

Similarity and Dilations: math test, Grade 10 – download the PDF

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

1 Dilation

/ 3 pts

Dilate $A(2, 4)$, $B(6, -2)$, and $C(-4, 0)$ from the origin with scale factor 2.5.

- Find A' , B' , and C' .
- What is the ratio $\frac{A'B'}{AB}$?

2 Are they similar?

/ 3 pts

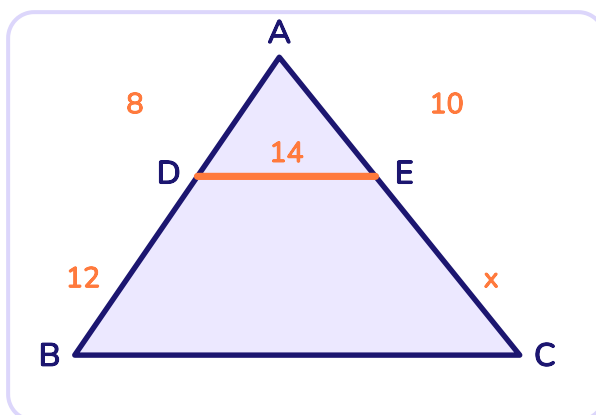
For each pair, decide whether the triangles are similar and name the criterion.

- Sides 7, 10, 14 and sides 10.5, 15, 21.
- Angles 35° , 80° and angles 80° , 65° .
- Two sides 5 and 8 with included angle 60° ; two sides 10 and 12 with included angle 60° .

3 Parallel line in a triangle

/ 4 pts

In triangle ABC , $DE \parallel BC$ with D on AB and E on AC . $AD = 8$, $DB = 12$, $AE = 10$, and $DE = 14$.



- Find EC .
- Find BC .
- Find the ratio of the areas of $\triangle ADE$ and $\triangle ABC$.

4 Angle bisector

/ 3 pts

In triangle ABC , $AB = 15$, $AC = 10$, and $BC = 20$. The bisector of $\angle A$ meets BC at D . Find BD and DC , then verify the theorem.

5 A tall sign

/ 3 pts

A 5 ft sign casts a 2 ft shadow. At the same time, a building casts a 30 ft shadow. Find the height of the building in feet and in meters (1 ft = 0.3048 m, round to the nearest tenth).

6 Banners

/ 4 pts

Two similar triangular banners have perimeters 36 in and 90 in. The small banner has area 48 in^2 and longest side 15 in.

- Find the scale factor from the small to the large banner.
- Find the longest side of the large banner.
- Find the ratio of the areas.
- Find the area of the large banner.



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