Trigonometry (Sine Rule, Cosine Rule) and Circle Theorems

Year 10 · Geometry · y10-geo-area-triangle

Name: _____ Date: _____

Class: _____ Score: _____ / _____

Instructions
Answer every question in Practice. Try the Challenge section once Practice is complete. 10 questions in total.

Practice

1. In triangle ABC, angle A = 30° (sin 30° = 0.5), side a (opposite A) = 8 cm. Angle B has sin B = 0.75. Using the sine rule a/sin A = b/sin B, find side b.

2. A chord subtends an angle of 50° at the circumference. Using the angle at the centre theorem (the angle at the centre is twice the angle at the circumference), find the angle subtended at the centre by the same chord.

3. In triangle ABC, side b = 5 cm, side c = 8 cm, and angle A = 60° (cos 60° = 0.5). Using the cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$, find side a.

4. A triangle is inscribed in a circle with one side as the diameter. Using the angle in a semicircle theorem, what is the size of the angle opposite the diameter?

5. A tree casts a shadow 20 m long. The angle of elevation from the tip of the shadow to the top of the tree is 30° (tan 30° ~ 0.577). Find the height of the tree to 1 decimal place.

6. In the sine rule, each side is paired with the angle directly opposite it, not an adjacent angle. In triangle ABC, angle A = 30° (sin 30° = 0.5), side a = 10 cm. Angle C has sin C = 0.6. Find side c.

7. The cosine rule is $a^2 = b^2 + c^2 - 2bc \cos A$ — subtract the extra term, don't add it. In triangle ABC, side b = 8 cm, side c = 3 cm, and angle A = 60° (cos 60° = 0.5). Find side a.

8. A cyclic quadrilateral has opposite angles that sum to 180°, not angles that are equal. A cyclic quadrilateral has one angle of 75°. Find the angle opposite it.

Challenge

1. In triangle ABC, side b = 15 cm, side c = 8 cm, angle A = 60° (cos 60° = 0.5). Find side a, then find the perimeter of the triangle.

2. In triangle ABC, angle A = 30° (sin 30° = 0.5), side a = 9 cm. Angle C has sin C = 0.8. Find side c, to 1 decimal place.