Name: KEY

Section 3.2 – Writing Equations of Lines

Write the equation of a line, in General Form, that meets the following criteria.

Perpendicular to the line $2x - 6y = 12$ and going through the point $(3, -2)$

need slope: $2x - 6y = 12$

$-6y = -2x + 12$

$y = \frac{2}{6}x - 2$

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

↑ need neg reciprocal

$y = -3x + b$

$-2 = -3(3) + b$

$-2 = -9 + b$

$7 = b$

$y = -3x + 7$

$+3x - 7 \quad +3x - 7$

$3x + y - 7 = 0$

Parallel to the line $3x - 4y = 15$ and going through the point $(-3, 7)$

need slope: $3x - 4y = 15$

$-4y = -3x + 15$

$y = \frac{3}{4}x - \frac{15}{4}$

parallel so $m = \frac{3}{4}$

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

$7 = \frac{3}{4}(-3) + b$

$7 = -\frac{9}{4} + b$

$b = 7 + \frac{9}{4}$

$= \frac{28}{4} + \frac{9}{4} = \frac{37}{4}$

$\left(y = \frac{3}{4}x + \frac{37}{4}\right) \times 4$

$4y = 3x + 37$ → $0 = 3x - 4y + 37$

Parallel to the line going through $(2, 3)$ *and* $(3, -6)$ and the same $y-$ *intercept* as the line $3x - 5y = 15$.

$\frac{-6-3}{3-2} = \frac{-9}{1}$ → $m = -9$

$3x - 5y = 15$

$-5y = -3x + 15$

$\frac{-5y}{-5} = \frac{-3x}{-5} + \frac{15}{-5}$ → $y = \frac{3}{5}x - 3$

New equation:

$y = -9x - 3$

$9x + y + 3 = 0$

Perpendicular to the line going through $(-2, 5)$ *and* $(5, -8)$ and the same $x-$ *intercept* as the line $3x - 5y = 15$.

x-int is when $y = 0$

$3x = 15$

$x = 5$ → $(5, 0)$

slope: $\frac{-8-5}{5-(-2)} = \frac{-13}{7}$ so perp → $\frac{7}{13}$

$y = \frac{7}{13}x + b$

$0 = \frac{7}{13}(5) + b$

$0 = \frac{35}{13} + b$

$b = -\frac{35}{13}$

$\left(y = \frac{7}{13}x - \frac{35}{13}\right) \times 13$

$13y = 7x - 35$

$7x - 13y - 35 = 0$