Similar Triangles Practice

Use this key to check answers and read the explanations.

1. Triangles PQR and VWX are similar. P matches V, Q matches W, and R matches X. Which pair contains corresponding sides?

A. PR and VX
B. PR and VW
C. QR and VX
D. PQ and WX

Correct answer: A. PR and VX
Match the endpoints of each side. P goes with V and R goes with X, so side PR corresponds to side VX.

2. Triangle ABC is similar to triangle DEF, with vertices listed in corresponding order. Angle A is 49° and angle B is 72°. What is the measure of angle E?

A. 59°
B. 49°
C. 72°
D. 108°

Correct answer: C. 72°
B and E are the second vertices in their lists, so they correspond. Matching angles in similar triangles have the same measure.

3. In similar triangles ABC and JKL, side AB corresponds to side JK. If AB = 6 cm and JK = 15 cm, what is the scale factor from ABC to JKL?

A. 2/5
B. 5/2
C. 3/2
D. 9

Correct answer: B. 5/2
Divide the new length by the original length. The scale factor from ABC to JKL is 15 ÷ 6 = 5/2.

4. Triangle ABC is similar to triangle DEF in that order. AB = 9 cm, DE = 6 cm, and BC = 15 cm. What is EF?

A. 18 cm
B. 22.5 cm
C. 12 cm
D. 10 cm

Correct answer: D. 10 cm
AB corresponds to DE, so the factor from ABC to DEF is 6/9 = 2/3. EF corresponds to BC, so EF = 15 × 2/3 = 10 cm.

5. Similar triangles ABC and DEF have corresponding sides AB = 8 cm and DE = 12 cm. The perimeter of ABC is 34 cm. What is the perimeter of DEF?

A. 38 cm
B. 51 cm
C. 22⅔ cm
D. 76.5 cm

Correct answer: B. 51 cm
The side lengths all grow by a factor of 12/8 = 3/2. Their sum grows by that same factor, giving 34 × 3/2 = 51 cm.

6. In triangle ABC, angle A is 31° and angle B is 94°. In triangle DEF, angle D is 55° and angle E is 31°. Which triangle is similar to ABC with its vertices listed in corresponding order?

A. EFD
B. EDF
C. DEF
D. FED

Correct answer: A. EFD
Subtract the two known angles in each triangle from 180°. Angle C is 55° and angle F is 94°. The equal angles match A to E, B to F, and C to D, proving similarity by angle-angle.

7. Triangle ABC has AB = 8 cm, BC = 10 cm, and CA = 13 cm. Which list of lengths for JK, KL, and LJ, in that order, makes JKL similar to ABC with A matching J, B matching K, and C matching L?

A. 12 cm, 16 cm, 18 cm
B. 12 cm, 15 cm, 21 cm
C. 12 cm, 14 cm, 19 cm
D. 12 cm, 15 cm, 19.5 cm

Correct answer: D. 12 cm, 15 cm, 19.5 cm
The first pair sets a scale factor of 12/8 = 3/2. At that scale, BC becomes 15 cm and CA becomes 19.5 cm. Only this list uses one factor for all three pairs.

8. In triangle ABC, AB = 12 cm, AC = 14 cm, and angle A is 48°. Triangle DEF has DE = 18 cm and DF = 21 cm. Which extra fact establishes that ABC and DEF are similar in that order by side-angle-side?

A. Angle F is 48°.
B. Angle E is 48°.
C. Angle D is 48°.
D. Angle D is 52°.

Correct answer: C. Angle D is 48°.
The two side pairs are proportional because 18/12 = 21/14 = 3/2. The sides in DEF meet at D, so the included angle D must match angle A.

9. Triangles JKL and MNP share the same measure for angles J and M. The side lengths are JK = 9 cm, JL = 16 cm, MN = 18 cm, and MP = 34 cm. A student claims JKL is similar to MNP in that order. Which check correctly tests the claim?

A. 18/9 and 34/16 are unequal, so this correspondence fails.
B. Equal angles J and M are enough to prove the claim by angle-angle.
C. Both pairs grow in length, so the side ratios establish the claim.
D. 18/9 and 34/16 are close enough to prove the claim by rounding.

Correct answer: A. 18/9 and 34/16 are unequal, so this correspondence fails.
The proposed correspondence pairs JK with MN and JL with MP. Their scale factors are 2 and 17/8. A similarity would need the same scale factor for both pairs.

10. On level ground at the same time, a vertical signpost casts a 9.6 m shadow and a nearby 1.5 m vertical marker casts a 2.4 m shadow. The two triangles match height to height and shadow to shadow. How tall is the signpost?

A. 15.36 m
B. 4 m
C. 8.7 m
D. 6 m

Correct answer: D. 6 m
Both triangles have right angles at the ground and the same sunlight angle. The shadows give a scale factor of 9.6/2.4 = 4, so the signpost is 4 × 1.5 = 6 m tall.

11. Triangle JKL is similar to triangle MNP in that order. JK = 9 cm and MN = 15 cm. The corresponding lengths KL and NP are x + 3 and 3x − 1 centimeters. What is NP?

A. 10 cm
B. 7.5 cm
C. 12.5 cm
D. 14 cm

Correct answer: C. 12.5 cm
Scale KL by 15/9 to get NP. The equation 3x − 1 = (5/3)(x + 3) gives 9x − 3 = 5x + 15, so x = 4.5 and NP = 12.5 cm.

12. Triangle ABC is similar to triangle PQR in that order. Their areas are 28 cm² and 63 cm², respectively. If AC = 16 cm, what is PR?

A. 36 cm
B. 24 cm
C. 32 cm
D. 10⅔ cm

Correct answer: B. 24 cm
Area scales by the square of the length factor because both a base and its height scale. The area ratio is 63/28 = 9/4, so the length factor is 3/2. PR = 16 × 3/2 = 24 cm.

13. In triangle KLM, S lies between K and L, and T lies between K and M. Segment ST is parallel to LM. If KS = 7 cm, SL = 5 cm, and KT = 10.5 cm, what is TM?

A. 4.375 cm
B. 18 cm
C. 5 cm
D. 7.5 cm

Correct answer: D. 7.5 cm
Triangles KST and KLM share angle K. Because ST is parallel to LM, angle KST equals angle KLM. By angle-angle, KT/KM = KS/KL = 7/12. Thus KM = 18 cm, and TM = 18 − 10.5 = 7.5 cm.

14. Triangle ABC has A(−1, 1), B(3, 1), and C(−1, 4). Triangle PQR has P(8, 3), Q(8, 11), and R(2, 3). Which order matches the vertices to ABC, and what is the length factor from ABC to PQR?

A. PQR, with factor 2
B. PRQ, with factor 2
C. QPR, with factor 2
D. PQR, with factor 1/2

Correct answer: A. PQR, with factor 2
AB and AC have lengths 4 and 3. PQ and PR have lengths 8 and 6, and both pairs meet at right angles. By side-angle-side, A matches P, B matches Q, and C matches R, with a factor of 2.

15. Triangle ABC has a right angle at C. Point D lies between A and B, and CD is perpendicular to AB. If AD = 25 cm and DB = 144 cm, what is CD?

A. 156 cm
B. 65 cm
C. 60 cm
D. 169 cm

Correct answer: C. 60 cm
Triangles ADC and CDB both have a right angle at D. Angles DAC and DCB each complement angle ACD, so the triangles are similar by angle-angle in that order. Thus AD/CD = CD/DB, giving $CD^2 = 25 \times 144$ and CD = 60 cm.