



Attempt questions first; check the separate key afterward. Show steps and draw labelled diagrams where asked.

A. Very short answers - 1 mark each

1. Define similar triangles.
2. State the AA similarity criterion.
3. Are all equilateral triangles similar?
4. Are all isosceles triangles similar?
5. State the basic proportionality theorem.
6. If similar sides are in ratio 2:3, find perimeter ratio.
7. In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. Write a ratio relation.
8. Can equal angles establish similarity without equal side lengths?

B. Short answers / practice - 2 marks each

9. In the stated parallel-line setup, $AD=3$, $DB=2$, $AE=6$. Find EC.
10. If $AB/DE=2$ and $\triangle ABC \sim \triangle DEF$, with $BC=10$, find EF.
11. Sides 3, 4, 5 and 6, 8, 10 form similar triangles. State the criterion.
12. Two triangles have proportional sides enclosing equal angles. Name criterion.
13. In $\triangle ABC$, $DE \parallel BC$, $AD/AB=2/5$ and $BC=15$. Find DE.
14. Explain why AAA gives similarity, not necessarily congruence.
15. A 1.5 m pole casts 2 m shadow; a tree casts 12 m shadow at the same time. Find tree height.
16. In $\triangle ABC$, $DE \parallel BC$, $AB=12$, $AD=8$, $AC=15$. Find AE.
17. If $AD=4$, $DB=6$, $AE=2$, $EC=3$, determine whether $DE \parallel BC$.
18. Sides of similar triangles are in ratio 4:7. One perimeter is 28. Find the other if it is larger.
19. A triangle has angles 50° , 60° , 70° . Another has angles 60° , 70° , 50° . Are they similar?
20. State a counterexample to 'equal perimeter implies similar triangles'.

C. Application / reasoning - 3 marks each

21. Prove the basic proportionality theorem using area ratios.

22. Prove the converse of the basic proportionality theorem.
23. A line parallel to one side cuts the other sides in ratio 3:2. Find the smaller-to-whole corresponding-side ratio.
24. In $\triangle ABC$, angle A equals angle D and angle B equals angle E of $\triangle DEF$. Match corresponding sides.
25. Two similar triangles have sides 5, 7, 8 and shortest side 15 in the larger. Find remaining sides.
26. Explain why similarity depends on vertex correspondence.
27. In $\triangle ABC$, $DE \parallel BC$, $AD=5$, $DB=3$ and $AE=10$. Find EC.
28. Two similar triangles have corresponding sides 6 cm and 15 cm. If the smaller perimeter is 28 cm, find the larger.
29. A 2 m person casts a 1.5 m shadow while a tower casts a 12 m shadow. Find tower height.
30. Sides 4,6,8 and 6,9,12 belong to two triangles. Test similarity.
31. Prove that a line through the midpoint of one side of a triangle, parallel to another side, bisects the third side.

D. Extended practice - 5 marks each

32. Prove AA similarity and use it to justify the shadow method for heights.
33. A ladder rests against a wall. Draw a smaller similar triangle using a horizontal line halfway up the wall; justify its scale factor.
34. In $\triangle ABC$, AD bisects angle A and meets BC at D. Using a parallel construction, prove $BD/DC=AB/AC$.
35. An observer sees the top of a tree in a ground mirror 2 m away; tree is 12 m beyond the mirror and eye height 1.6 m. Find tree height using similar triangles.

ANSWER KEY - Numerical / closed questions

- 3) Yes. 4) No. 6) 2:3. 7) $AD/DB=AE/EC$. 8) Yes. 9) 4. 10) 5. 11) SSS. 12) SAS. 13) 6. 15) 9 m. 16) 10. 17) Yes, by converse BPT. 18) 49. 19) Yes. 23) 3:5. 24) $AB \leftrightarrow DE$, $BC \leftrightarrow EF$, $CA \leftrightarrow FD$. 25) 21, 24. 27) 6. 28) 70 cm. 29) 16 m. 30) Similar by SSS; ratio 2:3. 33) 1/2. 35) 9.6 m.