ILLAWARRA TUTORING

This worksheet covers The cosine rule. In these questions you will apply the cosine rule to find unknown sides or angles in triangles where the sine rule is not applicable. Read each question carefully and show all your working.

Easy Questions

1. Solve for a in the triangle where $b = 5$, $c = 7$ and the included angle $A = 60°$. Assume that A is the angle between sides b and c.
2. In a triangle the side lengths are $a = 8$, $b = 6$ and $c = 7$. Find the measure of $\angle A$ using the cosine rule.
3. Write down the cosine rule formula for a triangle with sides a, b, c and corresponding opposite angles A, B, C.
4. A triangle has sides $a = 8$ and $b = 5$ with the included angle $C = 60°$. Find the length of side c.
5. Given a triangle with sides $a = 10$, $b = 6$ and $c = 8$, calculate $\angle A$ using the cosine rule.

Intermediate Questions

6. In a triangle, the sides $a = 7$ and $b = 9$ with the included angle $C = 45°$. Use the cosine rule to find side c.
7. A triangle has sides $b = 10$ and $c = 12$ with the included angle $A = 30°$. Find the length of side a.
8. A triangle has two sides measuring 8 and 15 with an included angle of 120°. Calculate the length of the remaining side.
9. In triangle ABC, it is given that $c = 9$, $a = 11$ and $\angle C = 70°$. Determine $\angle A$ using the cosine rule.
10. For a triangle with side lengths $a = 5$, $b = 6$ and $c = 7$, use the cosine rule to compute one of the angles of your choice.
11. In a triangle, two sides measure 14 and 8 with an included angle of 60°. Determine the length of the third side.
12. In triangle XYZ, side $XY = 8$ and side $XZ = 5$ with the included angle $YXZ = 110°$. Calculate the length of side YZ.

13. A triangle has side lengths $a = 11$ and $b = 13$ with an included angle of $40°$. Use the cosine rule to find side c.

14. In a triangle, $a = 9$, $b = 12$ and the angle between these sides is $50°$. What is the length of the third side?

15. A triangle has sides 10 and 15 with an included angle of $30°$. Find the measure of the third side using the cosine rule.

16. Given a triangle with sides $a = 16$ and $b = 9$ and the included angle $C = 55°$, determine side c.

17. In triangle PQR, you are given $PQ = 7$ and $PR = 10$ with the included angle $P = 65°$. Use the cosine rule to find side QR.

18. In a triangle, side lengths $a = 12$ and $b = 7$ are known along with the included angle $C = 85°$. Find the length of side c.

19. A triangle has sides 5 and 7 with an included angle of $120°$. Calculate the length of the third side.

20. In a triangle, $a = 3$, $b = 4$, and the included angle is $100°$. Determine the length of side c using the cosine rule.

Hard Questions

21. In triangle ABC, it is given that $a = 6$, $b = 9$ and $\angle C = 40°$. First, use the cosine rule to find side c, then determine $\angle A$.

22. In triangle DEF, the side lengths are $d = 8$, $e = 10$, and $f = 12$. Use the cosine rule to find all the angles of the triangle.

23. A triangle has two sides measuring 9 and 11 with an included angle of $75°$. Determine the third side and then calculate the remaining angles.

24. In triangle GHI, side $GH = 13$, side $HI = 15$, and $\angle H = 50°$. Find the length of side GI and the other two angles.

25. In triangle JKL, it is known that side $JL = 10$, side $JK = 14$, and the angle $K = 30°$. Calculate side KL and $\angle J$.

26. A triangle has side lengths $a = 7$, $b = 8$, and $c = 9$. Compute the measure of the angle opposite side c using the cosine rule.

27. In triangle ABC, the sides are $AB = 12$, $BC = 13$, and $AC = 5$. Determine all angles in the triangle.

28. In a triangle with $a = 9$, $b = 14$, and $c = 16$, calculate the angle between sides a and b.

29. In a triangle with sides $a = 10$, $b = 15$, and $c = 20$, use the cosine rule to find the measure of the angle opposite side c.

30. A triangular plot has two known sides measuring 30 and 42 with an included angle of 75°. Calculate the length of the third side and then find the remaining angles of the triangle.