Linear equation under dilation

1. Plot the line $4x + 3y = 24$ and the point $D(3, 4)$ on the grid below. The line is dilated by a factor of 2.
   What is the equation of the new line in slope-intercept form?
   Regents question:

2. Jan 2018 #13
   The line whose equation is $3x - 5y = 4$ is dilated by a scale factor of $\frac{5}{3}$ centered at the origin. Which statements are true?
   Turn into long true-false problem

   (a) The image of the line has the same slope as the pre-image but a different y-intercept.

   (b) The image of the line has the same y-intercept as the pre-image but a different slope.

   (c) The image of the line has the same y-intercept as the pre-image.

   (d) The image of the line has a different slope and a different y-intercept from the pre-image.

3. Jan 2018 #30
   Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point $(3, 4)$, the equation of the dilated line is $y = \frac{4}{3} + 16$. Is Aliyah correct? Explain why

Point-slope applications

4. What is an equation of a line which passes through $(6, 9)$ and is perpendicular to the line whose equation is $4x - 6y = 15$?

5. Given $\overline{AB}$ where $A(1, 2)$ and $B(6, -8)$. What is the equation of the perpendicular bisector of $\overline{AB}$?

6. Given the triangle ABC shown. (graph) What is the equation of the line through C that is perpendicular to $\overline{AB}$? What are the coordinates of D, the intersection of $\overline{AB}$ and the altitude through C?

7. Prove that quadrilateral $ABCD$ is a rectangle by calculating the slope of each side and showing that consecutive sides are perpendicular.

8. Aug 2018 #35
   The vertices of quadrilateral MATH have coordinates M(4,2), A(1,-3), T(9,3), and H(6,8). Prove that quadrilateral MATH is a parallelogram. (scaffold)

   (a) Find four slopes, starting with: $m_{MA} = \dfrac{-3 - 2}{1 - 4} =$

(b) Make two statements about parallel sides:
$m_{MA} = m_{TH}$ *iff* _____ $\parallel$ _____

(c) Conclusion: $MATH$ is a parallelogram because both pairs of opposite sides are _____

Skills review

9. Write down the slope perpendicular to the given slope.
$m = \frac{1}{2}$ $m_{\perp} =$

10. Turn into true-false
Which equation represents a line that is perpendicular to the line represented by (equation)?
(various linear equations)

11. Write down the missing length of the triangle's sides. $(3, 4, 5; 6, 8, 10; 5, 12, 13; 7, 24, 25)$ data-driven variable inputs?

12. Write the reason justifying the following statement made in a proof:

$\overline{DE} \cong \overline{DE}$ _____

Distance

13. Rhombus $STAR$ has vertices $S(-1, 2)4$, $T(2, 3)$, $A(3, 0)$, and $R(0, -1)$. What is the perimeter of rhombus $STAR$?

Transformations

14. Triangle $A'B'C'$ is the image of triangle ABC after a translation of 2 units to the right and 3 units up. Is triangle ABC congruent to triangle $A'B'C'$? Explain why.
(Yes). Translation is a (rigid motion). Angles and lengths are (preserved). Therefore, the $\triangle$s' corresponding sides are congruent. $\triangle ABC \cong \triangle A'B'C'$ by (SSS).

Dilation preserves angle measures. Therefore the corresponding angles of the two triangles are congruent. $\triangle ABC \sim \triangle A'B'C'$ by (AAA).

15. Angelo says translation preserves length. Bartholemew thinks dilation preserves angle measures. Cathy adds that rotation preserves orientation. They are all right, but Doug is confused!

Make a table showing which transformations (translation, reflection, rotation, and dilation) preserve which features (include distance or length, angle measure, slope, parallelism, perpendicularity, and orientation).

* add true/false claims
* Rewrite as a sentence

For example, for $D_{origin,k=2}$ & slope, write "Dilation preserves slope."