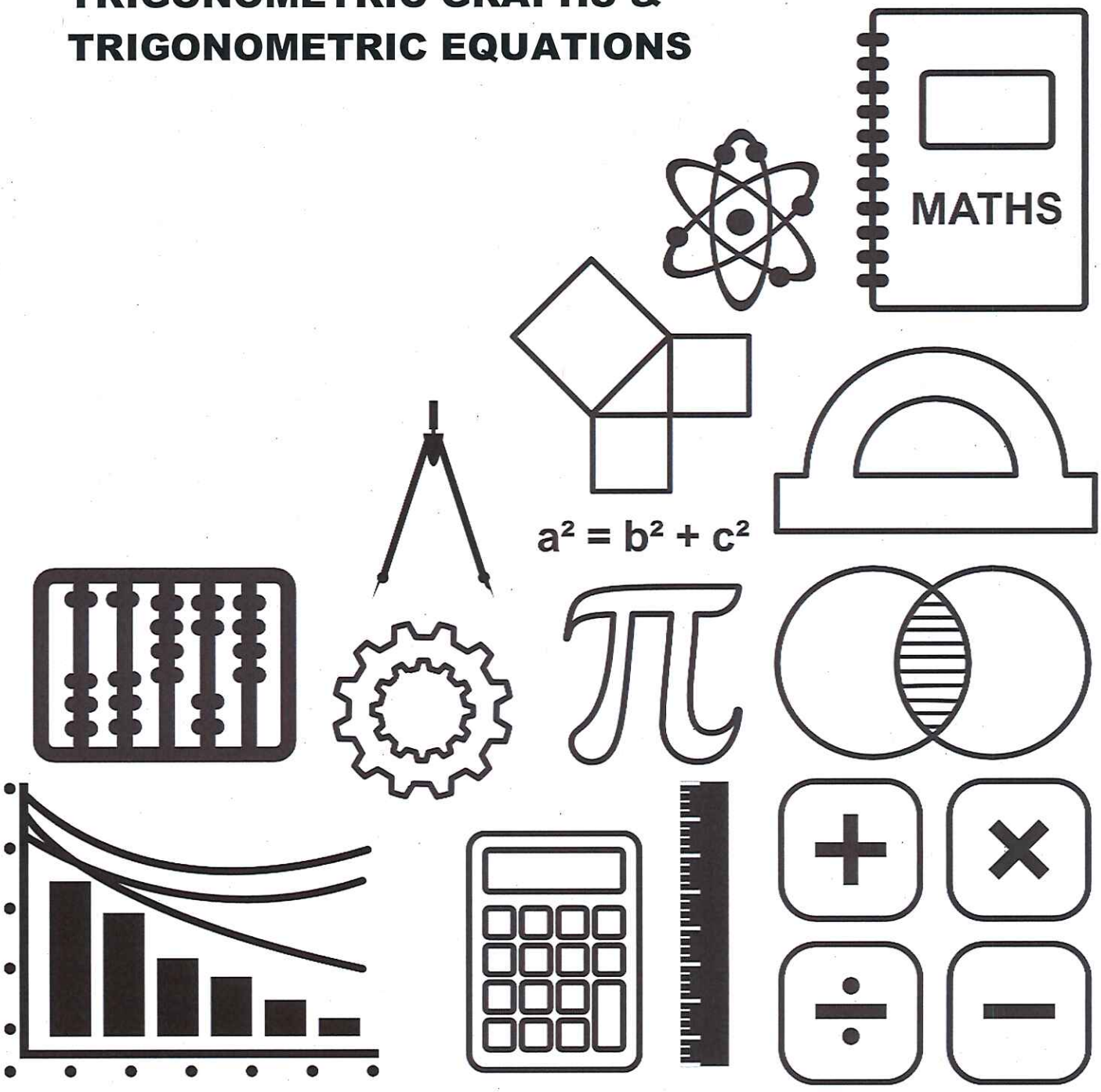
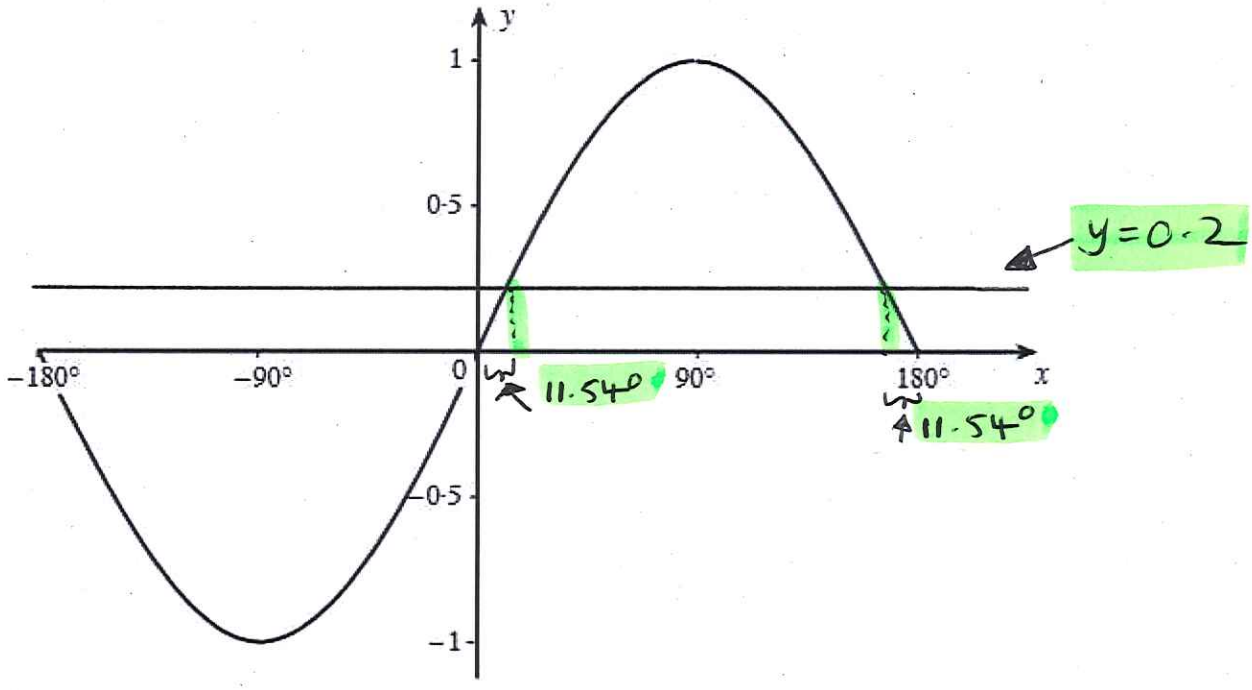
MATHSDIY

