ILLAWARRA TUTORING

In this worksheet, you will learn how to determine unknown angles in a right-angled triangle using inverse trigonometric functions. Work through the questions carefully and check your reasoning.

Easy Questions

1. Use the inverse sine function to find the angle θ in a right-angled triangle where the opposite side is 3 and the hypotenuse is 5. Write your answer to 1 decimal place.

2. Use the inverse cosine function to determine the angle θ in a right-angled triangle where the adjacent side is 4 and the hypotenuse is 5. Give your answer to 1 decimal place.

3. Use the inverse tangent function to find the angle θ in a right-angled triangle where the opposite side measures 3 and the adjacent side measures 4. Express your answer in degrees to 1 decimal place.

4. In a right-angled triangle, one acute angle is $35°$. Determine the other acute angle.

5. In a right triangle, if $\sin\theta = \dfrac{1}{2}$, use the inverse sine function to find the measure of θ in degrees. (Assume $0° < \theta < 90°$)

Intermediate Questions

6. In a right-angled triangle, the opposite side is 6 and the adjacent side is 8. Calculate the angle θ using the inverse tangent function. Express the answer to 1 decimal place.

7. In a right triangle, the adjacent side is 9 and the hypotenuse is 15. Use the inverse cosine function to determine the angle between the adjacent side and the hypotenuse. Give your answer in degrees to 1 decimal place.

8. A ladder leans against a wall such that its top reaches a window. If the base of the ladder is 2.5 metres from the wall and the ladder is 5 metres long, use the inverse cosine function to determine the angle between the ladder and the ground. Round your answer to 1 decimal place.

9. A ramp is built to access a loading dock. If the horizontal distance is 4 metres and the length of the ramp is 4.5 metres, calculate the angle of elevation of the ramp using the inverse cosine function. Express your answer to 1 decimal place.

10. In a right triangle, if the length of the side opposite to angle θ is 7 and the hypotenuse is 10, use the inverse sine function to find θ. Round your answer to 1 decimal place.

11. Given that $\tan\theta = \dfrac{5}{12}$ in a right-angled triangle, use the inverse tangent function to find θ to 1 decimal place.

12. In a right triangle, if $\cos\theta = \dfrac{8}{10}$, find θ using the inverse cosine function. Express your answer in degrees and round to 1 decimal place.

13. A tree casts a shadow 4 metres long. If the angle of elevation of the sun is θ and the tree height is 5 metres, use the inverse tangent function to find θ. Work to 1 decimal place.

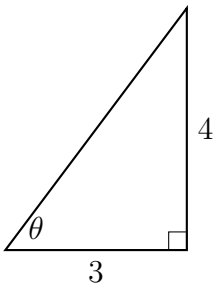
14. A right-angled triangle has a hypotenuse of 13 units and the side opposite to angle θ of 5 units. Use the inverse sine function to calculate θ to 1 decimal place.

15. In a right triangle, the side adjacent to angle θ is 11 and the hypotenuse is 13. Use the inverse cosine function to determine θ. Provide your answer in degrees to 1 decimal place.

16. A driveway ramp has a length of 6 metres and a vertical rise of 1.5 metres. Using the inverse sine function, determine the angle between the ramp and the horizontal ground. Round your answer to 1 decimal place.

17. In a right triangle, if the opposite side is 9 and the adjacent side is 12, compute the angle θ using the inverse tangent function. Give your answer in degrees to 1 decimal place.

18. Below is a diagram of a right-angled triangle. Calculate θ using the appropriate inverse trigonometric function. Express your answer to 1 decimal place.



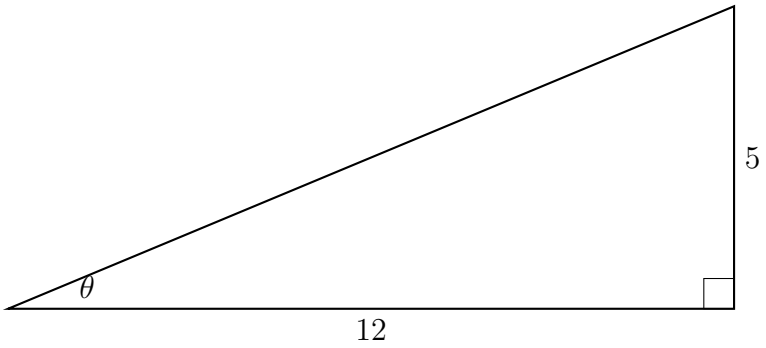
19. In a right-angled triangle, the adjacent side to angle θ is 7 while the hypotenuse is 10. Use the inverse cosine function to determine θ. Round your answer to 1 decimal place.

20. A right triangle has an angle θ such that $\sin\theta = \dfrac{3}{5}$. Determine the measure of θ using the inverse sine function. Express your answer to 1 decimal place.

Hard Questions

21. A ladder leans against a wall such that its base is 1.8 metres from the wall. If the ladder is 6 metres long, use the inverse cosine function to find the angle between the ladder and the ground. Then, verify your result by using the inverse sine function on the height reached by the ladder. Round all answers to 1 decimal place.

22. Refer to the diagram below. Determine θ. Express your answer in degrees to 1 decimal place.



23. An observer stands 20 metres away from the base of an observation tower. The angle of elevation to the top of the tower is θ. If the height of the tower is 25 metres, use the inverse tangent function to find θ. Express your answer to 1 decimal place.

24. In a right-angled triangle, the length of the opposite side is unknown but can be computed from $2\sin\theta = \dfrac{\text{opposite}}{5}$. If θ is found to be $30°$, find the length of the opposite side and verify the angle using the inverse sine function. (Show your working; round to 1 decimal place where necessary.)

25. In a right triangle representing a roof, the length of the rafter (hypotenuse) is 4 metres and the horizontal projection (adjacent) is 3.5 metres. Use the inverse cosine function to determine the angle of elevation of the roof. Provide your answer in degrees to 1 decimal place.

26. A right-angled triangle has sides of unknown lengths except that the tangent of one acute angle is $\dfrac{7}{24}$. First, determine this angle using the inverse tangent function. Then, if the adjacent side measuring 24 units, compute the length of the opposite side. Round the angle to 1 decimal place and the side length to 1 decimal place.

27. A wheelchair ramp is designed such that the vertical rise is 0.75 metres and the horizontal run is 3 metres. Use the inverse tangent function to determine the angle of elevation of the ramp. Present your answer in degrees to 1 decimal place.

28. In a right-angled triangle, if $\tan\theta = \dfrac{11}{7}$, calculate θ using the inverse tangent function. Then, find $\cos\theta$ using the definition and verify your angle calculation. Give θ in degrees to 1 decimal place.

29. Consider a right-angled triangle where one leg is 8 units and the other leg is 15 units. Use the inverse tangent function to find the angle adjacent to the side of length 8 units. Express your answer to 1 decimal place.

30. A surveyor measures the angle of elevation to the top of a hill as θ, where $\tan\theta = \dfrac{18}{24}$. First, find the angle θ using the inverse tangent function. Then, if the horizontal distance to the hill is 24 metres, compute the height of the hill. Round your answers to 1 decimal place.