

Harder Graphs: Trig/Exponential

Mark Scheme

Level	GCSE
Subject	Maths
Exam Board	Edexcel GCSE
Topic	Harder Graphs: Trig/Exponential
Grade Level	Grade 7
Booklet	Mark Scheme

Time Allowed: 35 minutes

Score: /29

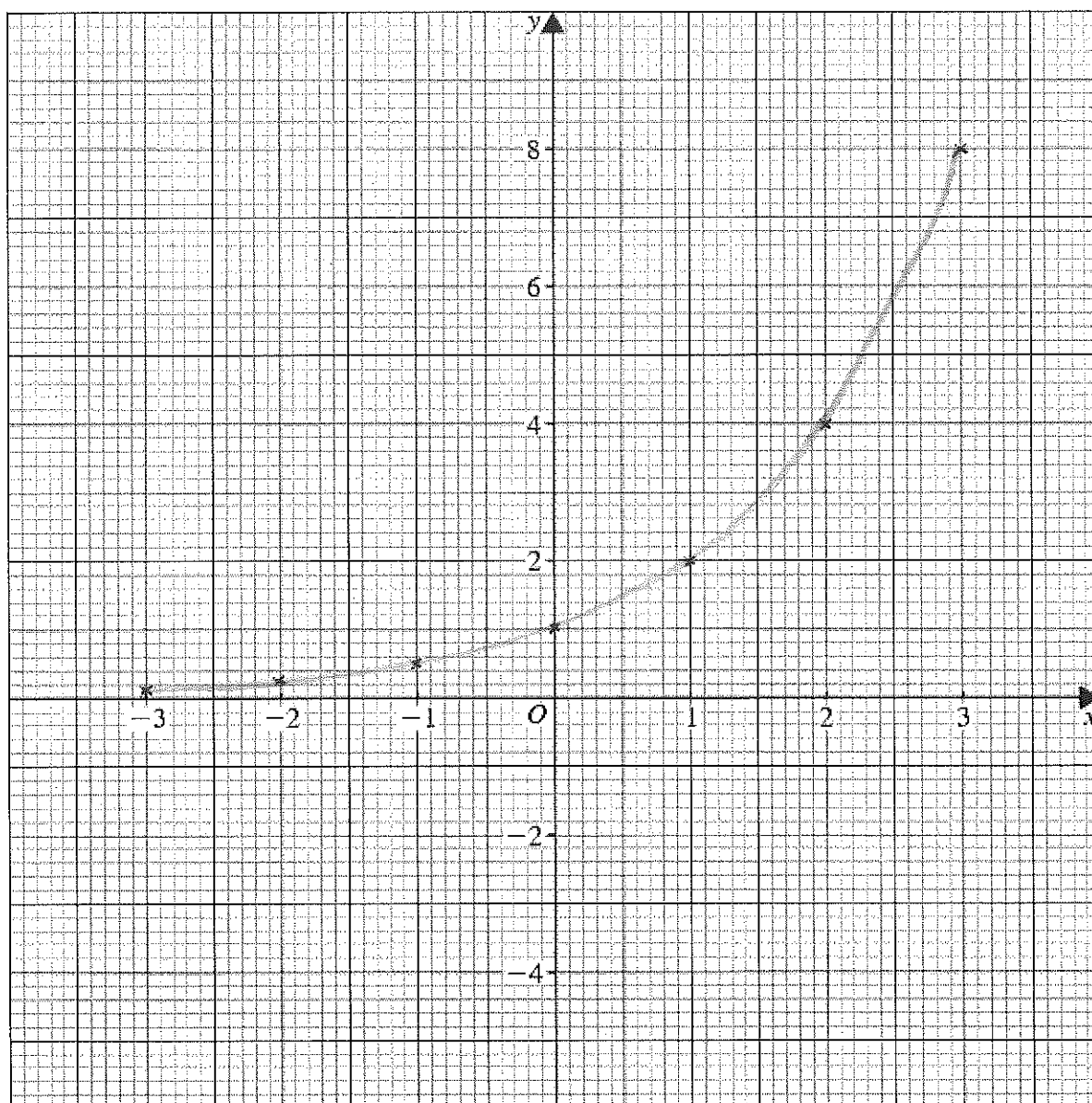
Percentage: /100

Grade Boundaries:

