

Foundation GCSE: Triangle Constructions

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Use a ruler, protractor, and a pair of compasses where appropriate. Construction arcs should be left visible.

1. Construct a triangle with side lengths 5 cm, 7 cm, and 9 cm using a ruler and a pair of compasses.
2. Construct an equilateral triangle with side length 6 cm using a ruler and a pair of compasses.
3. Construct an isosceles triangle with a base of 8 cm and two equal sides of 7 cm using a ruler and compasses.
4. Construct triangle ABC with side $AB = 7$ cm, angle $ABC = 60^\circ$, and side $BC = 6$ cm using a ruler and protractor.
5. Construct triangle PQR with angle $QPR = 50^\circ$, side $PQ = 8$ cm, and angle $PQR = 70^\circ$ using a ruler and protractor.
6. Construct a right-angled triangle with a base of 6 cm and a perpendicular height of 8 cm using a ruler and protractor.
7. Construct a triangle with sides 6 cm, 8 cm, and 10 cm using a ruler and compasses, and measure its largest angle using a protractor.
8. Construct an isosceles triangle with a vertex angle of 40° and two equal sides of 9 cm using a ruler and protractor.
9. Construct triangle XYZ where $XY = 7$ cm, $XZ = 9$ cm, and angle $\angle YXZ = 55^\circ$ using a ruler and protractor.
10. Construct a right-angled triangle with a hypotenuse of 10 cm and one base side of 6 cm using a ruler and compasses.
11. Construct a triangle with side lengths 5 cm, 12 cm, and 13 cm using a ruler and compasses, and verify with a protractor that the angle opposite the longest side is 90° .
12. Construct triangle DEF where side $DE = 8$ cm, angle $DEF = 45^\circ$, and the perpendicular height from F to DE is 5 cm using a ruler and protractor.
13. Construct an equilateral triangle inscribed inside a circle of radius 5 cm drawn using a pair of compasses.
14. Construct triangle ABC such that $AB = 10$ cm, angle $ABC = 30^\circ$, and angle $BAC = 45^\circ$ using a ruler and protractor.
15. Construct an isosceles triangle with a perimeter of 24 cm and a base of 8 cm using a ruler and compasses.
16. Construct a regular hexagon by constructing six equilateral triangles sharing a common vertex using a compass and ruler.
17. Construct a 30° angle by first constructing an equilateral triangle with a compass and then bisecting one of its interior angles.
18. Construct triangle PQR with side $PQ = 9$ cm, the median from R to PQ of length 6 cm, and angle $\angle RPQ = 60^\circ$ using a ruler and protractor.
19. Construct a triangle whose side lengths are in the ratio 3 : 4 : 5 with the shortest side equal to 6 cm using a ruler and compasses.
20. Construct triangle ABC with base $AB = 8$ cm, construct the perpendicular bisector of AB , locate point C on the bisector such that the height of the triangle is 7 cm, and measure angle ACB using a protractor.

Answers & Worked Solutions

1. Draw base 9 cm; use compasses set to 5 cm from one end and 7 cm from the other to locate the third vertex.
2. Draw base 6 cm; swing arcs of radius 6 cm from both endpoints to find the intersection point.
3. Draw base 8 cm; swing arcs of radius 7 cm from both endpoints to find the apex.
4. Draw line $AB = 7$ cm, measure 60° at B , draw a line of length 6 cm to C , and join AC .
5. Draw $PQ = 8$ cm, measure 50° at P and 70° at Q , and extend rays to intersect at R .
6. Draw base 6 cm, construct a 90° angle at one end, mark a height of 8 cm, and complete the triangle.
7. Construct sides 6 cm, 8 cm, and 10 cm using compasses; largest angle measured is 90° .
8. Draw side 9 cm, measure 40° at the vertex, draw second side 9 cm, and join the base.
9. Draw $XY = 7$ cm, measure 55° at X , mark length 9 cm along the arm to Z , and join YZ .
10. Draw base 6 cm, construct a perpendicular at one end, and swing an arc of radius 10 cm from the other end to intersect at the third vertex.
11. Draw 12 cm base, use compasses with radii 5 cm and 13 cm; measured angle opposite longest side is 90° .
12. Draw $DE = 8$ cm, construct a parallel line at distance 5 cm, and draw a 45° ray from E to intersect at F .
13. Draw circle of radius 5 cm, step out chords equal to the radius (5 cm) around the circumference, and connect alternate points.
14. Draw $AB = 10$ cm, measure 30° at B and 45° at A , and extend rays to intersect at C .
15. Equal sides $= (24 - 8) \div 2 = 8$ cm each; draw 8 cm base and construct arcs of radius 8 cm from both ends.
16. Draw a circle, step out the radius around the circumference to create six equilateral triangles meeting at the center.
17. Construct an equilateral triangle (60° angles) and bisect one corner angle using compasses to get 30° .
18. Draw $PQ = 9$ cm, construct 60° at P , locate the midpoint of PQ , swing an arc of radius 6 cm from the midpoint to find R , and complete the triangle.
19. Scale ratio 3 : 4 : 5 by factor 2 to get sides 6 cm, 8 cm, and 10 cm; construct using ruler and compasses.
20. Draw $AB = 8$ cm, construct its perpendicular bisector, measure 7 cm up from the midpoint to locate C , and measure $\angle ACB \approx 61.9^\circ$.