

Slope Direction Switch

Write lines that match or turn from a given line.

HIGH SCHOOL • MA.912.AR.2.3

MA.912.AR.2.3 "Write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point."

NAME _____

DATE _____

CHOOSE THE NEW SLOPE

Parallel lines have the same slope. Perpendicular nonvertical lines have slopes that are negative reciprocals, and vertical and horizontal lines are perpendicular to each other. After you choose the slope, substitute the given point into $y = mx + b$ to find b .

WORKED EXAMPLE

Write an equation of the line parallel to $y = 8x + 13$ that passes through $(5, -6)$.

1. Parallel lines have the same slope, so $m = 8$.
2. Substitute the point: $-6 = 8(5) + b$.
3. Solve for b : $-6 = 40 + b$, so $b = -46$.

Answer: $y = 8x - 46$

PRACTICE 6 problems

- 1** Write an equation of the line parallel to $y = -3x + 7$ that passes through $(4, -2)$.

ANSWER _____

- 2** Write an equation of the line parallel to $2x + y = 9$ that passes through $(-1, 3)$.

ANSWER _____

- 3** Write an equation of the line perpendicular to $y = \frac{1}{2}x - 4$ that passes through $(7, 2)$.

ANSWER _____

- 4** Write an equation of the line parallel to $x = -3$ that passes through $(2, 9)$.

ANSWER _____

- 5** Write an equation of the line perpendicular to $y = 4x - 7$ that passes through $(3, -1)$.

ANSWER _____

- 6** Write an equation of the line perpendicular to $y = 3$ that passes through $(-4, 7)$.

ANSWER _____

APPLY IT Show your work

- 1** A student is designing a skatepark map on a coordinate grid. The edge of one ramp is $y = -\frac{3}{2}x + 11$. A rail must be parallel to that edge and pass through $(2, 1)$. Write an equation for the rail.

WORK SPACE

ANSWER _____

- 2** In a coding club's game map, a character's route follows $y = \frac{1}{3}x - 2$. A barrier must cross the route at a right angle and pass through $(3, 7)$. Write an equation for the barrier.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

The line $7x + 2y = 14$ is given. Write an equation of the line perpendicular to it that passes through $(-2, 4)$. Explain how you chose the slope.

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write an equation of the line parallel to $y = -3x + 7$ that passes through $(4, -2)$.	$y = -3x + 10$
2	Write an equation of the line parallel to $2x + y = 9$ that passes through $(-1, 3)$.	$y = -2x + 1$
3	Write an equation of the line perpendicular to $y = 1/2x - 4$ that passes through $(7, 2)$.	$y = -2x + 16$
4	Write an equation of the line parallel to $x = -3$ that passes through $(2, 9)$.	$x = 2$
5	Write an equation of the line perpendicular to $y = 4x - 7$ that passes through $(3, -1)$.	$y = -1/4x - 1/4$
6	Write an equation of the line perpendicular to $y = 3$ that passes through $(-4, 7)$.	$x = -4$

PART 2 · APPLY IT

1. $y = -3/2x + 4$ A parallel rail has slope $-3/2$. Substitute $(2, 1)$ into $y = -3/2x + b$ to get $b = 4$.
2. $y = -3x + 16$ A line perpendicular to slope $1/3$ has slope -3 . Substitute $(3, 7)$ into $y = -3x + b$ to get $b = 16$.

CHALLENGE

$y = 2/7x + 32/7$. The given line has slope $-7/2$, so a perpendicular line has slope $2/7$.

Accept equivalent slope-intercept, point-slope, or standard-form equations. For vertical lines, accept only the equivalent equation $x = \text{constant}$.