LESSON MAKER PRO

Lines in Step

Use slopes to build parallel and perpendicular lines.

HIGH SCHOOL · MT.CORE.ALG.LIN.3.c

MT.CORE.ALG.LIN.3.c "Represent linear functions using tables, graphs, equations, and verbal situations, while using technology strategically. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities by:..."

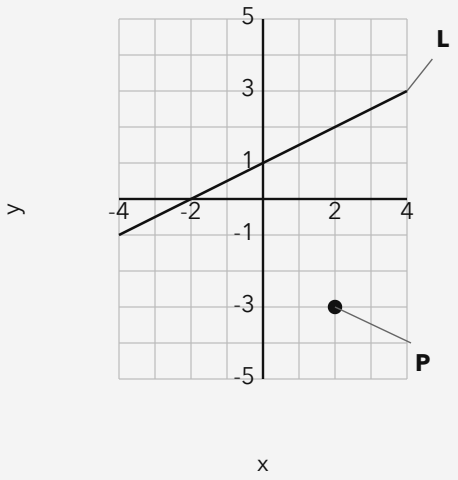
NAME _____ DATE _____

SLOPE CONNECTIONS

Parallel lines have the same slope. The slopes of perpendicular lines multiply to -1. Find the slope from a graph, table, or equation, then use the given point to find b in y = mx + b.

WORKED EXAMPLE

Use the graph. Write an equation for the line parallel to L that passes through P.

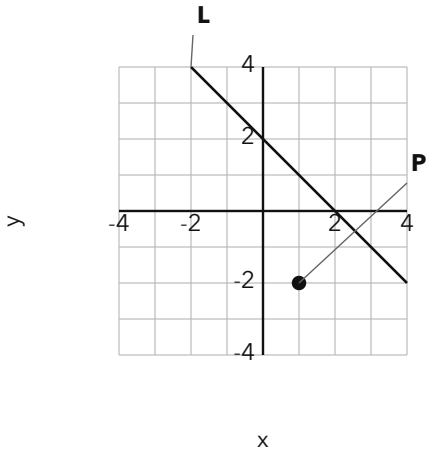


1. On L, moving right 2 units means moving up 1 unit. Its slope is 1/2.
2. A parallel line has the same slope, so write y = 1/2x + b.
3. Use P(2, -3): -3 = 1/2(2) + b, so b = -4.

Answer: y = 1/2x - 4

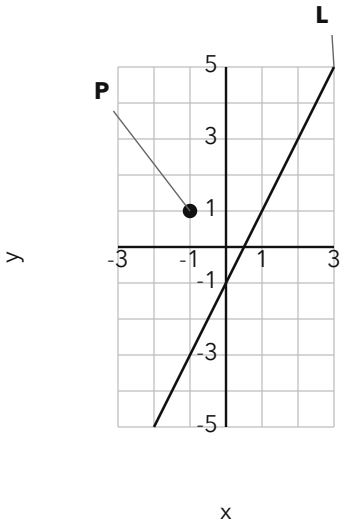
PRACTICE 6 problems

1 Use the graph. Write an equation for the line perpendicular to L that passes through P.



ANSWER _____

2 Use the graph. Write an equation for the line parallel to L that passes through P.



ANSWER _____

3 Write an equation for the line parallel to y = -3x + 4 that passes through (3, 2).

ANSWER _____

4 Write an equation for the line perpendicular to y = 1/4x - 2 that passes through (4, 3).

ANSWER _____

5 Write an equation in y = mx + b form for the line parallel to 2x + 3y = 6 that passes through (0, 4).

ANSWER _____

6 The table shows points on line L. Write an equation for the line perpendicular to L that passes through P(4, -1).

POINTS ON L

x	y
-2	1
0	2
2	3

ANSWER _____

APPLY IT Show your work

1 A student group at a Montana high school plans a reading night featuring books by Montana Indigenous authors. One plan costs y = 8x + 12 dollars for x books. A second plan costs $30 for 3 books and has the same cost per additional book. Write an equation for the second plan.

WORK SPACE

ANSWER _____

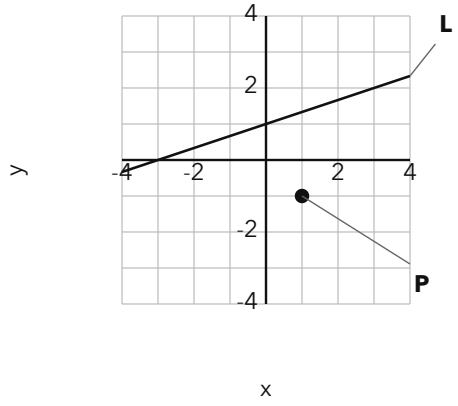
2 A student club designs a poster for a community event featuring Montana Indigenous artists. On its coordinate grid, one border follows y = -1/2x + 5. A second border must be perpendicular to it and pass through (2, 1). Write an equation for the second border.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Use the graph. Write an equation for the line perpendicular to L that passes through P. Then find the exact point where the two lines intersect.



WORK SPACE AND ANSWER

Lines in Step

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the graph. Write an equation for the line perpendicular to L that passes through P.	**y = x - 3**
2	Use the graph. Write an equation for the line parallel to L that passes through P.	**y = 2x + 3**
3	Write an equation for the line parallel to y = -3x + 4 that passes through (3, 2).	**y = -3x + 11**
4	Write an equation for the line perpendicular to y = 1/4x - 2 that passes through (4, 3).	**y = -4x + 19**
5	Write an equation in y = mx + b form for the line parallel to 2x + 3y = 6 that passes through (0, 4).	**y = -2/3x + 4**
6	The table shows points on line L. Write an equation for the line perpendicular to L that passes through P(4, -1).	**y = -2x + 7**

PART 2 · APPLY IT

1. **y = 8x + 6** The same cost per additional book means the plans have the same slope, 8. Substitute x = 3 and y = 30 into y = 8x + b to get b = 6.
2. **y = 2x - 3** The perpendicular slope to -1/2 is 2. Substitute (2, 1) into y = 2x + b to get b = -3.

CHALLENGE

y = -3x + 2; intersection: (3/10, 11/10)

Accept equivalent equations unless a form is specified. In the challenge, L passes through (0, 1) and (3, 2), so its exact slope is 1/3.