

Find and Use Slopes

Vocabulary	Definition	Picture	
SLOPE	The slope of a nonvertical line is the ratio of the vertical change (rise) to horizontal change (run)	$m = \text{slope}$ $m = \frac{\Delta y}{\Delta x} = \frac{\text{rise (up/down)}}{\text{run (left/right)}}$ from a graph	Given 2 points Equation of Line $m = \frac{y_2 - y_1}{x_2 - x_1}$ $y = mx + b$

SLOPE OF LINES IN THE COORDINATE PLANE

NEGATIVE SLOPE	<u>Down</u> from left to right.	$m = \frac{-2}{4}$ $m = -\frac{1}{2}$	$m = \frac{\text{down}}{\text{right}}$ $m = \frac{\text{up}}{\text{left}}$ down 1, right 2
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POSITIVE SLOPE	<u>up</u> from left to right.	$m = \frac{2}{3}$	$m = \frac{\text{up}}{\text{right}}$ $m = \frac{\text{down}}{\text{left}}$ up 2, right 3
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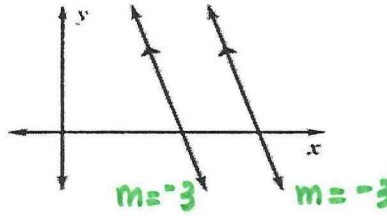
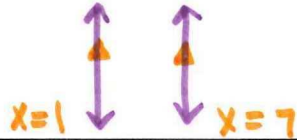
ZERO SLOPE (slope of 0)	<u>Horizontal</u> line. *Looks like the <u>Horizon</u>	$m = \frac{0}{5}$ $m = 0$	$m = \frac{\text{NO RISE}}{\text{RUN}}$ $m = \frac{0}{\#}$ $y = 0x + b$ $ y = b $ $y = \#$ $y = 2$
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UNDEFINED SLOPE	<u>Vertical</u> line.	$m = \frac{6}{0}$ $m = \text{undefined}$	$m = \frac{\text{RISE}}{\text{NO RUN}}$ $m = \frac{\#}{0}$ $ x = \# $ ex: $x = 5$ $x = 5$
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POSTULATE 17
SLOPES of
PARALLEL
LINES

In a coordinate plane, two nonvertical lines are parallel if and only if they have the same slope.

Any two vertical lines are parallel.



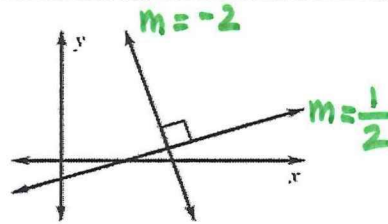
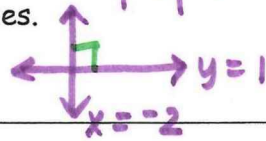
$$y_1 = \frac{2}{3}x - 8 \quad y_2 = \frac{2}{3}x + 1$$

$$y_1 \parallel y_2 \quad \boxed{m = \frac{2}{3}}$$

POSTULATE 18
SLOPES of
PERPENDICULAR
LINES

In a coordinate plane, two nonvertical lines are perpendicular if and only if the product of their slopes is -1.

Horizontal lines are perpendicular to vertical lines.



$$-2 \left(\frac{1}{2} \right) = -1$$

$$m = \frac{2}{3} \quad m = -\frac{3}{2}$$

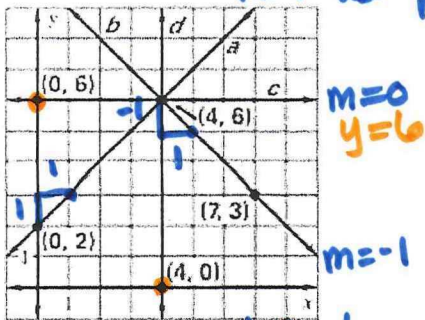
$$m = \frac{1}{5} \quad m = -5$$

$$m = 1 \quad m = -1$$

$$m = -\frac{9}{8} \quad m = \frac{8}{9}$$

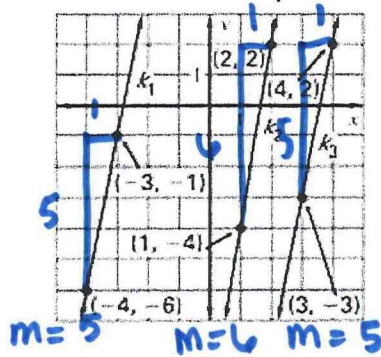
$m = 0$ Horizontal
 $m = \text{undefined}$ Vertical

Find the slope of each line. rise / run



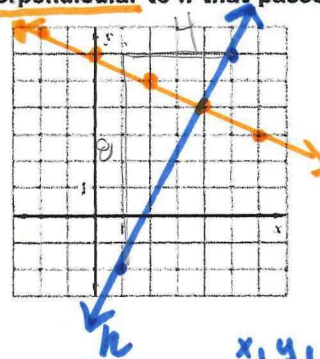
$m = \text{undefined}$
 $x = 4$

Find the slope of each line. Which lines are parallel?



$k_1 \parallel k_3$

Line h passes through $(1, -2)$ and $(5, 6)$. Graph the line perpendicular to h that passes through the point $(2, 5)$.



slopes need to be opposite reciprocals
line $h \quad m = \frac{8}{4}$
 $m = 2$

\perp line $m = -\frac{1}{2}$

Line n passes through $(1, 6)$ and $(8, 4)$. Line m passes through $(0, 5)$ and $(2, 12)$. Is $n \perp m$? Explain.

line $n: m = \frac{4-6}{8-1} = \frac{-2}{7}$ line $m: m = \frac{12-5}{2-0} = \frac{7}{2}$

$n \perp m$
b/c opp. rec.