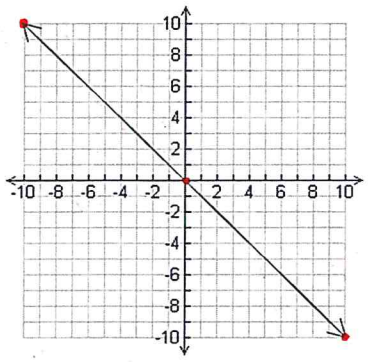
Linear Equations

Finding the Equation of a Line – Given a graph

Write the Linear Equation of the line given the graph:

1.



$(-10,10)\ (10,-10)$

$m = \frac{-10-10}{10+10} = \frac{-20}{20} = -1$

$y = -1x + b$

$-10 = -1(10) + b$

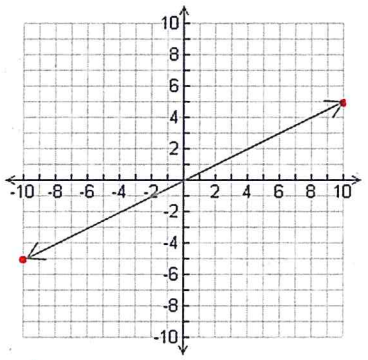
$-10 = -10 + b$

$+10 \quad +10$

$0 = b$

$y = -1x$

2.



$(-10,-5)\ (10,5)$

$m = \frac{5-(-5)}{10-(-10)} = \frac{10}{20} = \frac{1}{2}$

$y = \frac{1}{2}x + b$

$5 = \frac{1}{2}(10) + b$

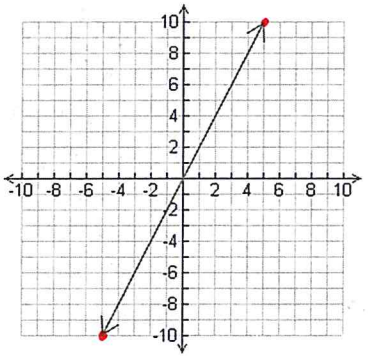
$5 = 5 + b$

$-5 \quad -5$

$0 = b$

$y = \frac{1}{2}x$

3.



$(-5,-10)\ (5,10)$

$m = \frac{10-(-10)}{5-(-5)} = \frac{20}{10} = 2$

$y = 2x + b$

$10 = 2(5) + b$

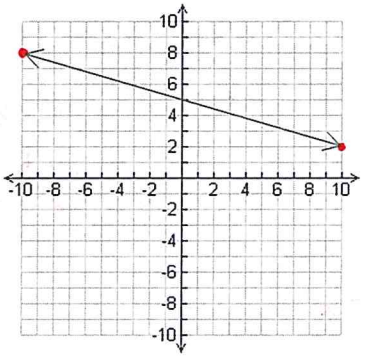
$10 = 10 + b$

$-10 \quad -10$

$0 = b$

$y = 2x$

4.



$(-10,8)\ (10,2)$

$m = \frac{2-8}{10+10} = \frac{-6}{20} = \frac{-3}{10}$

$y = \frac{-3}{10}x + b$

$2 = \frac{-3}{10}(10) + b$

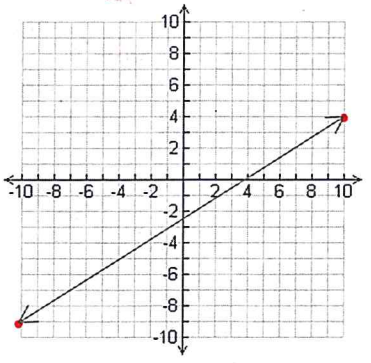
$2 = -3 + b$

$+3 \quad +3$

$5 = b$

$y = \frac{-3}{10}x + 5$

5.



$(-10,-9)\ (10,4)$

$m = \frac{4+9}{10+10} = \frac{13}{20}$

$y = \frac{13}{20}x + b$

$4 = \frac{13}{20}(10) + b$

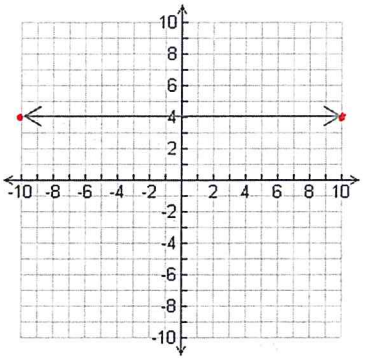
$4 = \frac{13}{2} + b$

$-\frac{13}{2} \quad -\frac{13}{2}$

$-\frac{5}{2} = b$

$y = \frac{13}{20}x - \frac{5}{2}$

6.



