

Unit 6: Geometric & Algebraic Conn.

Equations of parallel and perpendicular lines Notes

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

	SLOPE	SLOPE of a line <b>PARALLEL</b> to a given LINE	SLOPE of a line <b>PERPENDICULAR</b> to a given LINE
Equation of a line: Slope Intercept Form	$y = \underline{mx + b}$ $M = \underline{\text{Slope}}$ $b = \text{y-intercept}$		
Where/how do I find the slope?	# in front of x.	Same slope as original eq.	Reciprocal of original eq. (flip & change sign)
<b>Ex1</b> $y = -\frac{5}{4}x + 2$	Find the Slope. $-\frac{5}{4}$	Find the slope of a line parallel to a given line. $-\frac{5}{4}$	Find the slope of a line perpendicular to a given line. $\frac{4}{5}$
<b>Ex2</b> $y = 7x + 2$	Find the Slope. 7	Find the slope of a line parallel to a given line. 7	Find the slope of a line perpendicular to a given line. $\frac{7}{1} \rightarrow \frac{1}{7} \rightarrow \boxed{-\frac{1}{7}}$
<b>Ex3</b> $y = \frac{1}{5}x + 5$	Find the Slope. $\frac{1}{5}$	Find the slope of a line parallel to a given line. $\frac{1}{5}$	Find the slope of a line perpendicular to a given line. $\frac{1}{5} \rightarrow \frac{5}{1} \rightarrow \boxed{-5}$
<b>Ex4</b> $y = -2x - 1$	Find the Slope. -2	Find the slope of a line parallel to a given line. -2	Find the slope of a line perpendicular to a given line. $\frac{-2}{1} \rightarrow \frac{-1}{2} \rightarrow \boxed{\frac{1}{2}}$
<b>Ex5</b> $y = \frac{7}{3}x + 4$	Find the Slope. $\frac{7}{3}$	Find the slope of a line parallel to a given line. $\frac{7}{3}$	Find the slope of a line perpendicular to a given line. $\frac{7}{3} \rightarrow \frac{3}{7} \rightarrow \boxed{-\frac{3}{7}}$

	Slope- Intercept Form	Point-Slope Form
Equation	$y = mx + b$	$y - y_1 = m(x - x_1)$
EX1	<p>through: <math>(2, -3)</math>, parallel to <math>y = -x + 1</math>  <math>\text{slope} = -1</math></p> <p><math>y = mx + b</math>  <math>-3 = (1 \cdot 2) + b</math>  <math>-3 = -2 + b</math>  <math>+2 \quad +2</math>  <math>-1 = b</math></p> <p><math>y = -x - 1</math>  <math>y = -x - 1</math></p>	<p>through: <math>(1, 4)</math>, slope = 4</p> <p><math>y - y_1 = m(x - x_1)</math>  <math>y - 4 = 4(x - 1)</math></p>
EX2	<p>through: <math>(-3, 2)</math>, parallel to <math>y = \frac{1}{3}x - 5</math>  <math>\text{slope} = \frac{1}{3}</math></p> <p><math>y = mx + b</math>  <math>2 = (\frac{1}{3} \cdot -3) + b</math>  <math>2 = -1 + b</math>  <math>+5 \quad +5</math>  <math>3 = b</math></p> <p><math>y = \frac{1}{3}x - 3</math></p>	<p>through: <math>(-5, 2)</math>, slope = <math>-\frac{2}{5}</math></p> <p><math>y - y_1 = m(x - x_1)</math>  <math>y - 2 = -\frac{2}{5}(x - -5)</math>  <math>y - 2 = -\frac{2}{5}(x + 5)</math></p>
EX3	<p>through: <math>(2, -1)</math>, perp. to <math>y = -\frac{1}{2}x - 4</math>          flip, change <math>-\frac{1}{2} \rightarrow -2 \rightarrow 2</math>  <math>\text{slope} = 2</math></p> <p><math>y = mx + b</math>  <math>-1 = (2 \cdot 2) + b</math>  <math>-1 = 4 + b</math>  <math>-4 \quad -4</math>  <math>-5 = b</math></p> <p><math>y = 2x - 5</math></p>	<p>through: <math>(2, 0)</math>, slope = <math>\frac{3}{2}</math></p> <p><math>y - y_1 = m(x - x_1)</math>  <math>y - 0 = \frac{3}{2}(x - 2)</math>  <math>y = \frac{3}{2}(x - 2)</math></p>