1.(a) Complete the table of values for $y=2^x$ (2)

x	-3	-2	-1	0	1	2	3
y	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8

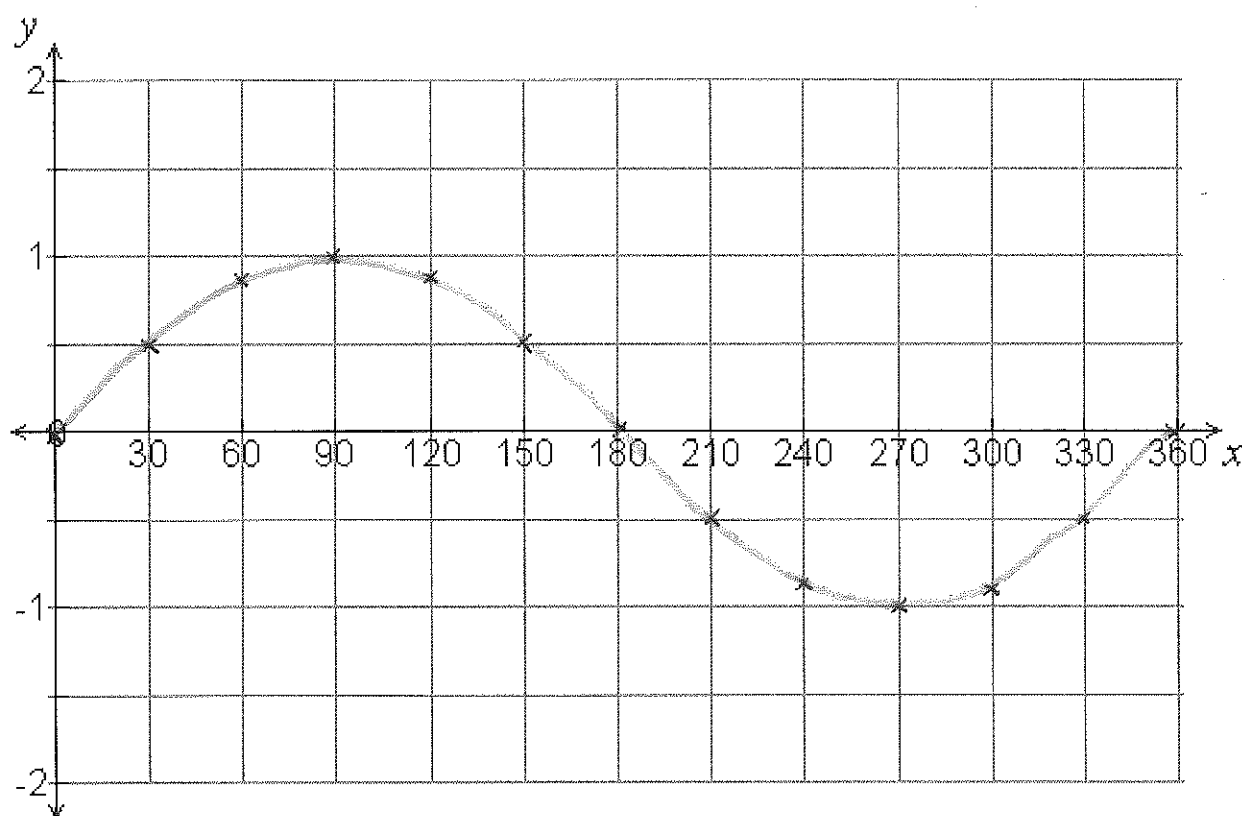
b) On the grid, draw the graph of $y=2^x$ (2)



