

Dilations and Similarity: math test solutions, Grade 8

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Test solutions with the detailed point scale. Add up your points and spot what to review.

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Scale factor and lengths

/ 3 pts

a. $k = \frac{15}{6} = 2.5$. (1 pt)

b. $OB' = 2.5 \times 8 = 20$ cm. (1 pt)

c. $A'B' = 2.5 \times 4.2 = 10.5$ cm. (1 pt)

2 Dilation on the coordinate plane

/ 4 pts

a. $K(-2, 1) \rightarrow K'(-3, 1.5)$ (1 pt), $L(4, 1) \rightarrow L'(6, 1.5)$ (1 pt),

$M(-2, -3) \rightarrow M'(-3, -4.5)$ (1 pt).

b. $KL = 4 - (-2) = 6$ and $K'L' = 6 - (-3) = 9 = 1.5 \times 6$. (1 pt)

3 Similar triangles

/ 3 pts

a. $k = \frac{ST}{PQ} = \frac{6}{9} = \frac{2}{3}$. (1 pt)

b. $TU = \frac{2}{3} \times 12 = 8$ and $SU = \frac{2}{3} \times 15 = 10$. (1 pt)

c. Perimeters: $9 + 12 + 15 = 36$ and $6 + 8 + 10 = 24$, and $\frac{24}{36} = \frac{2}{3}$: the perimeter is multiplied by the scale factor. (1 pt)

4 Angles of a triangle

/ 3 pts

a. $x + 2x + 10 + 3x + 20 = 180$, so $6x = 150$ and $x = 25$ (1 pt). The angles are 25° , 60° , and 95° (1 pt).

b. The exterior angle is $180 - 60 = 120^\circ$, which equals $25 + 95$, the sum of the two remote interior angles. (1 pt)

5 Indirect measurement (calculator allowed)

/ 4 pts

a. The person and the building are both vertical (right angles) and the sun's rays make the same angle with the ground, so two angles match: the triangles are similar by AA. (1 pt)

b. $\frac{h}{36} = \frac{6}{4}$, so $h = 36 \times 1.5 = 54$ ft. (2 pts)

c. $54 \times 0.3048 \approx 16.5$ m. (1 pt)

6 A sequence of transformations

/ 3 pts

a. Translation: $(4, 2)$, $(6, 2)$, $(4, 5)$ (1 pt). Dilation: $D'(8, 4)$, $E'(12, 4)$, $F'(8, 10)$ (1 pt).

b. They are similar because the sequence includes a dilation. They are not congruent because the scale factor is **2**, not **1**: for example $DE = 2$ but $D'E' = 4$. (1 pt)



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