SOLUTIONS

GCSE TOPIC BOOKLET
TRIGONOMETRIC GRAPHS & TRIGONOMETRIC EQUATIONS



1. The diagram shows a sketch of the graph $y = \sin x$.



Using your calculator, find the values of x in the range $-180° \leqslant x \leqslant 180°$ which satisfy the equation $\sin x = 0{\cdot}2$.

Shift sin (0·2) = 11·54°

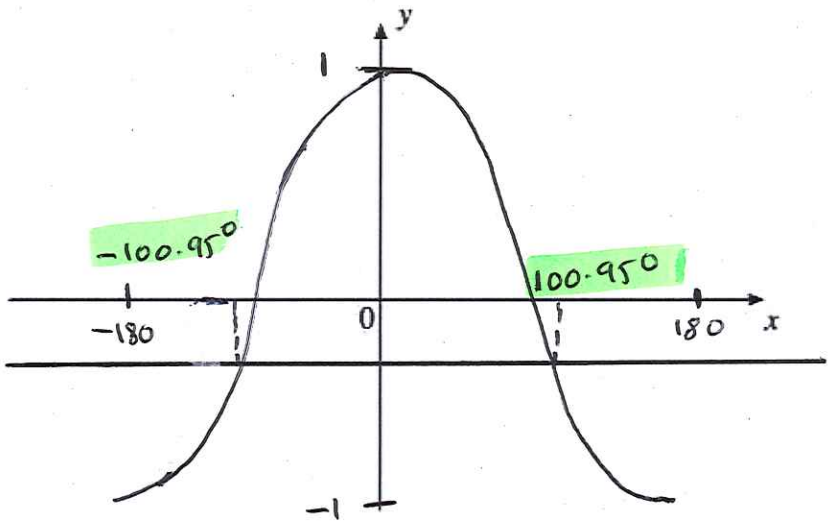
Second solution is 180 − 11·54°

= 168·46°

[2]

2. *(a)* Using the axes below, **sketch** the graph of $y = \cos x$ for values of x from $-180°$ to $180°$.

