Name: _____

CC Geometry Homework

Line Dilations

1) The line $y = 2x + 1$ is dilated through the origin by a scale factor of 2. Which one of the following describes the line of the resulting image?

A) The image line will be parallel to the pre-image line.

B) The image line will be perpendicular to the pre-image line.

C) The image line's slope will be twice the pre-image line's slope.

D) The image and the pre-image lines will coincide (be on top of each other).

2) The line represented by the equation $4y = 3x + 7$ is transformed by a dilation centered at the origin. Which one of the following linear equations could represent its image?

A) $4x + 3y = 9$ C) $3x + 4y = 9$

B) $4x - 3y = 9$ D) $3x - 4y = 9$

3) (**a**) Determine the equation of line p in the graph below.
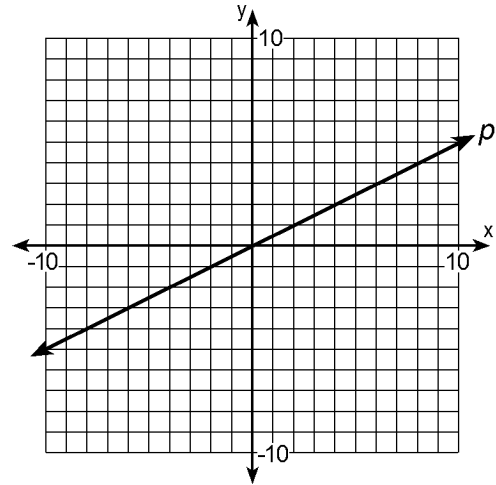
(**b**) What is the equation of line m, the image of line p after a dilation of scale factor $\dfrac{2}{15}$ with the origin as the center. [*Show all work and explain your reasoning.*]

4) Line *n* is represented by the equation $3x + 4y = 20$. Determine and state the equation of line *p*, the image of line *n*, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2). [*Show all work and explain your answer.*]

[*The use of the set of axes below is optional.*]
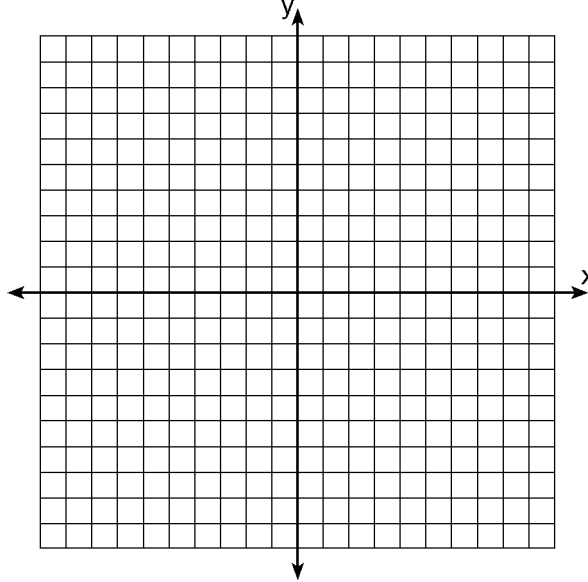
5) Line *ℓ* is mapped onto line *m* by a dilation centered at the origin with a scale factor of 2. The equation of line *ℓ* is $3x - y = 4$. Determine and state an equation for line *m*. [*Show all work.*]

1) A   2) D

3)   (a) $y = \dfrac{1}{2}x;$

     (b) $y = \dfrac{1}{2}x$

     SAMPLE EXPLANATION: Line p passes through the origin, which is the center of the dilation. When a line passes through the center of dilation, any dilation will result in the same line.

4)   SAMPLE EXPLANATION: $3x + 4y = 20$, $4y = -3x + 20$, $y = -\dfrac{3}{4}x + 5$; Line p has the equation $y = -\dfrac{3}{4}x + 5$ because the point of dilation is centered on line n leaving the location of the line unchanged. The size would also not change because lines are infinite. Thus line n and line p are the same line.
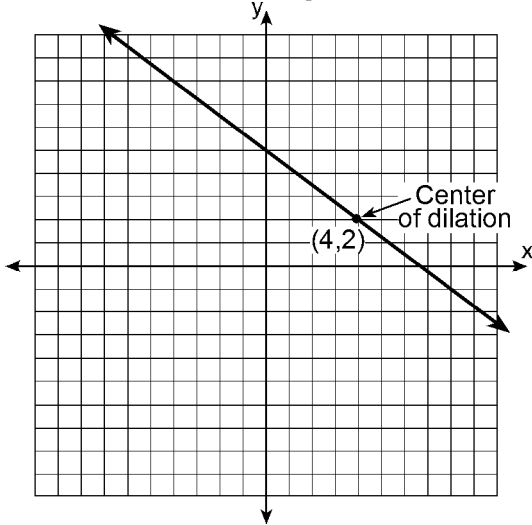
5) $y = 3x - 8$

     WORK SHOWN: $3x - y = 4$, $-y = -3x + 4$, $y = 3x - 4$; $(2,2) \to (4,4)$, $(3,5) \to (6,10)$; $m = \dfrac{10 - 4}{6 - 4} = \dfrac{6}{2} = 3$; $y = mx + b$, $10 = (3)(6) + b$, $10 = 18 + b$, $b = -8$; $y = 3x - 8$