Geometric Twins

Standard difficulty · 20 questions · 40 marks · Time: 30 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. In △PQR and △MKL, PQ = MK, QR = KL and RP = LM. The triangles are congruent by:
(a) SSS **(b)** RHS **(c)** ASA **(d)** SAS

2. △GHI ≅ △WUV. Which side equals HI?
(a) IG **(b)** WU **(c)** UV **(d)** VW

3. Two figures that have exactly the same shape and size are called:
(a) parallel **(b)** symmetrical **(c)** similar only **(d)** congruent

4. △UVW ≅ △CBA. Which angle equals ∠V?
(a) ∠W **(b)** ∠A **(c)** ∠B **(d)** ∠C

5. △KLM ≅ △TSR. ∠K = 62° and ∠L = 29°. What is ∠R?
(a) 118° **(b)** 62° **(c)** 89° **(d)** 29°

6. △LMN has sides of 7 cm, 10 cm, 6 cm. If △LMN ≅ △CBA, the perimeter of △CBA is:
(a) 23 cm **(b)** 24 cm **(c)** 46 cm **(d)** 16 cm

7. AB = PQ, BC = QR and CA = RP. The triangles are congruent by:
(a) ASA **(b)** SAS **(c)** SSS **(d)** RHS

8. In △GHI, GH = GI and ∠H = 62°. What is ∠G?
(a) 118° **(b)** 62° **(c)** 56° **(d)** 124°

Section B — Short answer — 8 × 2 = 16 marks

9. △GHI ≅ △VWU. GH = 11 cm, HI = 7 cm and IG = 11 cm. Find VW, WU and UV.

10. In △UVW, UV = 12 cm, ∠V = 46° and VW = 6 cm. In △ABC, AB = 12 cm, ∠B = 46° and BC = 6 cm. Are they congruent? By which rule? Write the congruence.

11. △ABC ≅ △RQP. In △RQP, ∠R = 84° and ∠Q = 50°. Find all three angles of △ABC.

12. One triangle has sides 5, 10, 9 cm and another has sides 9, 10, 6 cm. Are they congruent?

13. △LMN and △UVW both have a right angle. Each has a hypotenuse of 30 cm and one other side of 18 cm. Are they congruent? By which rule?

14. Two equilateral triangles each have a perimeter of 45 cm. What is the length of each side, what is each angle, and are the triangles congruent?

15. In kite ABCD, AB = AD = 7 cm and CB = CD = 12 cm. ∠BAC = 47°. Find ∠DAC and give the reason.

16. A rectangle 12 cm by 3 cm is cut along a diagonal. Are the two triangles congruent? What is the area of each?

Section C — Word problems — 4 × 4 = 16 marks

17. Two roof trusses are congruent triangles. One has a base of 4 m, a height of 3 m and an angle of 120° at the top. What are the base, height and top angle of the other truss?

18. A bridge has two triangular supports. In each, one side is 10 m and the angles at the ends of that side are 78° and 88°. Are the supports congruent, and by which rule? What is the third angle of each?

19. Arjun folds a rectangular sheet 22 cm by 19 cm along its diagonal. Do the two halves fit exactly on each other? What is the area of each half?

20. A kite frame has AB = AD = 32 cm and CB = CD = 53 cm, with a stick along AC. The angle between AB and the stick is 69°. What is the angle between AD and the stick? Which rule shows the two halves are congruent?

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Answer key

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Q	Answer	Working
1	**(a) SSS**	—
2	**(c) UV**	the letters match in order
3	**(d) congruent**	—
4	**(c) ∠B**	the letters match in order
5	**(c) 89°**	∠R = ∠M = 180° − 62° − 29°
6	**(a) 23 cm**	congruent triangles have equal sides, so equal perimeters
7	**(c) SSS**	—
8	**(c) 56°**	∠I = ∠H = 62°; 180° − 2 × 62°
9	**11 cm, 7 cm, 11 cm**	matching sides of congruent triangles are equal
10	**Yes, by SAS; △UVW ≅ △ABC**	two sides and the angle between them are equal
11	**∠A = 84°, ∠B = 50°, ∠C = 46°**	matching angles are equal; the third is 180° − 134°
12	**No**	the side lengths are not all the same
13	**Yes, by RHS**	right angle, equal hypotenuses and one equal side
14	**15 cm; 60°; yes**	45 ÷ 3 = 15; all sides equal, so SSS
15	**47°**	△ABC ≅ △ADC by SSS (AC is shared), so the matching angles are equal
16	**Yes; 18 cm^2**	SSS: the same three sides; 12 × 3 ÷ 2
17	**4 m, 3 m, 120°**	congruent shapes have all matching parts equal
18	**Yes, by ASA; 14°**	180° − 78° − 88°
19	**Yes, they are congruent; 209 cm^2**	22 × 19 = 418; half is 209
20	**69°; SSS**	AB = AD, CB = CD and AC is shared

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