

Trigonometric Graphs

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Sketch $y = \sin x$ for $0^\circ \leq x \leq 360^\circ$, marking the key points.

Step 1 · Start and end at zero

(0, 0), (180, 0), (360, 0)

Step 2 · Maximum and minimum

(90, 1) and (270, -1)

Step 3 · Join with a smooth wave

Up, down through 180° , down to -1, back up

Answer: A wave through (0,0), (90,1), (180,0), (270,-1), (360,0)

Check: $\sin 30^\circ = 0.5$ lies on the rising part ✓

2. Now try one with the steps

Solve $\sin x = 0.5$ for $0^\circ \leq x \leq 360^\circ$.

Step 1 · Calculator

Step 2 · $\sin$ graph is symmetrical about 90°

Step 3 · Check the graph: $y = 0.5$ crosses twice

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is the maximum value of $y = \sin x$? [1]

2. After how many degrees does the graph of $y = \cos x$ repeat? [1]

3. Write down the value of $\sin 90^\circ$. [1]

4. Write down the value of $\cos 180^\circ$. [1]

5. For $0^\circ \leq x \leq 360^\circ$, where is $\cos x = 0$? [2]

6. Solve $\sin x = \sqrt{3}/2$ for $0^\circ \leq x \leq 360^\circ$. [2]

7. Solve $\cos x = 0.5$ for $0^\circ \leq x \leq 360^\circ$. [2]

8. Solve $\tan x = \sqrt{3}$ for $0^\circ \leq x \leq 360^\circ$. [2]

9. $\sin 25^\circ = 0.4226$ to 4 d.p. Find another angle between 0° and 360° whose sine is 0.4226. [1]

10. Solve $\sin x = -0.5$ for $0^\circ \leq x \leq 360^\circ$. [3]

11. Solve $2 \cos x = 1$ for $0^\circ \leq x \leq 360^\circ$. [2]

12. Solve $\cos x = 0.3$ for $0^\circ \leq x \leq 360^\circ$, giving answers to 1 decimal place. [3]

13. Solve $\sin x = -0.8$ for $0^\circ \leq x \leq 360^\circ$, giving answers to 1 decimal place. [3]

14. Solve $\tan x = 2$ for $0^\circ \leq x \leq 360^\circ$, giving answers to 1 decimal place. [2]

15. Write down the equations of the asymptotes of $y = \tan x$ for $0^\circ \leq x \leq 360^\circ$. [2]

4. Before you hand it in

$\sin x = 0.5 \rightarrow x = 30^\circ$ only

The line $y = 0.5$ crosses the sine wave twice between 0° and 360° . Use the symmetry: 30° and 150° .

$\cos x = 0.5 \rightarrow x = 60^\circ$ or 120°

The cos graph is symmetrical about 180° , so the second answer is $360^\circ - 60^\circ = 300^\circ$.

$\tan x = -1 \rightarrow x = -45^\circ$

Add 180° (the period of tan) until the answers are in range: 135° and 315° .

Drawing $y = \tan x$ wave between -1 and 1

$\tan x$ is not bounded: it rises without limit towards 90° and 270° , where there are vertical asymptotes.