LESSON MAKER PRO

Slope Match Mission

Write equations for parallel and perpendicular lines.

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 _____

USE THE SLOPE

Parallel lines have the same slope. Perpendicular lines have slopes that are negative reciprocals. A vertical line is parallel to other vertical lines and perpendicular to horizontal lines, and a horizontal line works the opposite way.

WORKED EXAMPLE

Write an equation of the line parallel to $y = 12x + 17$ that passes through (13, 19).

1. A parallel line has slope 12, so start with $y = 12x + b$.
2. Substitute the point: $19 = 12(13) + b$.
3. Solve: $19 = 156 + b$, so $b = -137$.

Answer: $y = 12x - 137$

PRACTICE 6 problems

1 Write an equation of the line parallel to $y = 4x + 9$ that passes through (-8, 10).

ANSWER _____

2 Write an equation of the line perpendicular to $y = -3x + 2$ that passes through (6, -5).

ANSWER _____

3 Write an equation of the line parallel to $5x - 2y = 14$ that passes through (4, -1).

ANSWER _____

4 Write an equation of the line perpendicular to $x = 15$ that passes through (-9, 7).

ANSWER _____

5 Write an equation of the line parallel to $y = -7/4x + 6$ that passes through (16, 3).

ANSWER _____

6 Write an equation of the line perpendicular to $8x + 3y = -18$ that passes through (-6, 11).

ANSWER _____

APPLY IT Show your work

1 A music app models the downloads for one new song with y = 6x + 24, where x is the number of hours after release and y is the number of downloads. Another song is gaining downloads at the same hourly rate and had 15 downloads when x = 0. Write an equation for the second song.

WORK SPACE

ANSWER _____

2 In a video game design, a boundary path is modeled by y = -4x + 20. A laser path must be perpendicular to the boundary and pass through (5, 2). Write an equation for the laser path.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Line r has equation 9x - 6y = 30. Write an equation of the line perpendicular to r that passes through (2, -3). Then explain how you chose the slope.

WORK SPACE AND ANSWER

ANSWER KEY # Slope Match Mission

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write an equation of the line parallel to y = 4x + 9 that passes through (-8, 10).	**y = 4x + 42**
2	Write an equation of the line perpendicular to y = -3x + 2 that passes through (6, -5).	**y = 1/3x - 7**
3	Write an equation of the line parallel to 5x - 2y = 14 that passes through (4, -1).	**y = 5/2x - 11**
4	Write an equation of the line perpendicular to x = 15 that passes through (-9, 7).	**y = 7**
5	Write an equation of the line parallel to y = -7/4x + 6 that passes through (16, 3).	**y = -7/4x + 31**
6	Write an equation of the line perpendicular to 8x + 3y = -18 that passes through (-6, 11).	**y = 3/8x + 53/4**

PART 2 · APPLY IT

1. **y = 6x + 15** The songs have the same download rate, so use slope 6. The point (0, 15) makes the y-intercept 15.
2. **y = 1/4x + 3/4** The boundary slope is -4, so a perpendicular slope is 1/4. Substitute (5, 2) into y = 1/4x + b to find b = 3/4.

CHALLENGE

y = -2/3x - 5/3; line r has slope 3/2, so a perpendicular line has slope -2/3, its negative reciprocal.

Accept any equivalent equation, including standard form or point-slope form. For perpendicular lines, accept an explanation that correctly identifies negative reciprocal slopes or correctly handles vertical and horizontal lines.