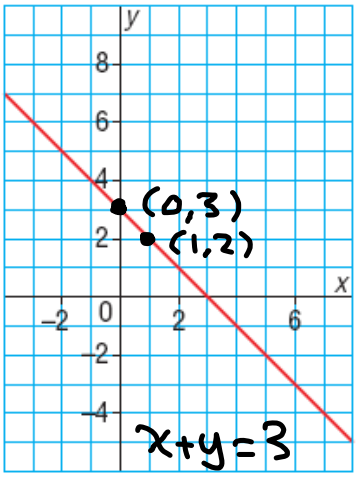
# 4.4: Matching Linear Equations and Graphs

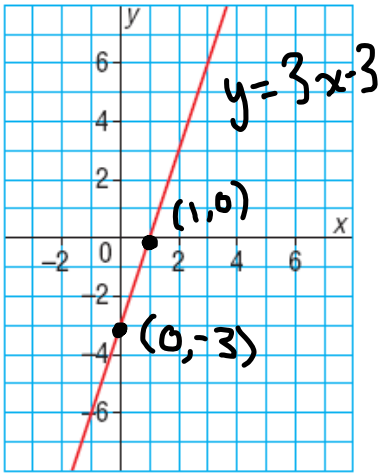
Exercise 1: The 3 graphs below have these equations, but the graphs are not in order:

$y = 3x + 3$ $x + y = 3$ $y = 3x - 3$

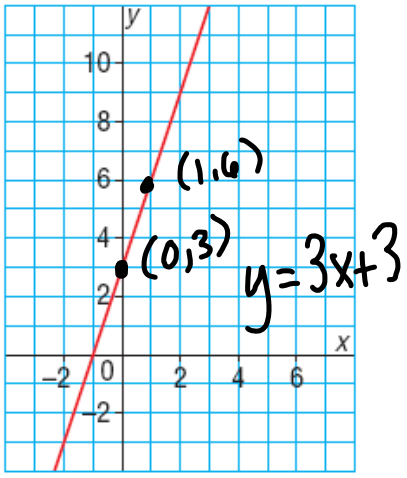
Graph A




Graph B




Graph C

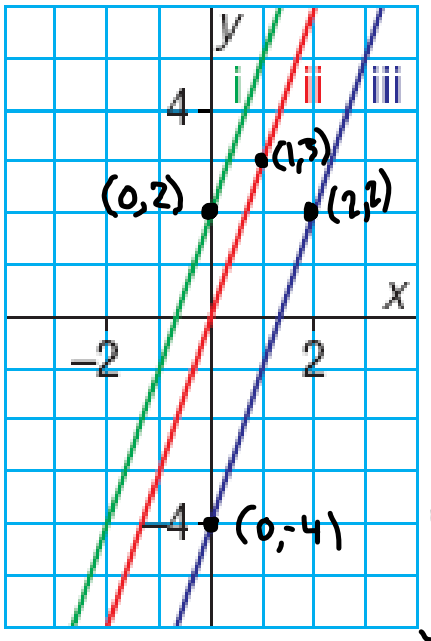



To match each equation with its graph, use the equation to determine the coordinates of 2 points. Then find which graph passes through those 2 points.

| Graph C | Graph A | Graph B |
|---|---|---|
| $y = 3x + 3$ | $x + y = 3$ | $y = 3x - 3$ |
| x=0 $y = 3x + 3$ $= 3(0) + 3$ $= 0 + 3$ $= 3$ (0,3) | x=0 $x + y = 3$ $0 + y = 3$ $y = 3$ (0,3) | x=0 $y = 3x - 3$ $= 3(0) - 3$ $= 0 - 3$ $= -3$ (0,-3) |
| x=1 $y = 3x + 3$ $= 3(1) + 3$ $= 3 + 3$ $= 6$ (1,6) | x=1 $x + y = 3$ $1 + y = 3$ $-1 \quad -1$ $y = 2$ (1,2) | x=1 $y = 3x - 3$ $= 3(1) - 3$ $= 3 - 3$ $= 0$ (1,0) |

Exercise 2: Which graph on this grid has the equation $y = 3x - 4$?

**Method 2**: Choose two points on each graph and see if it satifies the equation.




i) $(x, y)$ $(0,2)$

$y = 3x - 4$

$2 \stackrel{?}{=} 3(0) - 4$

$2 \stackrel{?}{=} 0 - 4$

$2 \neq -4$, the point does not match our equation.

ii) $(x, y)$ $(1,3)$

$y = 3x - 4$

$3 \stackrel{?}{=} 3(1) - 4$

$3 \stackrel{?}{=} 3 - 4$

$3 \neq -1$, the point does not match our equation.

iii) $(x, y)$ $(0,-4)$

$y = 3x - 4$

$-4 \stackrel{?}{=} 3(0) - 4$

$-4 \stackrel{?}{=} 0 - 4$

$-4 = -4$ ✓ this point matches our equation, but we need to check 2 points.

$(x, y)$ $(2,2)$

$y = 3x - 4$

$2 \stackrel{?}{=} 3(2) - 4$

$2 = 6 - 4$

$2 = 2$ ✓

since both points satifies our equation graph iii) matches the equation $y = 3x - 4$