[2]



$y = -0·19$

(b) Find **all** solutions of the following equation in the range $-180°$ to $180°$.

$$\cos x = -0·19$$

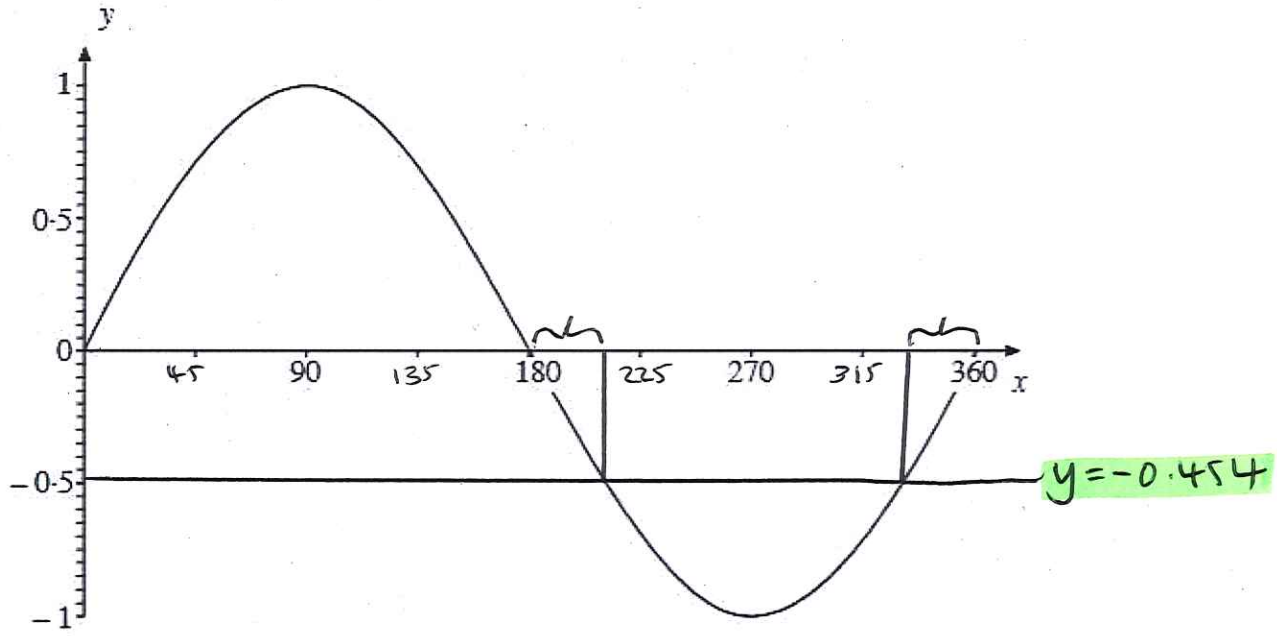
shift cos (−0·19) = 100·95°

From symmetry second solution is −100·95°

$x = 100·95°$, $x = -100·95°$

[2]

3. The diagram below shows the sketch of $y = \sin x$ for values of x from 0° to 360°



Find all solutions of the following equation in the range 0° to 360°.

