Homework 10-7 Writing the Equation of Perpendicular Bisectors

1 The coordinates of the endpoints of $\overline{AB}$ are $A(0,0)$ and $B(0,6)$. The equation of the perpendicular bisector of $\overline{AB}$ is

1) $x = 0$
2) $x = 3$
3) $y = 0$
4) $y = 3$

midpt $\left(\frac{0+0}{2}, \frac{0+6}{2}\right) = (0,3)$ ✓ x, y

$m = \frac{\Delta y}{\Delta x} = \frac{6-0}{0-0} = \frac{6}{0}$ und. $\frac{0}{-6}$ $m = 0$

$y - 3 = 0(x - 0)$

2 Which equation represents the perpendicular bisector of $\overline{AB}$ whose endpoints are $A(8,2)$ and $B(0,6)$?

1) $y = 2x - 4$
2) $y = -\frac{1}{2}x + 2$
3) $y = -\frac{1}{2}x + 6$
4) $y = 2x - 12$

① $\left(\frac{8+0}{2}, \frac{2+6}{2}\right) = (4,4)$

② $m = \frac{\Delta y}{\Delta x} = \frac{6-2}{0-8} = \frac{4}{-8} = -\frac{1}{2}$ $\perp m = 2$

③ $y - 4 = 2(x - 4)$ $y = 2x - 4$
$y - 4 = 2x - 8$

3 Triangle ABC has vertices $A(0,0)$, $B(6,8)$, and $C(8,4)$. Which equation represents the perpendicular bisector of $\overline{BC}$?

1) $y = 2x - 6$
2) $y = -2x + 4$
3) $y = \frac{1}{2}x + \frac{5}{2}$
4) $y = -\frac{1}{2}x + \frac{19}{2}$

① $\left(\frac{6+8}{2}, \frac{8+4}{2}\right) = \left(\frac{14}{2}, \frac{12}{2}\right) = (7,6)$

② $m = \frac{\Delta y}{\Delta x} = \frac{8-4}{6-8} = \frac{4}{-2} = -2$ $\perp m = \frac{1}{2}$

③ $y - 6 = \frac{1}{2}(x - 7)$ $y = \frac{1}{2}x + \frac{5}{2}$
$y - 6 = \frac{1}{2}x - \frac{7}{2}$
$+6 \quad +6\frac{12}{2}$

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4. Write the equation of the perpendicular bisector that goes through the line segment with endpoints A (2,1) and B (6,-3).

① $\left(\frac{2+6}{2}, \frac{1+-3}{2}\right) = \left(\frac{8}{2}, \frac{-2}{2}\right) = (4,-1)$

② $m = \frac{\Delta y}{\Delta x} = \frac{-3-1}{6-2} = \frac{-4}{4} = -1$

$\perp m = 1$

③ $y+1 = 1(x-4)$

$y+1 = x-4$

$-1 \quad -1$

$y = x-5$

5. Write the equation of the perpendicular bisector that goes through the line segment with endpoints of A(-1, -2) and B (-2, -8).

① $\left(\frac{-1+-2}{2}, \frac{-2+-8}{2}\right) = \left(\frac{-3}{2}, \frac{-10}{2}\right) = \left(-\frac{3}{2}, -5\right)$

② $m = \frac{\Delta y}{\Delta x} = \frac{-8+(+2)}{-2+(+1)} = \frac{-6}{-1} = 6 \quad \perp m = -\frac{1}{6}$