2.(a) Complete the table of values for $y = \sin(x)$ (2)

x	0	30	60	90	120	150	180	210	240	270	300	330	360
y	0	$\frac{1}{2}$	0.866	1	0.866	$\frac{1}{2}$	0	$-\frac{1}{2}$	-0.866	-1	-0.866	$-\frac{1}{2}$	0

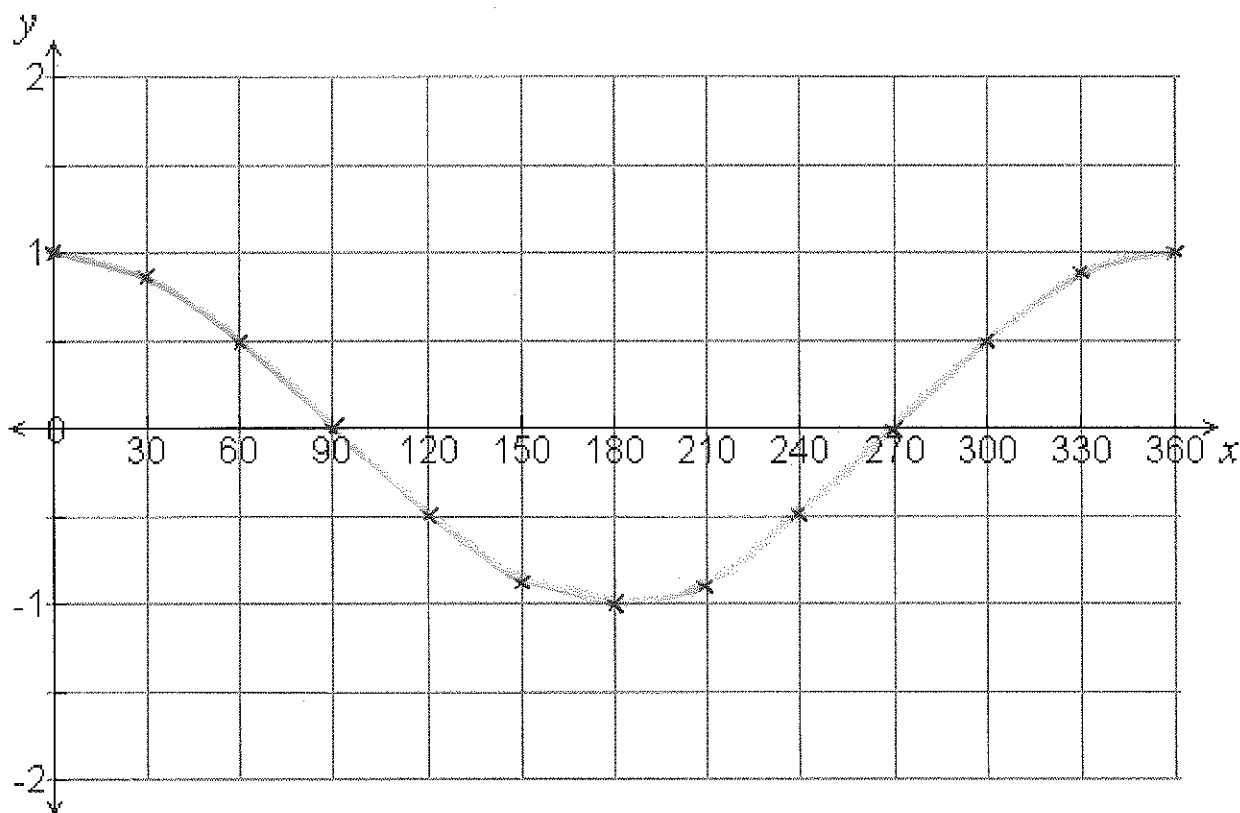
b) On the grid, draw the graph of $y = \sin(x)$ (2)



