

Foundation GCSE: Trigonometry – Sin, Cos and Tan

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. In a right-angled triangle, the angle is 30° and the hypotenuse is 10 cm. Calculate the opposite side using $\sin(30^\circ) = 0.5$.
2. A right-angled triangle has an angle of 60° and a hypotenuse of 8 cm. Calculate the adjacent side using $\cos(60^\circ) = 0.5$.
3. In a right-angled triangle, the opposite side is 4 cm and the adjacent side is 4 cm. Calculate $\tan(\theta)$ and find angle θ .
4. Find the length of the side x in a right-angled triangle where the angle is 45° , the hypotenuse is 14 cm, and using $\sin(45^\circ) = \frac{\sqrt{2}}{2}$. Give your answer to 1 decimal place.
5. Calculate the missing side x (hypotenuse) given an angle of 35° , an adjacent side of 10 cm, and using $\cos(35^\circ) \approx 0.819$. Give your answer to 1 decimal place.
6. In a right-angled triangle, the opposite side is 7 cm and the angle is 50° . Calculate the hypotenuse to 1 decimal place.
7. Find the size of angle θ in a right-angled triangle where the opposite side is 5 cm and the hypotenuse is 10 cm.
8. Calculate angle θ given that the adjacent side is 6 cm and the hypotenuse is 12 cm.
9. Find the side x using $\tan(40^\circ) \approx 0.839$, where the adjacent side is 15 cm and x is the opposite side.
10. Calculate the angle θ in a right-angled triangle where the opposite side is 8 cm and the adjacent side is 8 cm.
11. A ladder of length 8 m leans against a wall making an angle of 55° with the ground. Calculate how high up the wall the ladder reaches to 1 decimal place.
12. A right-angled triangle has an angle of 25° and an opposite side of 12 cm. Calculate the length of the adjacent side to 1 decimal place.
13. Calculate the angle of elevation of a roof if the horizontal span is 12 m and the vertical rise is 5 m, giving your answer to 1 decimal place.
14. Find the hypotenuse of a right-angled triangle where the angle is 68° and the adjacent side is 9 cm. Give your answer to 1 decimal place.
15. A ramp rises to a height of 2.5 m over a horizontal distance of 6.0 m. Calculate the angle of the ramp to the horizontal to 1 decimal place.
16. In triangle ABC with a right angle at B , side $AB = 14$ cm and angle $BAC = 38^\circ$. Calculate the length of side AC (hypotenuse) to 1 decimal place.
17. Calculate the angle θ to 1 decimal place if the opposite side is 18 cm and the hypotenuse is 22 cm.
18. A surveyor stands 50 m away from the base of a tower and measures an angle of elevation to the top of 42° . Calculate the height of the tower to 1 decimal place.
19. In a right-angled triangle, the hypotenuse is 30 cm and the angle is 18° . Calculate the length of the side opposite to the angle to 1 decimal place.
20. A guy wire is attached to the top of a 15 m vertical mast and anchored to the ground at an angle of 52° to the horizontal. Calculate the total length of the wire to 1 decimal place.

Answers & Worked Solutions

1. 5 cm : $10 \times \sin(30^\circ) = 10 \times 0.5 = 5$.
2. 4 cm : $8 \times \cos(60^\circ) = 8 \times 0.5 = 4$.
3. 45° : $\tan(\theta) = \frac{4}{4} = 1$, so $\theta = 45^\circ$.
4. 9.9 cm : $14 \times \frac{\sqrt{2}}{2} = 7\sqrt{2} \approx 9.9$.
5. 12.2 cm : $\frac{10}{\cos(35^\circ)} \approx \frac{10}{0.819} = 12.2$.
6. 9.1 cm : $\frac{7}{\sin(50^\circ)} \approx \frac{7}{0.766} = 9.1$.
7. 30° : $\sin(\theta) = \frac{5}{10} = 0.5$, so $\theta = 30^\circ$.
8. 60° : $\cos(\theta) = \frac{6}{12} = 0.5$, so $\theta = 60^\circ$.
9. 12.6 cm : $15 \times \tan(40^\circ) \approx 15 \times 0.839 = 12.6$.
10. 45° : $\tan(\theta) = \frac{8}{8} = 1$, so $\theta = 45^\circ$.
11. 6.6 m : $8 \times \sin(55^\circ) \approx 8 \times 0.819 = 6.6$.
12. 25.7 cm : $\frac{12}{\tan(25^\circ)} \approx \frac{12}{0.466} = 25.7$.
13. 22.6° : $\tan(\theta) = \frac{5}{12}$, $\theta = \arctan(0.4167) \approx 22.6^\circ$.
14. 24.0 cm : $\frac{9}{\cos(68^\circ)} \approx \frac{9}{0.375} = 24.0$.
15. 22.6° : $\tan(\theta) = \frac{2.5}{6.0}$, $\theta = \arctan(0.4167) \approx 22.6^\circ$.
16. 17.8 cm : $\frac{14}{\cos(38^\circ)} \approx \frac{14}{0.788} = 17.8$.
17. 54.9° : $\sin(\theta) = \frac{18}{22}$, $\theta = \arcsin(0.8182) \approx 54.9^\circ$.
18. 45.0 m : $50 \times \tan(42^\circ) \approx 50 \times 0.900 = 45.0$.
19. 9.3 cm : $30 \times \sin(18^\circ) \approx 30 \times 0.309 = 9.3$.
20. 19.0 m : $\frac{15}{\sin(52^\circ)} \approx \frac{15}{0.788} = 19.0$.