

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: $m_{MA} = \frac{-3 - 2}{1 - 4} =$

(b) Make two statements about parallel sides:

$$m_{MA} = m_{TH} \text{ iff } \underline{\hspace{2cm}} \parallel \underline{\hspace{2cm}}$$

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

Volume

9. #31 Jun 2108

Randy's basketball is in the shape of a sphere with a maximum circumference of 29.5 inches. Determine and state the volume of the basketball, to the nearest cubic inch.

(a) What is the radius of the basketball?

(b) What is 85% of the volume?

(c) (What is the volume of 2 balls?)

10. #7 Jan 2018

An ice cream waffle cone can be modeled with a right circular cone with a base diameter of 6.6 centimeters and a volume of 54.45π cubic centimeters. What is the number of centimeters in the height of the waffle cone?

(a) Write down the formula to use.

(b) Let x be the value to be solved for. $x = \underline{\hspace{3cm}}$

(c) Substitute the given values into the formula.

Give page of text questions to be completed. (Formatting note)

For each problem, complete the three modeling steps, as in the example above. Do not solve the algebra.

Include scale factor examples

Ask for intermediate values, like the length of a side, or the radius (strike extra words).

eg:

11. A regular pyramid has a square base. The perimeter of the base is 36 inches and the height of the pyramid is 15 inches. What is the volume of the pyramid in cubic inches?

Skills review

12. Write down the slope perpendicular to the given slope.

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

13. Turn into true-false

Which equation represents a line that is perpendicular to the line represented by (equation)?

(various linear equations)

14. 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?

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

$$\overline{DE} \cong \overline{DE} \quad \underline{\hspace{2cm}}$$

Distance

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

Transformations

17. 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 Δ 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).

18. 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."