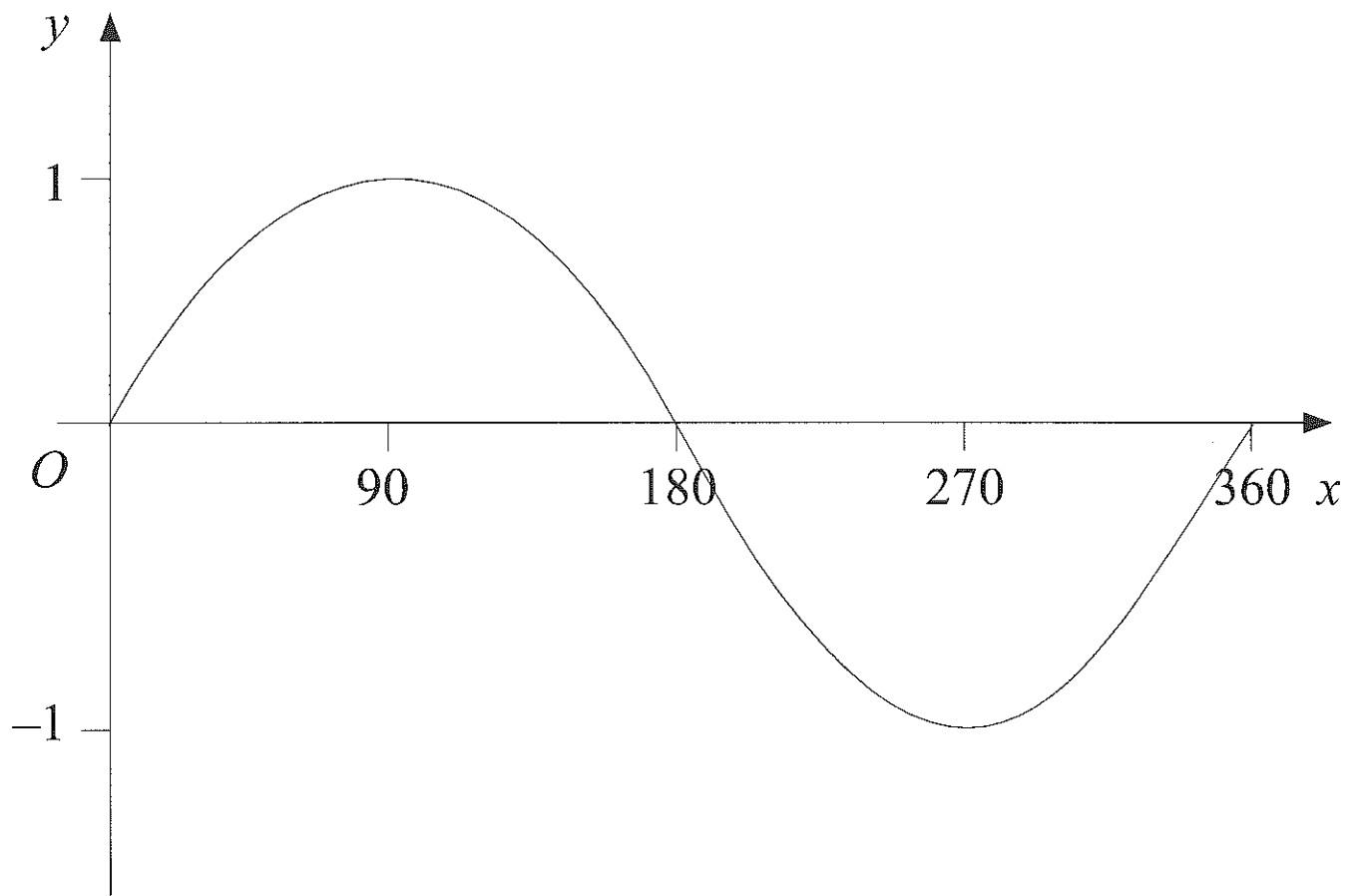
3.(a) Complete the table of values for $y = \cos(x)$ (2)

x	0	30	60	90	120	150	180	210	240	270	300	330	360
y	1	0.866	$\frac{1}{2}$	0	$-\frac{1}{2}$	-0.866	-1	-0.866	$-\frac{1}{2}$	0	$\frac{1}{2}$	0.866	1

b) On the grid, draw the graph of $y = \cos(x)$ (2)



