Six questions may be answered.

All questions carry equal marks.

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1. If in a triangle ABC the side BC is produced, and if D is any point on the produced part, prove that the angle ACD is greater than the angle BAC.

2. If one angle of a triangle is greater than another prove that the side opposite the greater angle is greater than the side opposite the lesser.

Show that in a right-angled triangle the hypotenuse is the greatest side.

3. Using ruler and compass only, construct an angle of (i) 90°, (ii) 45°, (iii) 30°.

[No proof required.]

4. Prove that the line joining the middle points of any two sides of a triangle is parallel to the third side.

5. If a rectangle and a triangle are on the same base and between the same parallels, prove that the area of the rectangle is double the area of the triangle.

Draw a triangle ABC so that the sides are 3, 4, and 5 inches in length respectively, and then construct a rectangle equal in area to ABC.

[No proof required.]

6. If a tangent and a chord are drawn through a point on the circumference of a circle, prove that the angles between these two lines are equal to the angles in the alternate segments of the circle.

[P.T.O.

7. Prove that the angle in a semicircle is a right angle.

O is the centre of a circle and AOB is a diameter. AP and AQ are chords so that ∠BAP=∠BAQ. Prove that AP=AQ.

8. Show, with proof, how to circumscribe about a given circle a triangle equiangular to a given triangle.

9. If two circles touch one another externally prove that the straight line joining their centres passes through the point of contact.

Two circles, whose centres are A and B, touch one another externally at O. A straight line LOM is drawn through O, meeting the circumference of the circle whose centre is A at L, and the circumference of the other circle at M. Prove that AL is parallel to BM.