$$\sin x = -0{\cdot}454$$

From Calculator

shift sin (−0·454) = −27·0°

∴

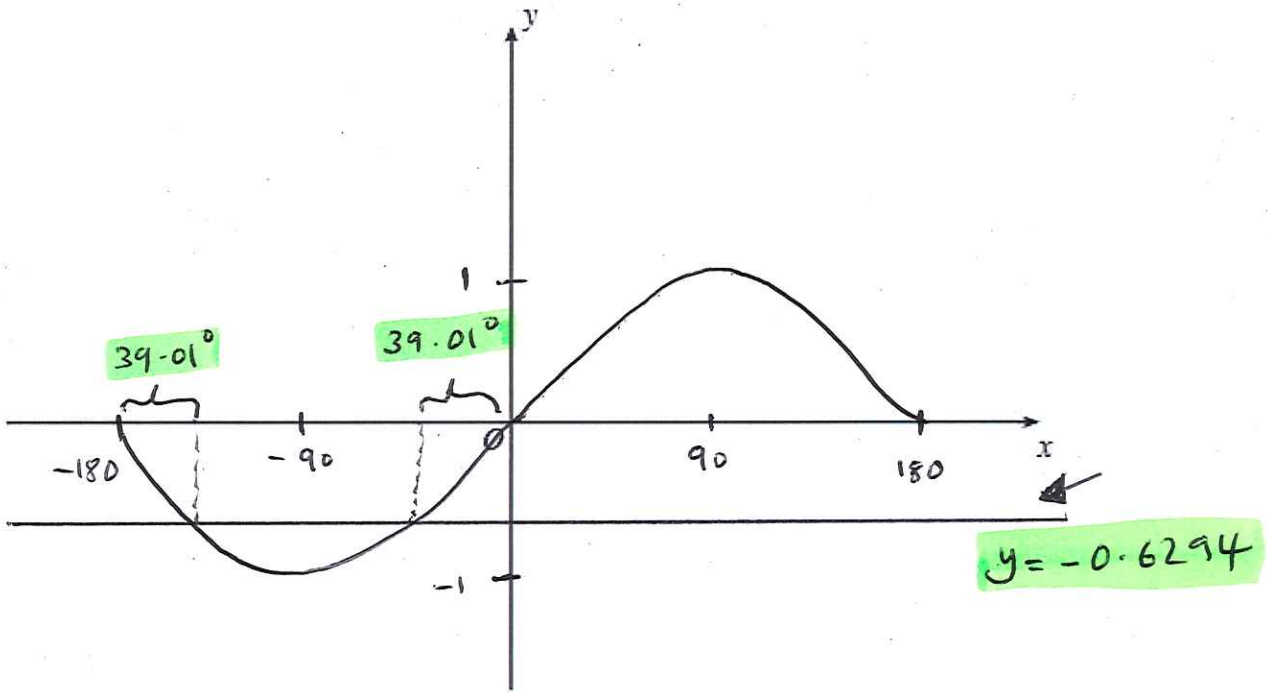
Solutions are 180 + 27·0 , 360 − 27·0

$x = 207{\cdot}0°$, $x = 333{\cdot}0°$

[2]

4. *(a)* Using the axes below, **sketch** the graph of $y = \sin x$ for values of x from $-180°$ to $180°$.

[2]



(b) Find all solutions of the following equation in the range $-180°$ to $180°$.