4. Here is a sketch of the curve $y = \sin x^\circ$ for $0 \leq x \leq 360$

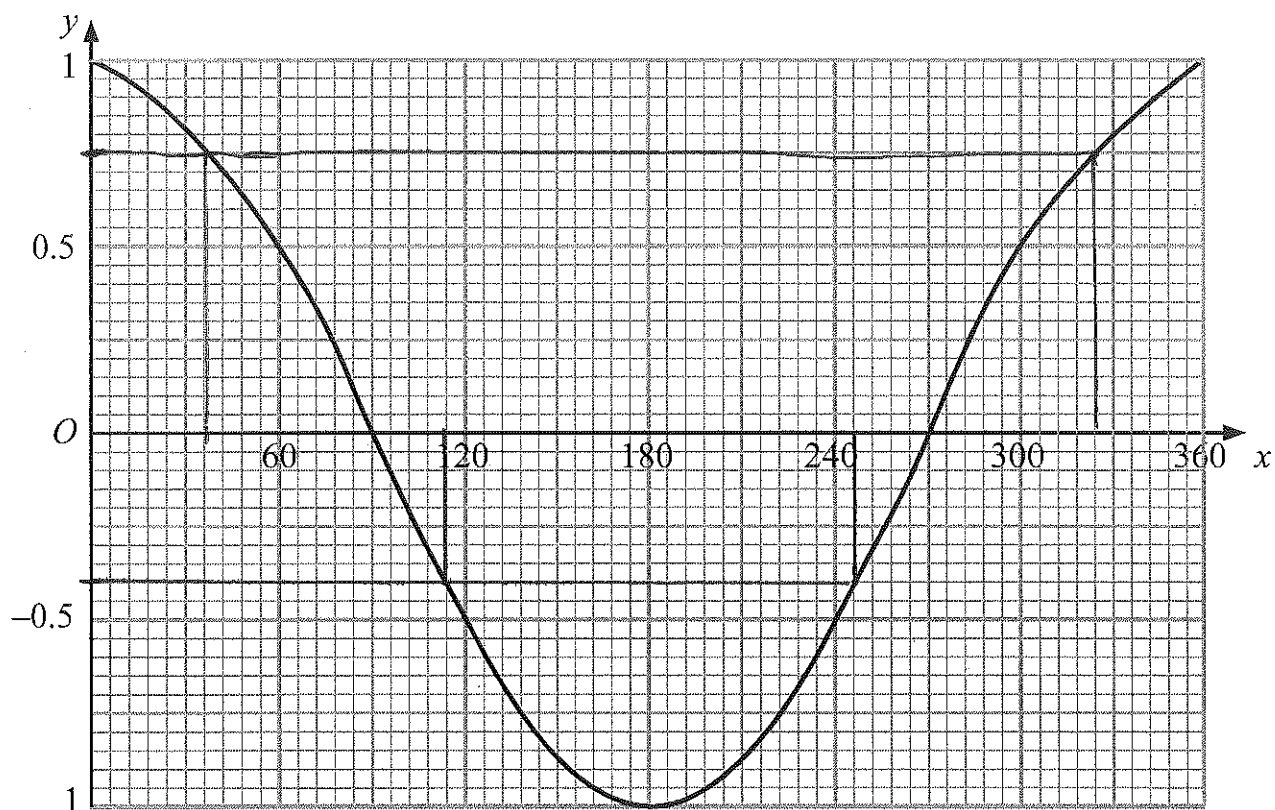


a) Given that $\sin 30^\circ = \frac{1}{2}$, write down the value of:

i) $\sin 150^\circ$ $\frac{1}{2}$ (1)

ii) $\sin 330^\circ$ $-\frac{1}{2}$ (1)

