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Dilations and Parallel Lines - Guided Lesson Explanation

Explanation#1

Start with the y-intercept. Since the equation of ℓ in slope-intercept form is y = -3 x + 5, the y-intercept is (0,5).

Next, since the slope of ℓ is -2, which can be written as -3/1, move down 3 and right 1 from (0,5) to find a second point on ℓ (1, 2).

Step3)So the points (0,5) and (1,2) lie on ℓ', apply the dilation (x, y) = (1/5x, 1/5y.)

(0, 5)= (0,1)

(1, 2) = $\left(\frac{1}{5},\frac{2}{5}\right)$

Next, use the slope formula to find the slope of ℓ'

slope of ℓ' $\frac{y2-y1}{x2-x1}$ Slope formula

$= \frac{\frac{2}{5}-1}{\frac{1}{5}-0}$ Plug in $y_2=\frac{2}{5}$, $y_1= 1$, $x_2=\frac{1}{5}$, and $x_1 = 0$

$= \frac{-\frac{3}{5}}{\frac{1}{5}}$ Subtract

$= -\frac{3}{5}\times\frac{5}{1}$ To divide, multiply by the reciprocal

$= -\frac{15}{5}$ multiply

= -3 simplify

Finally, since ℓ' has a slope of -3 and a y-intercept of 1,the equation of ℓ' in slope –intercept from is y=-3x+1

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Explanation#2

Start with the y-intercept. Since the equation of ℓ in slope-intercept form is y= $\frac{1}{3}$x-1, the y-intercept is (0,-1).

Next, since the slope of ℓ is $\frac{1}{3}$, which can be written as , $\frac{1}{3}/1$ move down 1 and right 3 from (0,-1) to find a second point on ℓ (3,0).

Step3)So the points (0,-1) and (3,0) lie on ℓ', apply the dilation (x, y) = (4x, 4y.)

(0, -1)= (0,-4)

(3, 0) = (12,0)

Next, use the slope formula to find the slope of ℓ'

slope of ℓ' $\frac{y2-y1}{x2-x1}$ Slope formula

$= \frac{0--4}{12-0}$ Plug in y_2=0, y_1= -4, $x_{2=}$ 12, and $x_{1\,=}$ 0

$= \frac{\mathbf{4}}{\mathbf{12}}$ Subtract

$= \frac{1}{3}$ simplify

Finally, since ℓ' has a slope of $\frac{\mathbf{1}}{\mathbf{3}}$ and a y-intercept of -4, the equation of ℓ' in slope –intercept from is y=$\frac{\mathbf{1}}{\mathbf{3}}$ x-4

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Explanation#3

Start with the y-intercept. Since the equation of ℓ in slope-intercept form is $y=\frac{1}{3}x+2$, the y-intercept is (0,2).

Next, since the slope of ℓ is $\frac{1}{3}$, which can be written as , $\frac{1}{3}/1$ move up 1 and right 3 from (0,2) to find a second point on ℓ (3,3).

Step3)So the points (0,2) and (3,3) lie on ℓ', apply the dilation (x, y) = (2x, 2y)

(0, 2)= (0, 4)

(3, 3) = (6,6)

Next, use the slope formula to find the slope of ℓ'

slope of ℓ' $\frac{y2-y1}{x2-x1}$ Slope formula

$= \frac{6-4}{6-0}$ Plug in $y_2=6$, $y_1= 4$, $x_{2=}$ 6, and $x_{1\,=}$ 0

$= \frac{\mathbf{2}}{\mathbf{6}}$ Subtract

$= \frac{1}{3}$ simplify

Finally, since ℓ' has a slope of $\frac{\mathbf{1}}{\mathbf{3}}$ and a y-intercept of 4,the equation of ℓ' in slope –intercept from is $y=\frac{\mathbf{1}}{\mathbf{3}}$ x+4