

SOLVING TRIG EQUATIONS.

RULES:

Rearrange the equations to give: $\sin x =$, $\cos x =$, $\tan x =$.

Use calculator to give 1st solution by pressing the inverse trig function (\sin^{-1} , \cos^{-1} , \tan^{-1})

The 2nd solution can be found by the symmetry of the graphs, or the "CAST" diagram.

Pupils should only input positive values into the calculator and use these to determine solutions that are negative.

Example 1. $\sin x = \frac{1}{2}$ from calculator: $\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$ from "CAST" : $180 - 30 = 150^\circ$

Example 2. $3\cos x + 1 = 0$ Rearrange: $\cos x = -\frac{1}{3}$ from calculator: $\cos^{-1}\left(\frac{1}{3}\right) = 70.5^\circ$

From "CAST": cosine is negative in 2nd and 3th quadrants:

$$180 - 70.5 = 109.5^\circ \text{ and } 180 + 70.5 = 250.5^\circ$$

Now try these: $0 \leq x \leq 360$

1st two rows do not require a calculator.

1. $\cos x = 1$

2. $\tan x = 0$

3. $\sin x = 1$

4. $\cos x = 0$

5. $\sin x = -1$

6. $\cos x = -1$

7. $\sin x = 0$

8. $\tan x = 90$

9. $\cos x = 0.5$

10. $\sin x = 0.3$

11. $\tan x = 3.4$

12. $\cos x = 0.6$

13. $\cos x = -0.4$

14. $\sin x = -0.5$

15. $\cos x = -0.7$

16. $\tan x = -4$

17. $4\cos x = 1$

18. $3\sin x = -2$

19. $5\cos x + 1 = 0$

20. $3\tan x + 6 = 0$

SOLUTIONS ARE ROUNDED TO 1 D.P. AND ARE IN DEGREES

1. 0, 360	2. 0, 180, 270	3. 90	4. 90, 270
5. 270	6. 180	7. 0, 180, 360	8. undefined
9. 60, 300	10. 17.5, 162.5	11. 73.6, 253.6	12. 53.1, 306.9
13. 113.6, 246.4	14. 210, 330	15. 134.4, 225.6	16. 80.0, 280.0
17. 75.5, 284.5	18. 221.8, 318.2	19. 101.5, 258.5	20. 116.6, 296.6