$$\sin x = -0{\cdot}6294$$

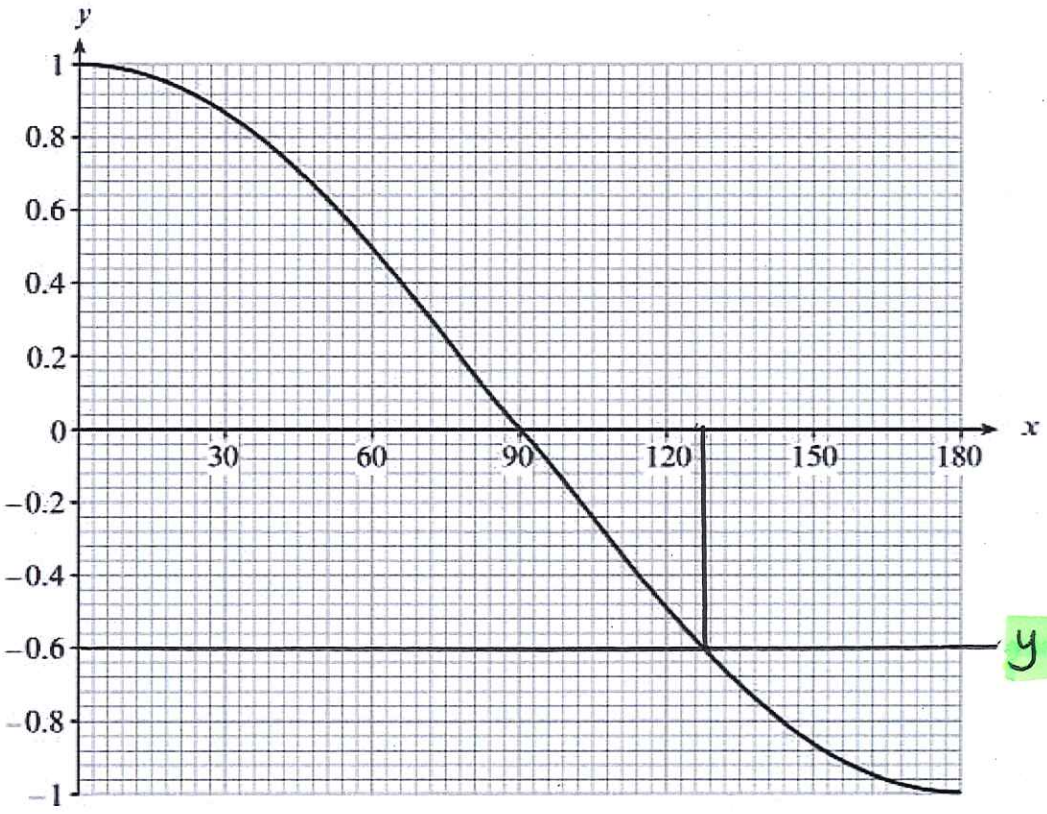
shift sin (−0·6294) = −39·01°

second solution is −180 + 39·01 = −140·99°

$x = -39{\cdot}01°$, $x = -140{\cdot}99°$

[2]

5. The graph of $y = \cos x$ for the values of x between 0° and 180° is given below.



Find all the solutions of the following equations in the range **−180° to 180°**.

(a) $\cos x = 0$

$x = 90$, $x = -90$ (symmetry)

[2]

(b) $\cos x = -0{\cdot}6$

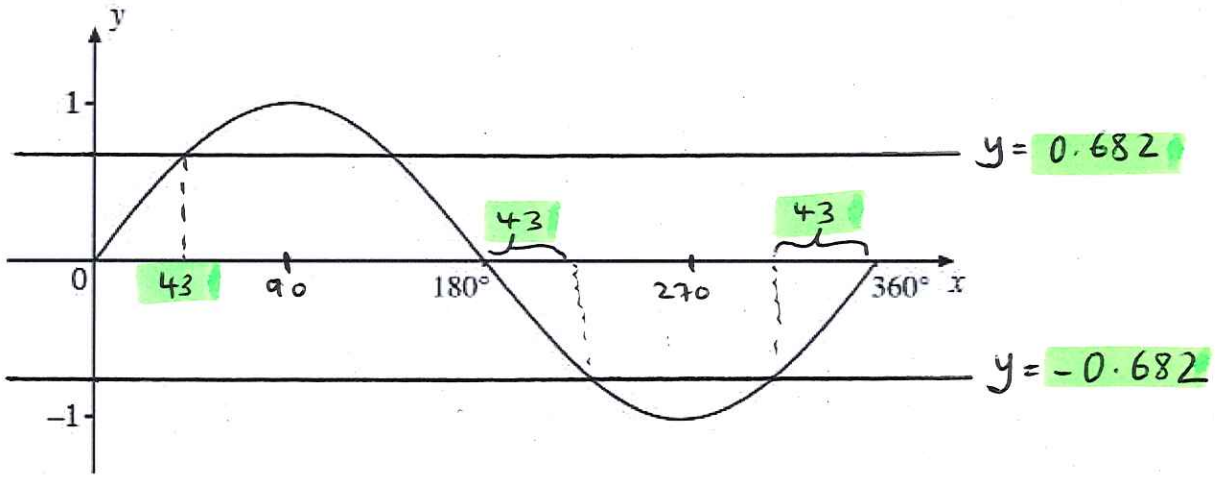
$x = 127°$, $x = -127$ (symmetry)

[2]

(Remember if you are considering the range −180° to 180°, the cosine curve is symmetrical about the y axis.)

NON CALCULATOR QUESTION

6. *(a)* The diagram shows a sketch of $y = \sin x$ for values of x from 0° to 360°.

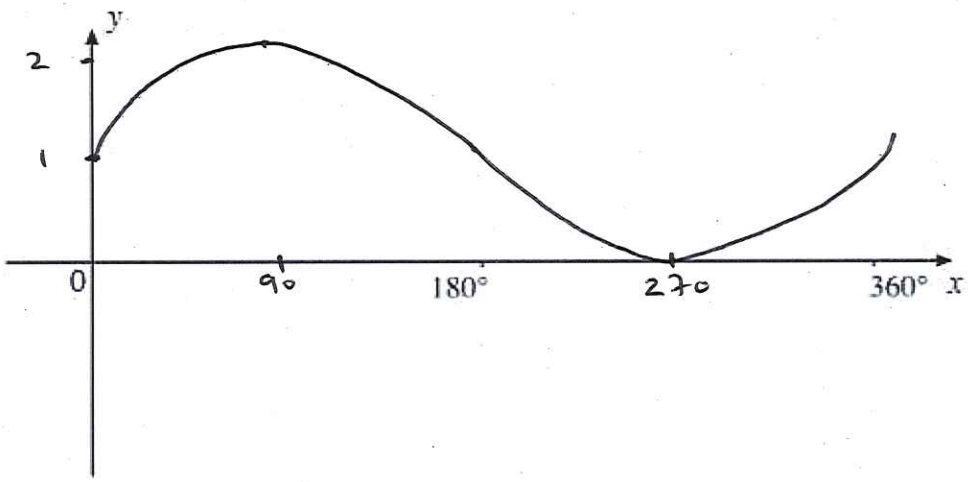


Given that sin 43° = 0·682 write down all the solutions of the equation $\sin x = -0.682$ for values of x from 0° to 360°.

