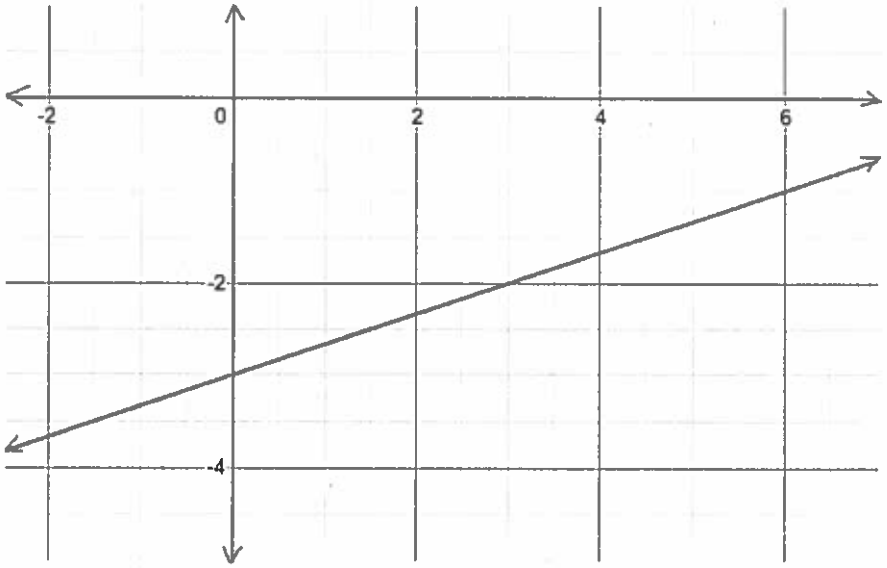
- Add the graph for $y = -\frac{5}{4}x$
- 

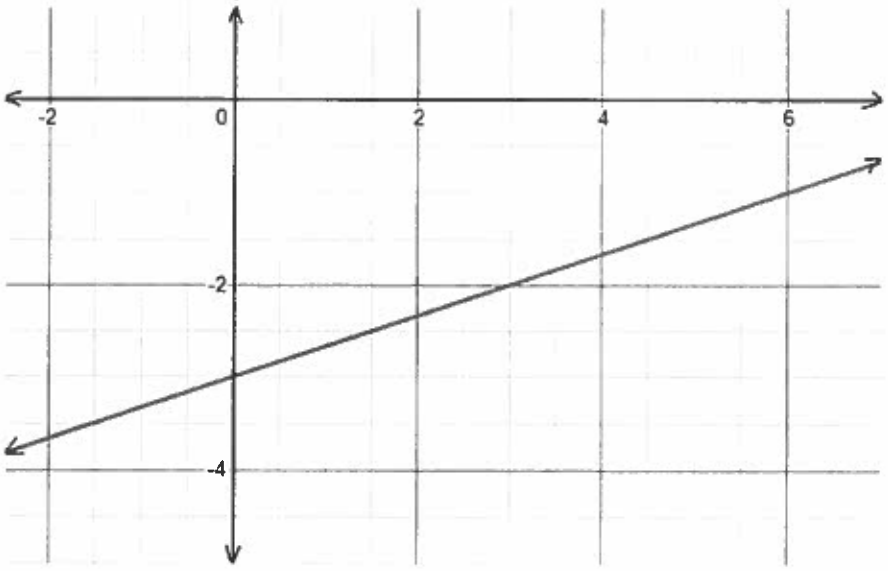
- Since these lines have the same slope and different $y - int$ they will never intercept
- There is no real solution

Ex 3.

Solve by graphing: $y = \frac{x}{3} - 3$

$$x = 3y + 9$$

- Start with graphing $y = \frac{x}{3} - 3$
- 

- Convert $x = 3y + 9$ to slope-intercept form $\rightarrow y = \frac{1}{3}x - 3$
- Graph $y = \frac{1}{3}x - 3$
- 

- Notice that the lines overlap, all the solutions for $y = \frac{x}{3} - 3$ also satisfy $x = 3y + 9$
- There are infinitely many solutions