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

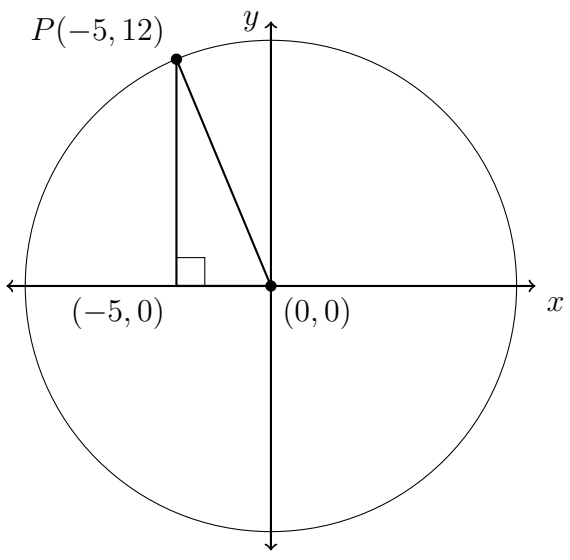
13. Rhombus $STAR$ has vertices $S(-1, 2)4$, $T(2, 3)$, $A(3, 0)$, and $R(0, -1)$. What is the perimeter of rhombus $STAR$?

Equation of a circle

14. The point $P(-5, 12)$ is on a circle centered at the origin, as shown below.

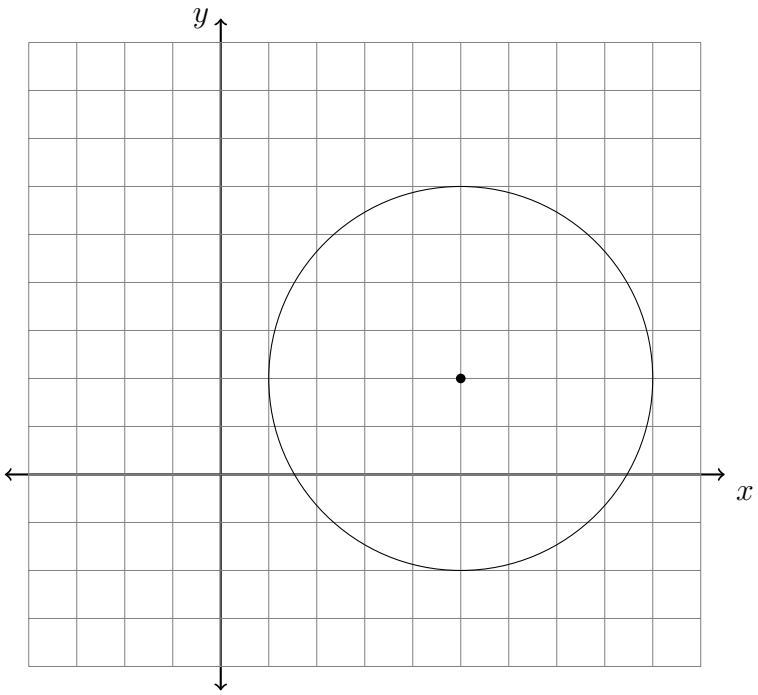
(a) Find the radius of the circle.

(b) Write down the equation of the cirle using the form $(x-a)^2+(y-b)^2 = r^2$.



15. What is the equation of a circle with center $(-3, 7)$ and radius $r = 4$?

16. What is an equation of circle O shown in the graph below?



(a) $x^2 + 10x + y^2 + 4y = -13$
(b) $x^2 - 10x + y^2 - 4y = -13$
(c) $x^2 + 10x + y^2 + 4y = -25$
(d) $x^2 - 10x + y^2 - 4y = -25$

17. What are the coordinates of the center and the length of the radius of the circle whose equation is $x^2 + y^2 = 8x - 6y + 39$?

(a) center $(-4, 3)$ and radius 64
(b) center $(4, -3)$ and radius 64
(c) center $(-4, 3)$ and radius 8
(d) center $(4, -3)$ and radius 8

18. The equation of a cirle is $x^2 + 8x + y^2 - 12y = 144$. What are the coordinates of the center and the length of the radius of the circle?

(a) center $(4, -6)$ and radius 12
(b) center $(-4, 6)$ and radius 12
(c) center $(4, -6)$ and radius 14
(d) center $(-4, 6)$ and radius 14

19. The equation of a cirle is $x^2 + y^2 - 6x + 2y = 6$. What are the coordinates of the center and the length of the radius of the circle?

    (a) center $(-3, 1)$ and radius 4

    (b) center $(3, -1)$ and radius 4

    (c) center $(-3, 1)$ and radius 16

    (d) center $(3, -1)$ and radius 16

20. What is an equation of a circle whose center is (1,4) and diameter is 10?

    (a) $x^2 - 2x + y^2 - 8y = 8$

    (b) $x^2 + 2x + y^2 + 8y = 8$

    (c) $x^2 - 2x + y^2 - 8y = 83$

    (d) $x^2 + 2x + y^2 + 8y = 83$

21. The equation of a cirle is $x^2 + y^2 + 4x - 8y = -16$. The statement that best describes circle O is the

    (a) center is $(2, -4)$ and is tangent to the x-axis

    (b) center is $(2, -4)$ and is tangent to the y-axis

    (c) center is $(-2, 4)$ and is tangent to the x-axis

    (d) center is $(-2, 4)$ and is tangent to the y-axis