$x = 223°$ $x = 317°$

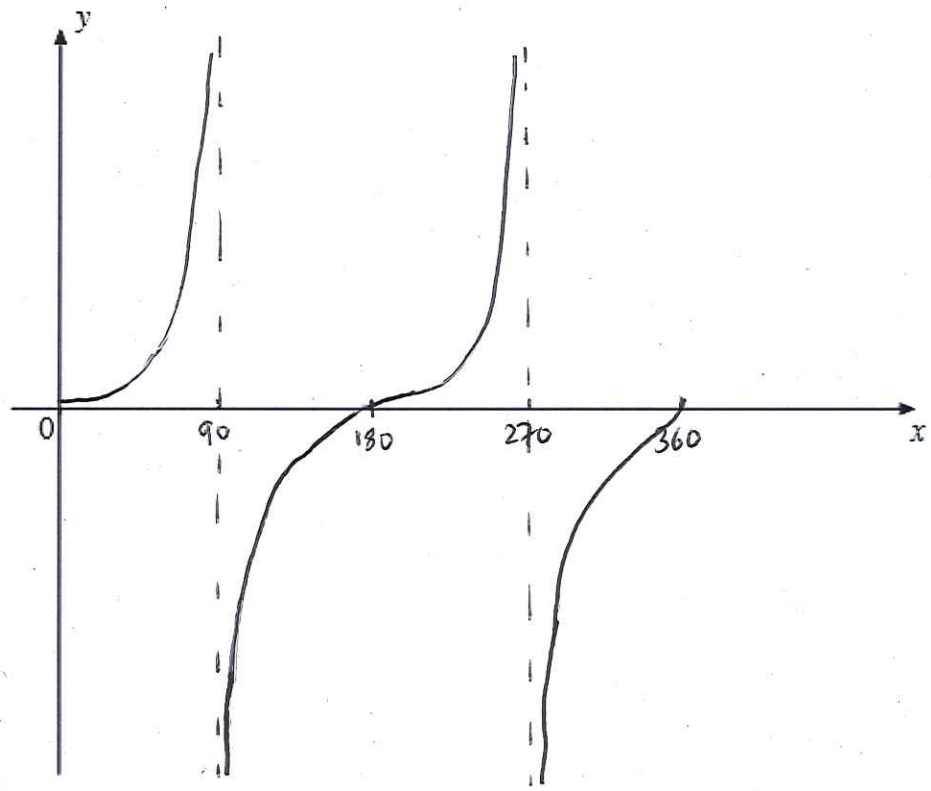
[2]

(b) Sketch the graph of $y = \sin x + 1$ for values of x from 0° to 360°.



[2]

(c) Sketch the graph of $y = \tan x$ for values of x from 0° to 360°.

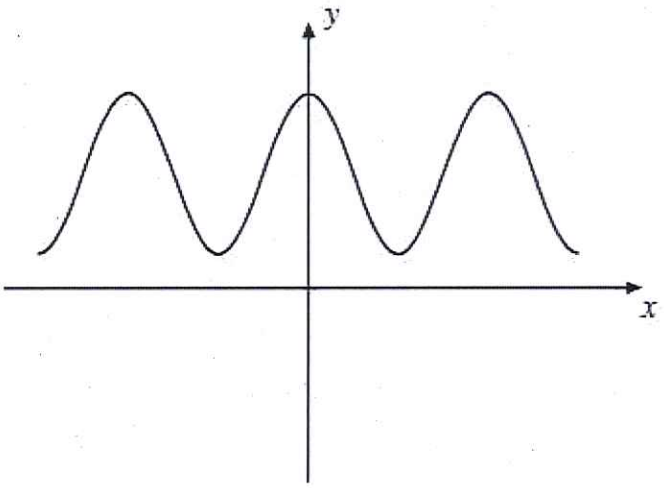


[2]

