

Parallel and Perpendicular Lines: Day 3 Notes

Name: _____

Objective: I can determine whether lines are parallel, perpendicular or neither and write equations of them.

Parallel Lines: //, //

slope = same

Perpendicular Lines: ⊥

slope = opposite reciprocal
(sign) (flip)

parallel

Find the slope that is perpendicular to the line given.

a) $y = 4x + 5$

b) $y = -6x - 8$

c) $y = \frac{7}{9}x - 7$

d) $3x + 5y = 10$

$m = \frac{4}{1}$
 $m_{//} = 4$
 $m_{\perp} = -\frac{1}{4}$

$m = \frac{6}{1}$
 $m_{//} = -6$
 $m_{\perp} = \frac{1}{6}$

$m = \frac{7}{9}$
 $m_{//} = \frac{7}{9}$
 $m_{\perp} = -\frac{9}{7}$

$-3x \quad -3x$
 $\frac{5y}{5} = \frac{-3x+10}{5}$
 $y = -\frac{3}{5}x + 2$
 $m_{//} = -\frac{3}{5} \quad m_{\perp} = \frac{5}{3}$

Write an equation of a line that passes through a given point and is perpendicular to the given equation.

perpendicular

$y = mx + b$

parallel

* a) $(2, -1); y = -\frac{2}{1}x + 1$
 $m_{\perp} = \frac{1}{2}$
 $(2, -1)$
 $x \quad y$

* b) $(5, 7); y = \frac{1}{3}x + 4$
 $m_{//} = \frac{1}{3}$
 $(5, 7)$
 $x \quad y$

$y = mx + b$
 $-1 = \frac{1}{2}(\frac{2}{1}) + b$
 $-1 = \frac{1}{2} + b$
 $-1 - \frac{1}{2} = b$
 $-\frac{3}{2} = b$

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

$y = mx + b$
 $7 = \frac{1}{3}(\frac{5}{1}) + b$
 $7 = \frac{5}{3} + b$
 $-\frac{5}{3} - \frac{5}{3}$

$y = \frac{1}{3}x + 5\frac{1}{3}$

Write an equation that is parallel AND perpendicular to the given equation that passes through the given point.

$(-8, 2); 4x + y = 5$

Parallel

$-4x \quad -4x$
 $y = -4x + 5$

Perpendicular

$m_{//} = -4 \quad (-8, 2)$
 $y = mx + b$
 $2 = -4(-8) + b$
 $2 = 32 + b$
 $-32 \quad -32$
 $-30 = b$

$y = -4x - 30$

$m_{\perp} = \frac{1}{4} \quad (-8, 2)$
* $y = mx + b$
 $2 = \frac{1}{4}(\frac{-8}{1}) + b$
 $2 = -2 + b$
 $+2 \quad +2$
 $4 = b$

$y = \frac{1}{4}x + 4$