

## HASOOLEILM TUITION ACADEMY

### Topic 12: Similar Figures

**Instructions:** Circle the letter of the BEST answer. Each correct answer = 1 mark. Time: 20 minutes.

Q1. Two triangles are shown below. Triangle I has sides 3 cm, 4 cm, 5 cm. Triangle II has sides 6 cm, 8 cm, 10 cm. Are they similar?

<b>A</b> Yes — corresponding sides are proportional	<b>B</b> No — the triangles have different perimeters
<b>C</b> No — the triangles have different areas	<b>D</b> Cannot be determined without the angles

Q2. Triangle ABC has angles  $40^\circ$ ,  $60^\circ$ ,  $80^\circ$ . Triangle PQR has angles  $40^\circ$ ,  $60^\circ$ ,  $80^\circ$ . Which statement is CORRECT?

<b>A</b> They are congruent because all angles match	<b>B</b> They are similar because all corresponding angles are equal (AA criterion)
<b>C</b> They are not similar because the sides may differ	<b>D</b> They are similar only if one side of each triangle is equal

Q3. Triangle X has sides 5 cm, 12 cm, 13 cm. Triangle Y has sides 10 cm, 24 cm, 27 cm. Are Triangles X and Y similar?

<b>A</b> Yes — all ratios are 1:2	<b>B</b> No — the ratio $13:27 \neq 1:2$ , so sides are not proportional
<b>C</b> Yes — two of the three ratios are equal	<b>D</b> Yes — the triangles are right-angled

Q4. In the figure, two triangles share the same angle at the top. The sides adjacent to this angle are in ratio 3:6 and 4:8. Are the triangles similar?

<b>A</b> No — two sides and an angle are not enough	<b>B</b> Yes — SAS similarity: the included angle is equal and the adjacent sides are proportional
<b>C</b> Yes — but only by the SSS rule	<b>D</b> No — the triangles must have equal areas

Q5. A triangle has sides 6 cm, 8 cm, 10 cm. A second triangle has sides 9 cm, 12 cm, 15 cm. Which of the following correctly identifies the scale factor from the first to the second triangle?

<b>A</b> Scale factor = 2	<b>B</b> Scale factor = 1.5
<b>C</b> Scale factor = 3	<b>D</b> Scale factor = 0.5

Q6. Square P has side 4 cm. Square Q has side 9 cm. Are Square P and Square Q similar?

<b>A</b> No — similar figures must have equal sides	<b>B</b> Yes — all angles are $90^\circ$ and sides are proportional
<b>C</b> No — their areas are different	<b>D</b> Yes — only if their diagonals are equal

Q7. Rectangle A measures 4 cm  $\times$  6 cm. Rectangle B measures 6 cm  $\times$  9 cm. Are these rectangles similar?

<b>A</b> No — the rectangles have different dimensions	<b>B</b> Yes — all rectangles are similar
<b>C</b> Yes — ratio of length to width is 2:3	<b>D</b> No — similar figures must be congruent

Q8. Rectangle  $R_1$  has length-to-width ratio 5:3. Rectangle  $R_2$  also has length-to-width ratio 5:3. Which statement is CORRECT?

<b>A</b> They are congruent	<b>B</b> They are similar
-----------------------------	---------------------------

<b>C</b> They cannot be similar unless they have the same perimeter	<b>D</b> They are similar only if they have the same area
---	---

Q9. Cube A has edge length 3 cm. Cube B has edge length 5 cm. Are they similar?

<b>A</b> No — similar 3-D figures must have equal edge lengths	<b>B</b> Yes — all cubes are similar; all edge ratios are equal and all angles are $90^\circ$
<b>C</b> No — cubes are 3-D and cannot be compared by similarity	<b>D</b> Yes — only if the cubes have the same colour

Q10. Cuboid X has dimensions 2 cm × 3 cm × 4 cm. Cuboid Y has dimensions 4 cm × 6 cm × 8 cm. Are they similar?

