ILLAWARRA TUTORING

In this worksheet you will challenge yourself with complex problems that require you to combine different trigonometric principles. Work through each question carefully, showing all relevant steps and using appropriate trigonometric techniques.

Easy Questions

1. A right-angled triangle has an acute angle of 30° and the side opposite this angle measures 4. Find the length of the hypotenuse.

2. A right-angled triangle has an acute angle of 45° and the side adjacent to this angle measures 5. Determine the length of the hypotenuse.

3. In a right-angled triangle the hypotenuse measures 10 and one of the acute angles is 60°. Find the length of the side opposite to the 60° angle.

4. A right-angled triangle has an acute angle of 36.87° and the side adjacent to this angle measures 8. Find the length of the side opposite this angle.

5. A right-angled triangle has sides of lengths 3, 4 and 5. Calculate the area of the triangle using an appropriate trigonometric method.

Intermediate Questions

6. In triangle ABC, angle A is 50°, side $a = 7$, and side $b = 9$. Use the sine rule to find the measure of angle B.

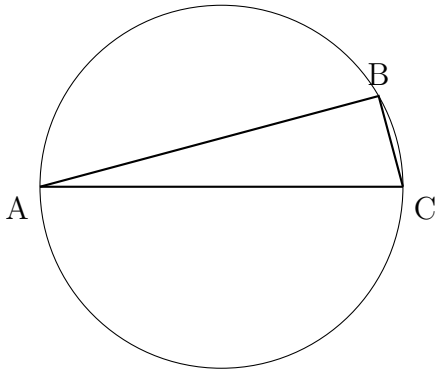
7. In triangle ABC, angle C is 70°, side $a = 10$, and side $c = 12$. Use the sine rule to find the measure of angle A.

8. In triangle ABC, two sides measure 7 and 9 with an included angle of 60°. Use the cosine rule to determine the length of the third side.

9. In triangle ABC, angle A is 40°, side $a = 8$, and side $b = 10$. First, use the sine rule to find angle B, and then use the cosine rule to determine the length of side c.

10. In triangle ABC, side $a = 12$, side $b = 15$, and angle $B = 55^\circ$. Determine the measure of angle A using the sine rule.

11. A right-angled triangle is inscribed in a circle such that the hypotenuse is the diameter. Given that one acute angle is 30° and the hypotenuse measures 10, find the lengths of the other two sides and calculate the area of the triangle.



12. In triangle ABC, side $a = 9$, side $b = 12$, and angle $C = 80°$. Calculate the area of the triangle using the formula $\frac{1}{2}ab\sin C$.

13. In triangle ABC, side $b = 14$, angle $A = 65°$, and angle $B = 50°$. Use the sine rule to determine the length of side a.

14. A triangle has sides of lengths 10, 8, and 6. First, determine the measure of the largest angle using the cosine rule. Then, compute the area of the triangle using two of the sides adjacent to that angle and the sine of the angle.

15. In triangle ABC, the sides measure $a = 8$, $b = 6$, and $c = 7$. Determine all three angles using the cosine rule.

16. In a right-angled triangle, the tangent of one acute angle is $\frac{3}{4}$ and the side adjacent to that angle is 8. Find the length of the hypotenuse.

17. In a right-angled triangle, the sine of one acute angle is 0.6 and the hypotenuse measures 15. Find the length of the side opposite the angle and determine the measure of the angle.

18. In a triangle, two sides measure 5 and 7, and the angle between them is 45°. Compute the area of the triangle.

19. In triangle ABC, angle $A = 30°$, side $a = 10$, and side $c = 14$. Use the sine rule to find the measure of angle C.

20. A right-angled triangle has an acute angle of 80° and the side adjacent to this angle measures 3. Determine the length of the side opposite the angle and the hypotenuse.

Hard Questions

21. In triangle ABC, the sides measure $a = 7$, $b = 9$, and $c = 11$. Determine all three angles using the cosine rule.

22. In triangle ABC, side $a = 13$, side $b = 14$, and angle $C = 40°$. First, use the cosine rule to find the length of side c, then use the sine rule to determine the measure of angle A.

23. Solve triangle ABC where angle $A = 50°$, side $a = 8$, and side $c = 10$. Find all unknown sides and angles.

24. In triangle ABC, angle $B = 65°$, angle $C = 55°$, and side $a = 10$. Use the sine rule to determine sides b and c, and then calculate the area of the triangle.

25. In a right-angled triangle, an acute angle measures $35°$ and the side opposite this angle measures 6. First, find the hypotenuse using the sine ratio and then determine the length of the adjacent side using the cosine ratio.

26. A triangle has sides of lengths 9, 12, and 15. First, use the cosine rule to confirm whether the triangle is right-angled, and then calculate its area.

27. In triangle ABC, angle $A = 40°$, angle $B = 70°$, and side $a = 10$. First, use the sine rule to find the length of side b, then determine angle C, and finally calculate the area of the triangle using sides a and b with the included angle.

28. In triangle ABC, side $a = 11$, side $b = 13$, and the included angle $C = 60°$. First, use the cosine rule to determine side c, then use the sine rule to find one of the angles and compute the radius of the circumscribed circle using $R = \dfrac{a}{2\sin A}$.

29. In triangle ABC, angle $A = 65°$, side $a = 12$, and side $b = 14$. First, use the sine rule to find angle B, then determine angle C, and finally use the cosine rule to calculate the length of side c.

30. In triangle ABC, sides $a = 9$, $b = 10$, and angle $C = 120°$ are given. First, use the cosine rule to find side c, then use the sine rule to determine the measure of angle A, and finally compute the area of the triangle.