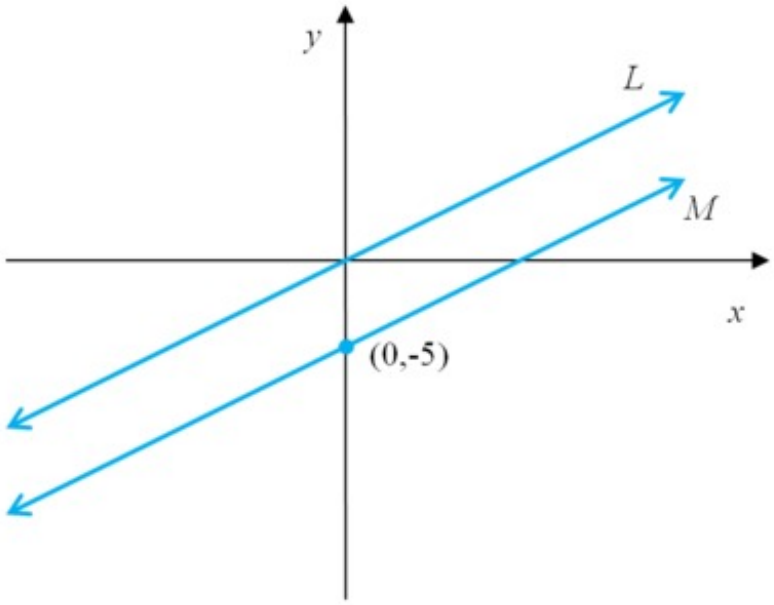
8.EE Proportional relationships, lines, and linear equations

Task

Lines L and M have the same slope. The equation of line L is $4y = x$. Line M passes through the point $(0, -5)$.



What is the equation of line M?

IM Commentary

There is a lot to know about the relationship between proportional relationships, lines,

and linear equations, and the purpose of this task is to assess whether students understand certain aspects of this relationship. In particular, it requires students to find the slope of the line defined by the equation $4y = x$ and to write the equation of a line knowing its slope and y-intercept. Note that students in 7th grade know that the graph of a proportional relationship is a line through (0,0), so this task assesses the specific connection between proportional relationships and their graphs with linear equations more generally.

Solution

The equation

$$4y = x$$

is equivalent to

$$y = \frac{1}{4}x$$

So the slope of line L is $\frac{1}{4}$. L and M have the same slope. Since M has slope $\frac{1}{4}$ and passes through the point (0,-5), the equation for line M is

$$y = \frac{1}{4}x - 5$$

Other acceptable forms of the equation include

- $y = -5 + \frac{1}{4}x$
- $y + 5 = \frac{1}{4}x$
- $4y = x - 20$
- $4y = -20 + x$
- $4y + 20 = x$

and any other equation that is equivalent to one of these.

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