<b>A</b> No — the volumes are different	<b>B</b> No — the surface areas are different
<b>C</b> Yes — all corresponding dimensions are in ratio 1:2	<b>D</b> Yes — only length and width are proportional

Q11. Cuboid P has dimensions 1 cm × 2 cm × 4 cm. Cuboid Q has dimensions 2 cm × 4 cm × 6 cm. Are they similar?

<b>A</b> Yes — all rectangular boxes are similar	<b>B</b> No — the ratios 1:2, 2:4, and 4:6 are not all equal ( $4:6 \neq 1:2$ )
<b>C</b> Yes — two of the three ratios are equal	<b>D</b> No — similar figures must be two-dimensional

Q12. A cube of side 4 cm and a cuboid of dimensions 4 cm × 4 cm × 6 cm are compared. Are they similar?

<b>A</b> Yes — they share a 4 cm × 4 cm face	<b>B</b> No — their ratios are not proportional
<b>C</b> Yes — all their faces are rectangles	<b>D</b> No — 3-D figures can never be similar

Q13. Two cuboids have dimensions 3 cm × 4 cm × 5 cm and 6 cm × 8 cm × 10 cm respectively. What is the scale factor from the first to the second?

<b>A</b> Scale factor = 3	<b>B</b> Scale factor = 2
<b>C</b> Scale factor = 1.5	<b>D</b> Scale factor = 4

Q14. Is a semicircle similar to a full circle?

<b>A</b> Yes — both are round figures	<b>B</b> No — a semicircle and a full circle have different shapes; they are not similar
<b>C</b> Yes — their radii can be made equal	<b>D</b> No — only figures of exactly the same type can be similar

Q15. A semicircle with radius  $r_1$  and a semicircle with radius  $r_2$  are given. The scale factor from the first to the second is:

<b>A</b> $r_1 + r_2$	<b>B</b> $r_1 \times r_2$
<b>C</b> $r_1 / r_2$	<b>D</b> $r_2 / r_1$

Q16. Which of the following pairs of figures are ALWAYS similar to each other?

<b>A</b> Any two rectangles	<b>B</b> Any two right-angled triangles
<b>C</b> Any two circles	<b>D</b> Any two cuboids

Q17. Two similar triangles have corresponding sides in ratio 2:5. What is the ratio of their areas?

<b>A</b> 2:5	<b>B</b> 4:25
<b>C</b> 8:125	<b>D</b> 4:10

Q18. Two similar circles have radii  $r_1 = 3$  cm and  $r_2 = 6$  cm. Using  $A_1/A_2 = (r_1/r_2)^2$ , what is  $A_1/A_2$ ?

<b>A</b> 1:2	<b>B</b> 1:4
<b>C</b> 1:8	<b>D</b> 3:6

Q19. The areas of two similar rectangles are  $16$  cm<sup>2</sup> and  $100$  cm<sup>2</sup>. What is the ratio of their corresponding sides (lengths)?

<b>A</b> 4:10	<b>B</b> 16:100
<b>C</b> 2:5	<b>D</b> 8:50

Q20. Two similar figures have areas  $49$  cm<sup>2</sup> and  $121$  cm<sup>2</sup>. What is the scale factor (ratio of corresponding lengths)?

<b>A</b> 7:11	<b>B</b> 49:121
<b>C</b> 14:22	<b>D</b> $\sqrt{7}:\sqrt{11}$

Q21. Two similar squares have sides  $5$  cm and  $10$  cm. The area of the smaller square is  $25$  cm<sup>2</sup>. What is the area of the larger square?

<b>A</b> $50$ cm <sup>2</sup>	<b>B</b> $100$ cm <sup>2</sup>
<b>C</b> $75$ cm <sup>2</sup>	<b>D</b> $200$ cm <sup>2</sup>

Q22. Two similar triangles have sides in ratio  $l_1:l_2 = 3:7$ . Their areas are  $A_1$  and  $A_2$ . Using  $A_1/A_2 = (l_1/l_2)^2$ , what is  $A_1/A_2$ ?

<b>A</b> 3:7	<b>B</b> 9:49
<b>C</b> 27:343	<b>D</b> 6:14

Q23. Circle P has radius  $5$  cm and area  $25\pi$  cm<sup>2</sup>. Circle Q is similar with radius  $10$  cm. What is the area of Circle Q?