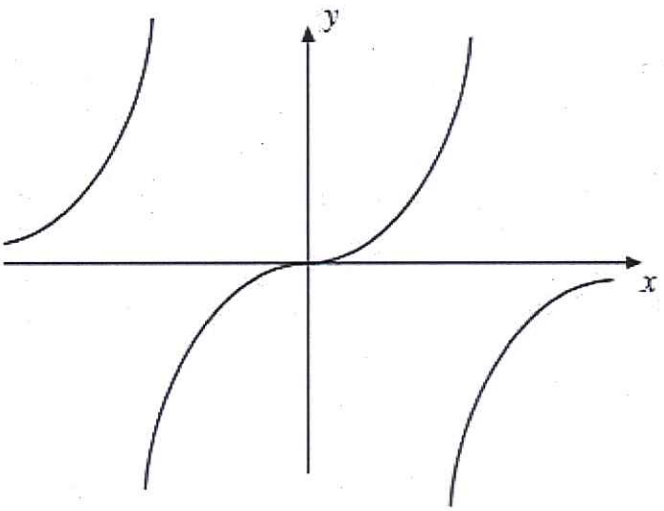
Label asymptotes to be sure of the mark.

7. Match each of the following equations to the appropriate sketch by writing the equations in the spaces below.

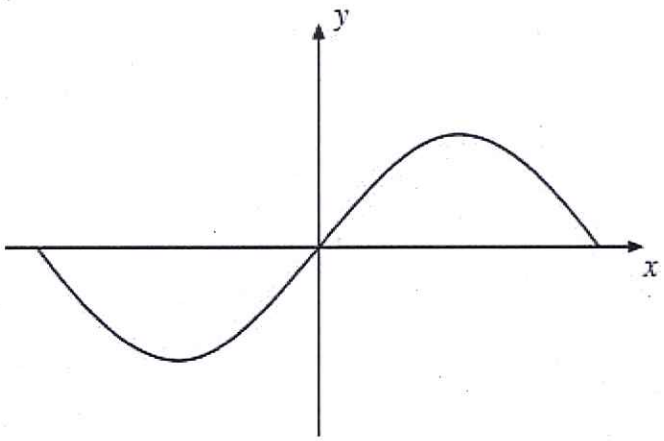
$y = \sin x$ $y = \tan x$ $y = 2 + \cos x$



Equation $y = 2 + \cos x$



Equation $y = \tan x$

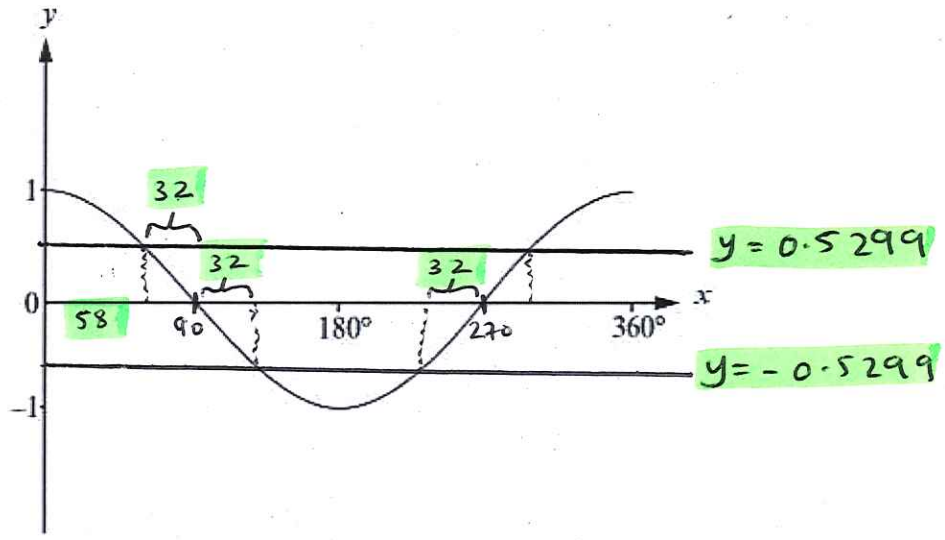


Equation $y = \sin x$

[2]

8.

(a) The diagram shows a sketch of $y = \cos x$ for values of x from 0° to 360°.

