

Parallel and Perpendicular Lines

Determine if the following equations are parallel, perpendicular, or neither

<p>1. $y = \frac{1}{2}x + 4$ $y = \frac{1}{2}x - 5$ $m_1 = \frac{1}{2}$ $m_2 = \frac{1}{2}$ <u>Parallel</u></p>	<p>2. $3x + y = 5$ $m_1 = -3$ $x - 3y = -3$ $m_2 = \frac{1}{3}$ a) $3x + y = 5$ <u>Perp.</u> $y = -3x + 5$ b) $x - 3y = -3$ $\frac{-3y}{-3} = \frac{-x-3}{-3}$</p>	<p>3. $y = \frac{1}{4}x + 3$ $m = \frac{1}{4}$ $2x + 8y = -8$ $m = -\frac{1}{4}$ $\frac{8y}{8} = \frac{-2x-8}{8}$ <u>neither</u> $y = -\frac{1}{4}x - 1$</p>	<p>4. $2x + 4y = 8$ $m = -\frac{1}{2}$ $3x + 6y = -6$ $m = -\frac{1}{2}$ a) $\frac{4y}{4} = \frac{-2x+8}{4}$ <u>Parallel</u> $y = -\frac{1}{2}x + 2$ b) $\frac{6y}{6} = \frac{-3x-6}{6}$ $y = -\frac{1}{2}x - 1$</p>
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Write the equation of a line parallel and a line perpendicular to the given equation.

Line	Parallel Lines	Perpendicular Lines
<p>5. $y = \frac{1}{3}x + 1$ $(-3, 4)$ $m = \frac{1}{3}$</p>	<p>$m_{ } = \frac{1}{3}$ $(-3, 4)$ x y $4 = \frac{1}{3}(-3) + b$ $4 = -1 + b$ $5 = b$ <u>$y = \frac{1}{3}x + 5$</u></p>	<p>$m_{\perp} = -3$ $(-3, 4)$ $4 = -3(-3) + b$ $4 = 9 + b$ $\frac{-9}{-9} = \frac{-9}{-9}$ $-5 = b$ <u>$y = -3x - 5$</u></p>
<p>6. $y = 4x + 2$ $(-8, -3)$ $m = 4$</p>	<p>$m_{ } = 4$ $(-8, -3)$ $-3 = 4(-8) + b$ $-3 = -32 + b$ $29 = b$ <u>$y = 4x + 29$</u></p>	<p>$m_{\perp} = -\frac{1}{4}$ $(-8, -3)$ $-3 = -\frac{1}{4}(-8) + b$ $-3 = 2 + b$ $\frac{-2}{-2} = \frac{-2}{-2}$ $-5 = b$ <u>$y = -\frac{1}{4}x - 5$</u></p>
<p>7. $6x - 3y = 12$ $(-6, 1)$ $\frac{-3y}{-3} = \frac{-6x+12}{-3}$ $y = 2x - 4$ $m = 2$</p>	<p>$m_{ } = 2$ $(-6, 1)$ $1 = 2(-6) + b$ $1 = -12 + b$ $\frac{+12}{+12} = \frac{+12}{+12}$ $13 = b$ <u>$y = 2x + 13$</u></p>	<p>$m_{\perp} = -\frac{1}{2}$ $(-6, 1)$ $1 = -\frac{1}{2}(-6) + b$ $1 = 3 + b$ $\frac{-3}{-3} = \frac{-3}{-3}$ $-2 = b$ <u>$y = -\frac{1}{2}x - 2$</u></p>
<p>8. $10x + 5y = 15$ $(-2, 0)$ $\frac{5y}{5} = \frac{-10x+15}{5}$ $y = -2x + 3$</p>	<p>$m_{ } = -2$ $(-2, 0)$ $0 = -2(-2) + b$ $0 = 4 + b$ $-4 = b$ <u>$y = -2x - 4$</u></p>	<p>$m_{\perp} = \frac{1}{2}$ $(-2, 0)$ $0 = \frac{1}{2}(-2) + b$ $0 = -1 + b$ $1 = b$ <u>$y = \frac{1}{2}x + 1$</u></p>