<b>A</b> $50\pi$ cm <sup>2</sup>	<b>B</b> $75\pi$ cm <sup>2</sup>
<b>C</b> $100\pi$ cm <sup>2</sup>	<b>D</b> $125\pi$ cm <sup>2</sup>

Q24. Two similar figures have corresponding sides in ratio  $1:4$ . If the area of the smaller figure is  $9$  cm<sup>2</sup>, what is the area of the larger figure?

<b>A</b> $36$ cm <sup>2</sup>	<b>B</b> $72$ cm <sup>2</sup>
<b>C</b> $144$ cm <sup>2</sup>	<b>D</b> $576$ cm <sup>2</sup>

Q25. Two similar semicircles have radii  $4$  cm and  $6$  cm. Using  $A_1/A_2 = (r_1/r_2)^2$ , what is the ratio of their areas?

<b>A</b> 2:3	<b>B</b> 4:6
<b>C</b> 4:9	<b>D</b> 8:27

Q26. The area of a larger similar figure is  $4$  times the area of a smaller similar figure. What is the ratio of their corresponding side lengths?

<b>A</b> 4:1	<b>B</b> 2:1
<b>C</b> 8:1	<b>D</b> 16:1

Q27. Two similar cubes have sides in ratio  $2:3$ . Using  $V_1/V_2 = (l_1/l_2)^3$ , what is the ratio of their volumes?

<b>A</b> 4:9	<b>B</b> 6:9
<b>C</b> 8:27	<b>D</b> 2:3

Q28. Two similar spheres (circles extended to 3-D) have radii  $r_1 = 2$  cm and  $r_2 = 4$  cm. Using  $V_1/V_2 = (r_1/r_2)^3$ , what is  $V_1/V_2$ ?

<b>A</b> 1:2	<b>B</b> 1:4
<b>C</b> 1:8	<b>D</b> 1:6

Q29. Two similar cuboids have corresponding sides in ratio 1:5. What is the ratio of their volumes?

<b>A</b> 1:5	<b>B</b> 1:25
<b>C</b> 1:125	<b>D</b> 1:15

Q30. Two similar cylinders have radii  $r_1 = 3$  cm and  $r_2 = 9$  cm. Using  $V_1/V_2 = (r_1/r_2)^3$ , what is  $V_1/V_2$ ?

<b>A</b> 1:3	<b>B</b> 1:9
<b>C</b> 1:27	<b>D</b> 3:9

Q31. The volumes of two similar figures are  $8 \text{ cm}^3$  and  $64 \text{ cm}^3$ . What is the ratio of their corresponding side lengths?

<b>A</b> 1:4	<b>B</b> 1:2
<b>C</b> 1:8	<b>D</b> 2:8

Q32. A model car is similar to the real car with a scale factor of 1:20. If the volume of the model car is  $50 \text{ cm}^3$ , what is the volume of the real car?

<b>A</b> $1000 \text{ cm}^3$	<b>B</b> $20,000 \text{ cm}^3$
<b>C</b> $400,000 \text{ cm}^3$	<b>D</b> $8,000 \text{ cm}^3$

Q33. Two similar cones have radii in ratio  $l_1:l_2 = 4:6$ . Using  $V_1/V_2 = (l_1/l_2)^3$ , what is the ratio of their volumes?

<b>A</b> 8:18	<b>B</b> 16:36
<b>C</b> 64:216	<b>D</b> 4:6

Q34. The volume of a larger similar solid is 27 times the volume of a smaller similar solid. What is the ratio of their corresponding side lengths?

<b>A</b> 27:1	<b>B</b> 9:1
<b>C</b> 3:1	<b>D</b> 6:1

Q35. Two similar boxes (cuboids) have corresponding edges 5 cm and 10 cm. The volume of the smaller box is  $125 \text{ cm}^3$ . What is the volume of the larger box?

<b>A</b> $250 \text{ cm}^3$	<b>B</b> $500 \text{ cm}^3$
<b>C</b> $750 \text{ cm}^3$	<b>D</b> $1000 \text{ cm}^3$

---

*Best of luck!*