

Dilations and Similarity: math test, Grade 8 – download the PDF

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

1 Scale factor and lengths

/ 3 pts

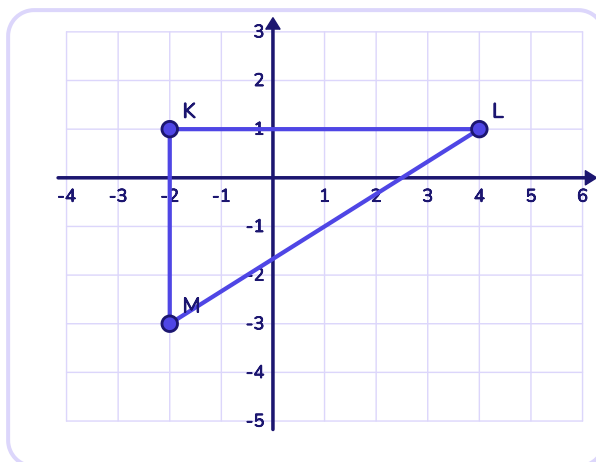
A dilation has center O . Point A is 6 cm from O and its image A' is 15 cm from O .

- Find the scale factor k .
- Point B is 8 cm from O . How far is B' from O ?
- $AB = 4.2$ cm. Find $A'B'$.

2 Dilation on the coordinate plane

/ 4 pts

Triangle KLM is shown below. It is dilated with center the origin and scale factor 1.5 .



- Find the coordinates of K' , L' , and M' .
- Compare KL and $K'L'$.

3 Similar triangles

/ 3 pts

$\triangle PQR \sim \triangle STU$ with $PQ = 9$, $QR = 12$, $PR = 15$, and $ST = 6$.

- Find the scale factor from PQR to STU .
- Find TU and SU .
- Compare the perimeters of the two triangles.

4 Angles of a triangle

/ 3 pts

A triangle has angles x° , $(2x + 10)^\circ$, and $(3x + 20)^\circ$.

- Find x and the three angles.
- Extend a side to create the exterior angle at the vertex of the 60° angle (the extended side touches that vertex). Find this exterior angle and explain how it relates to the other two angles.

5

Indirect measurement (calculator allowed)

/ 4 pts

At the same time of day, a 6-ft-tall person casts a 4-ft shadow and a building casts a 36-ft shadow.

- Explain why the triangles formed are similar.
- Find the height of the building in feet.
- Convert it to meters ($1 \text{ ft} = 0.3048 \text{ m}$) and round to the nearest tenth.

6

A sequence of transformations

/ 3 pts

Triangle DEF has vertices $D(1, 2)$, $E(3, 2)$, $F(1, 5)$. It is translated 3 units to the right, then dilated with center the origin and scale factor 2.

- Find the vertices of the final image $D'E'F'$.
- Are DEF and $D'E'F'$ similar? Congruent? Explain.

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