③ $y+5 = -\frac{1}{6}\left(x+\frac{3}{2}\right)$

$y+5 = -\frac{1}{6}x - \frac{1}{4}$

$-5 \quad\quad -\frac{20}{4}$

$y = -\frac{1}{6}x - \frac{21}{4}$

6. Write the equation of a line that is perpendicular to y = -2x + 4 that passes through the point (8,8).

$m = -2$

$\perp m = \frac{1}{2}$

$y-8 = \frac{1}{2}(x-8)$

$y-8 = \frac{1}{2}x - 4$

$+8 \quad\quad +8$

$y = \frac{1}{2}x + 4$

7. Write the equation of a line that is parallel to y = -4x + 12 that goes through the point (1,9).

$m = -4$

$y-9 = -4(x-1)$

$y-9 = -4x+4$

$+9 \quad\quad +9$

$y = -4x + 13$

Lesson 8: Exploring Equations of a Dilated Lines

1. Graph the following lines on the coordinate axes:

y = 3x + 4 and y = -2x

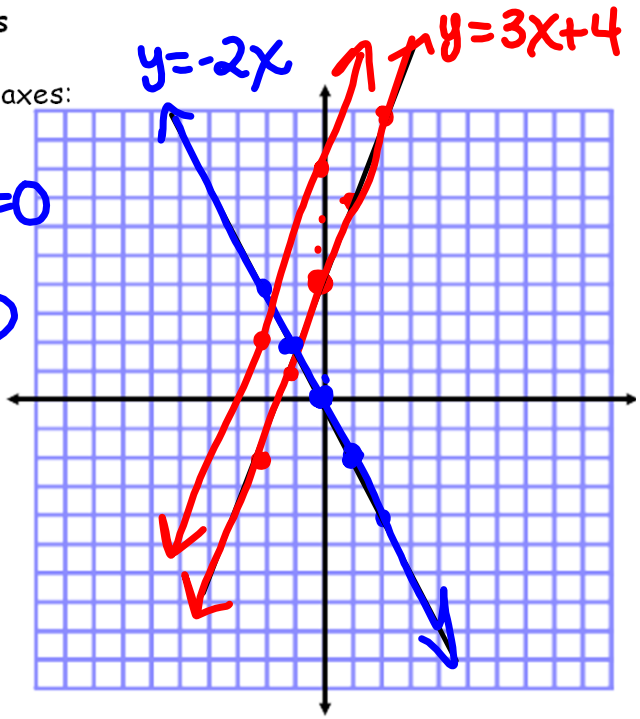
m = 3/1 b = 4 m = -2/1 b = 0

2. Fill out the table of values for each line:

y = 3x + 4 ✓ and y = -2x

x	y
-1	1
0	4
1	7

x	y
0	0
1	-2
2	-4



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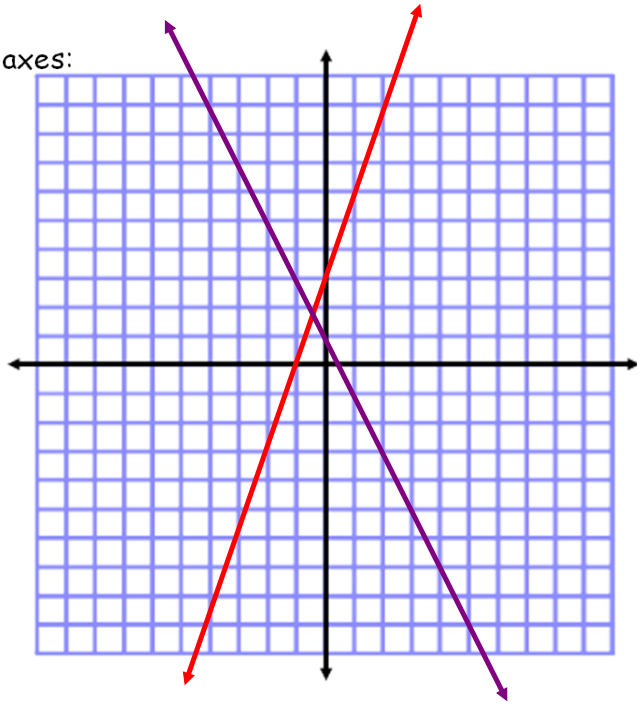

3. Dilate each of the points in your table using a scale factor of 2 centered about the origin and put the coordinates in the tables below:

multiply
K=2

$D_{2,(0,0)}(y = 3x + 4)$

D 0,2

x	y
-2	2
0	4
2	10

$D_{2,(0,0)}(y = -2x)$

x	y
0	0
2	-4
4	-8

original

x	y
-1	1
0	4
1	7

2 ( )

x	y
0	0
1	-2
2	-4

2 ( )

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$D_{2,(0,0)}(y= 3x +4)$

x	y
-2	2
0	8
2	14

$D_{2,(0,0)}(y = -2x)$

x	y
0	0
2	-4
4	-8

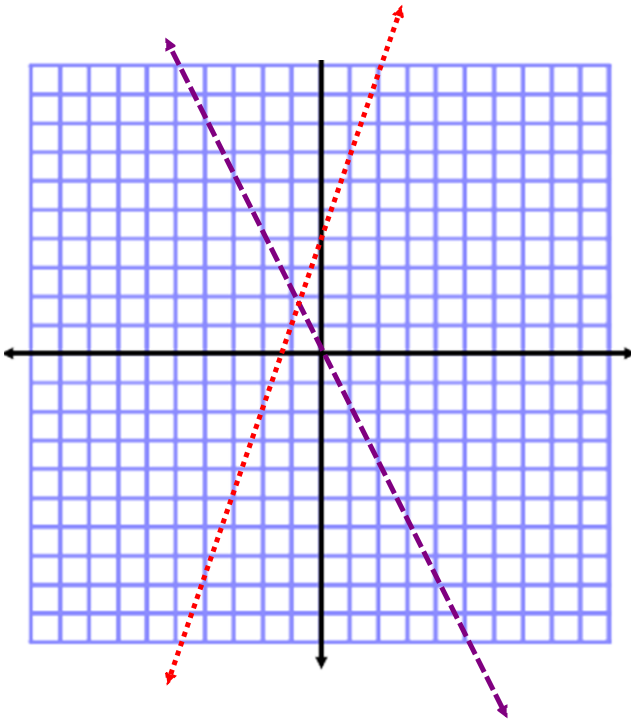
4. Graph the new points to determine the equations of the images of the dilated lines.