$(-10,4)\ (10,4)$

$m = \frac{4-4}{10+10} = \frac{0}{20} = 0$

$y = 0x + b$

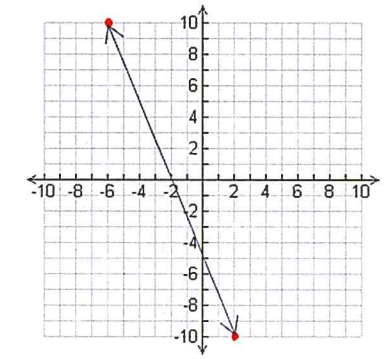
$4 = 0(10) + b$

$4 = 0 + b$

$4 = b$

$y = 0x + 4$ OR $y = 4$

7.



$(-6,10)\ (2,-10)$

$m = \frac{-10-10}{2+6}$

$= \frac{-20}{8} = \frac{-5}{2}$

$y = \frac{-5}{2}x + b$

$-10 = \frac{-5}{2}(2) + b$

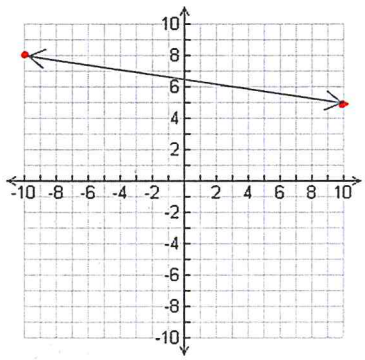
$-10 = -5 + b$

$+5 \quad +5$

$-5 = b$

$y = \frac{-5}{2}x - 5$

8.



$(-10,8)\ (10,5)$

$m = \frac{5-8}{10+10} = \frac{-3}{20}$

$y = \frac{-3}{20}x + b$

$5 = \frac{-3}{20}(10) + b$

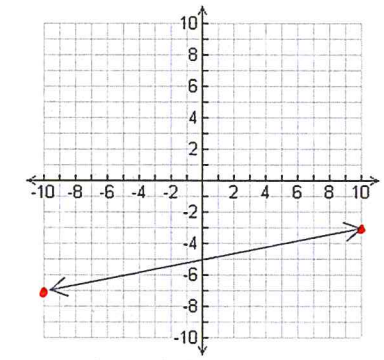
$5 = \frac{-3}{2} + b$

$+\frac{3}{2} \quad +\frac{3}{2}$

$\frac{13}{2} = b$

$y = \frac{-3}{20}x + \frac{13}{2}$

9.



$(-10,-7)\ (10,-3)$

$m = \frac{-3+7}{10+10} = \frac{4}{20}$

$= \frac{1}{5}$

$y = \frac{1}{5}x + b$

$-3 = \frac{1}{5}(10) + b$

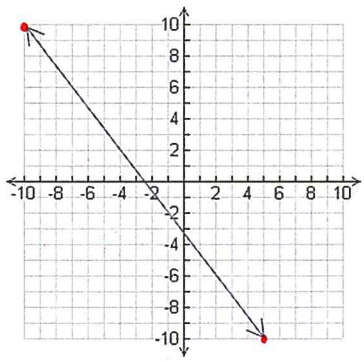
$-3 = 2 + b$

$-2 \quad -2$

$-5 = b$

$y = \frac{1}{5}x - 5$

10.



$(-10,10)\ (5,-10)$

$m = \frac{-10-10}{5+10} = \frac{-20}{15}$

$= \frac{-4}{3}$

$y = \frac{-4}{3}x + b$

$-10 = \frac{-4}{3}(5) + b$

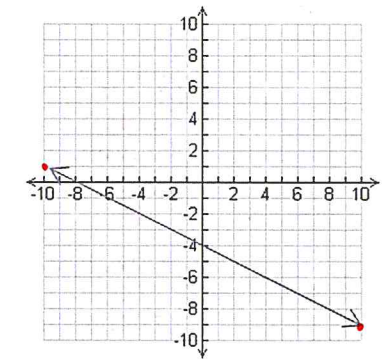
$-10 = \frac{-20}{3} + b$

$+\frac{20}{3} \quad +\frac{20}{3}$

$\frac{-10}{3} = b$

$y = \frac{-4}{3}x - \frac{10}{3}$

11.



$(-10,1)\ (10,-9)$

$m = \frac{-9-1}{10+10} = \frac{-10}{20}$

$= \frac{-1}{2}$

$y = \frac{-1}{2}x + b$

$-9 = \frac{-1}{2}(10) + b$

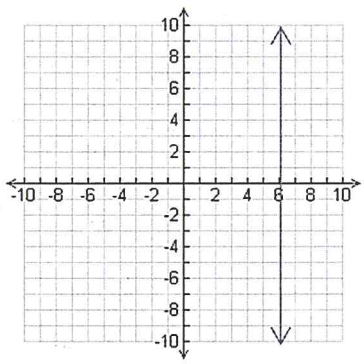
$-9 = -5 + b$

$+5 \quad +5$

$-4 = b$

$y = \frac{-1}{2}x - 4$

12.



Special case since slope is undefined.

$x = 6$