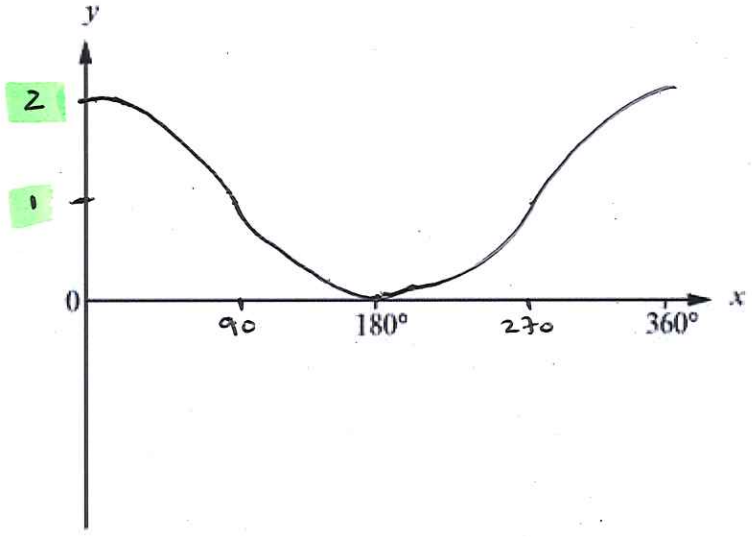


Given that cos 58° = 0.5299, write down all the solutions of the equation $\cos x = -0.5299$ for values of x from 0° to 360°.

$x = 122^{\circ}$, $x = 238^{\circ}$

[2]

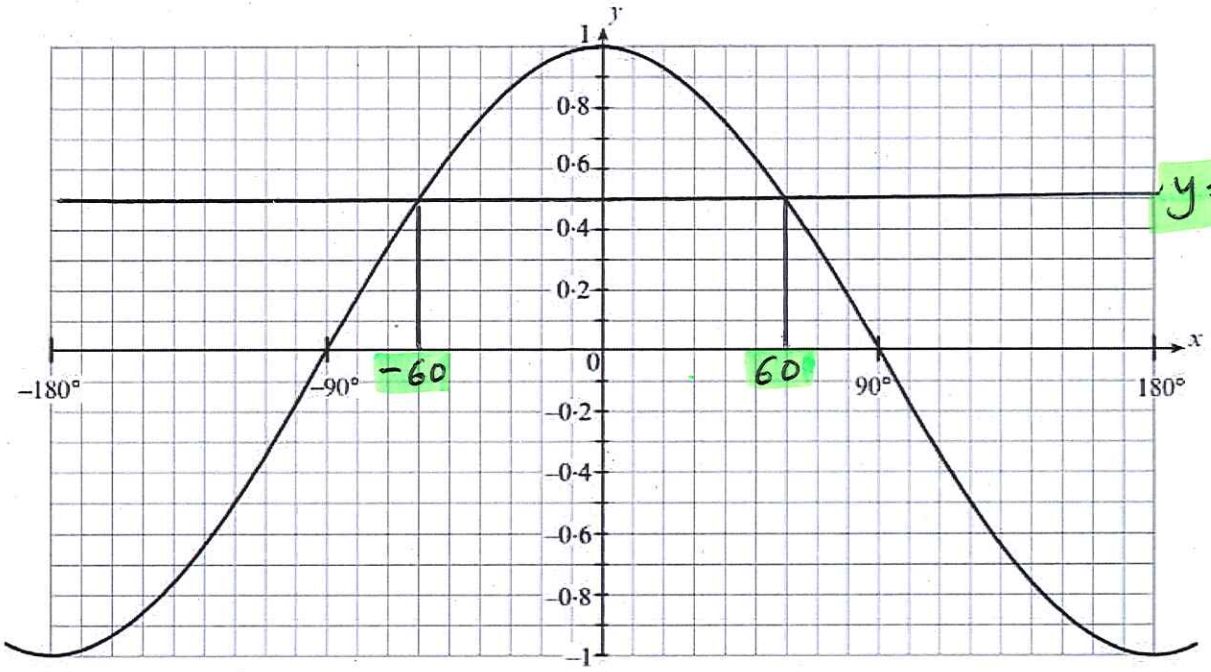
(b) Sketch the graph of $y = \cos x + 1$ for values of x from 0° to 360°.



[2]

9.

(b) The diagram shows a sketch of $y = \cos x$.



Find the values of x in the range $-180° \leqslant x \leqslant 180°$ which satisfy the equation $\cos x = 0{\cdot}5$.

$x = 60°$, $x = -60°$

[2]