mult. by scale factor

$D_{2,(0,0)}(y = 3x + 4) \rightarrow$ $y = 3x + 8$

$m = 3 \quad b = 8$

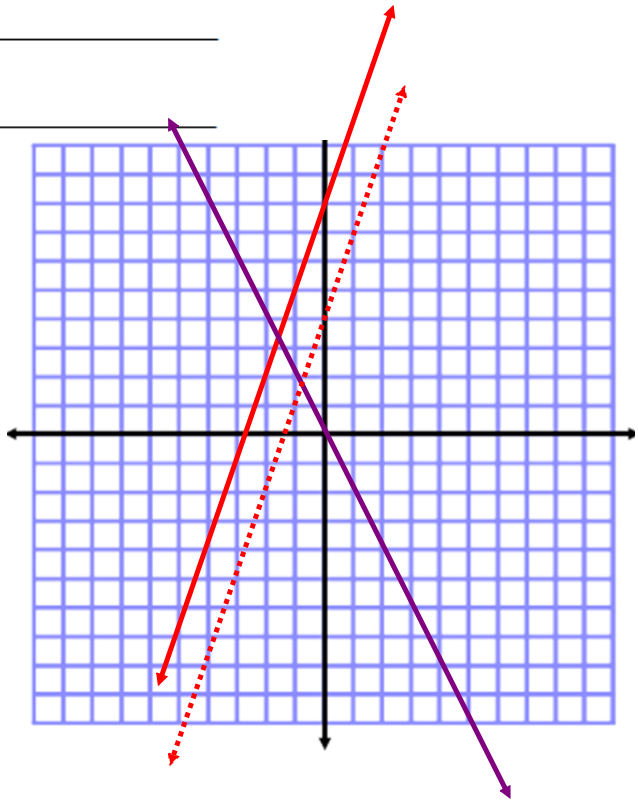
$D_{2,(0,0)}(y = -2x) \rightarrow$ $y = -2x$



4. Graph the new points to determine the equations of the images of the dilated lines.

$D_{2,(0,0)}$(y= 3x +4)→ _____

$D_{2,(0,0)}$(y = -2x)→ _____



Make a conjecture about the equations of lines that have been dilated:

When a line that passes through the center of dilation is dilated the new equation

is the same → same slope, same y-int.

When a line that does NOT pass through the center of dilation is dilated the new equation

changes ← same slope (//), diff. y-int. (mult. by k)

Shortcut: *To find the new equation always use matching slopes and to find the new y-intercept multiply the given y-intercept by the scale factor*

b = -2

1. The line y = 4x - 2 is dilated by a scale factor of 5 and centered at the origin. Which equation represents the image of the line after the dilation?

(1) y = 4x - 2
(2) y = 4x - 10
(3) y = 20x - 2
(4) y = 20x - 10

b = -2
x 5
-10

① Does it pass through origin?
↳ yes (Same equation)
↳ NO (Same slope, diff y-int, mult by k)

2. The line y = -7x is dilated by a scale factor of 3 and centered at the origin. Which equation represents the image of the line after the dilation?

(1) y = -7x
(2) y = -7x + 3
(3) y = -21x
(4) y = -21x + 3

① Does it pass through origin?

yes

3. The line $y - 3x = 0$ is dilated by a scale factor of 4 and centered at the origin. Determine an equation of the image of the line after the dilation.

$y = 3x$ ① yes

↳ same equation

4. The line y + 3 = -5(x - 1) is dilated by a scale factor of -2 and centered at the origin. Determine an equation of the image of the line after the dilation.

(0,0)

$y+3=-5x+5$

$-3 \quad -3$

$y=-5x+2$

$m=-5 \quad b=2$

$x-2$

-4

$y=-5x-4$

① Does it pass through (0,0)?

↳ ~~yes~~

↳ No ← same slope

← diff y-int

HW 10-8:

HW Packet 10-8