5. Here is a sketch of the curve $y = \cos x^\circ$ for $0 \leq x \leq 360$



a) Use the graph to find estimates of the solutions, in the interval $0 \leq x \leq 360$, of the equation:

i) $\cos(x) = -0.4$

114° and 246° (2)

ii) $4 \cos(x) = 3$

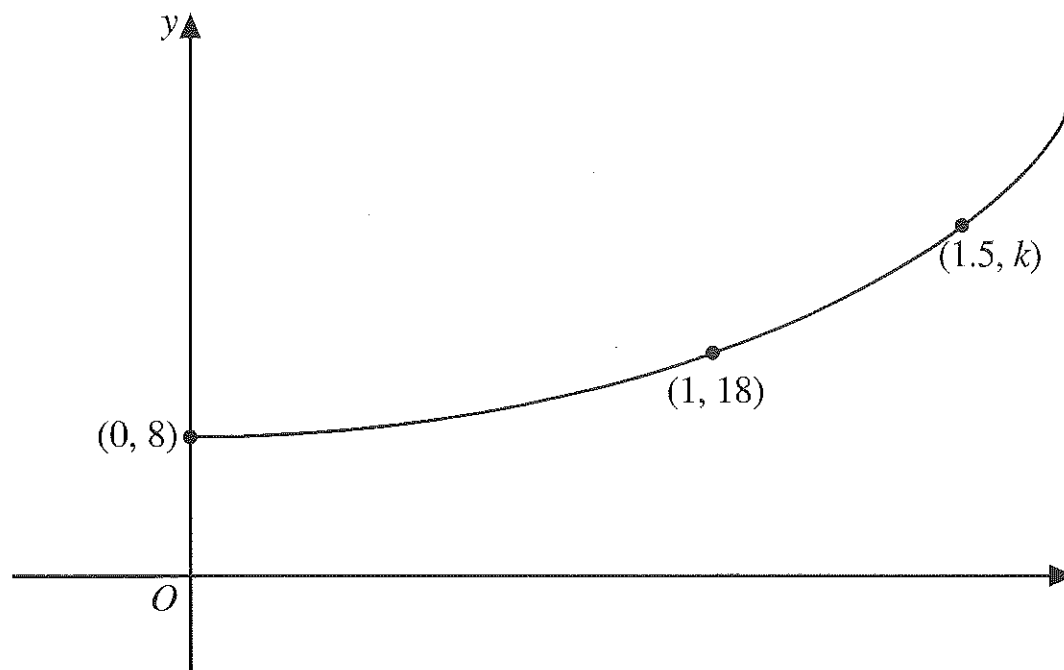
$\cos(x) = 3/4$

$= 0.75$

36° and 324° (2)

6.

This sketch shows part of the graph with equation $y = pq^x$, where p and q are constants.



The points with coordinates $(0, 8)$, $(1, 18)$ and $(1.5, k)$ lie on the graph. Calculate the values of p , q and k .

$$y = pq^x$$

$$(0, 8)$$

$$x \quad y$$

$$8 = pq^0$$

$$p = 8$$

$$(1, 18)$$

$$x \quad y$$

$$y = 8q^x$$

$$18 = 8q^1$$

$$q = \frac{18}{8} = \frac{9}{4}$$

$$(1.5, k)$$

$$x \quad y$$

$$y = 8\left(\frac{9}{4}\right)^x$$

$$yk = 8\left(\frac{9}{4}\right)^{\frac{3}{2}}$$

$$= 8\left(\frac{27}{8}\right)$$

$$k = 27$$

$$p = 8$$

$$q = 9/4$$

$$k = 27$$

(6)

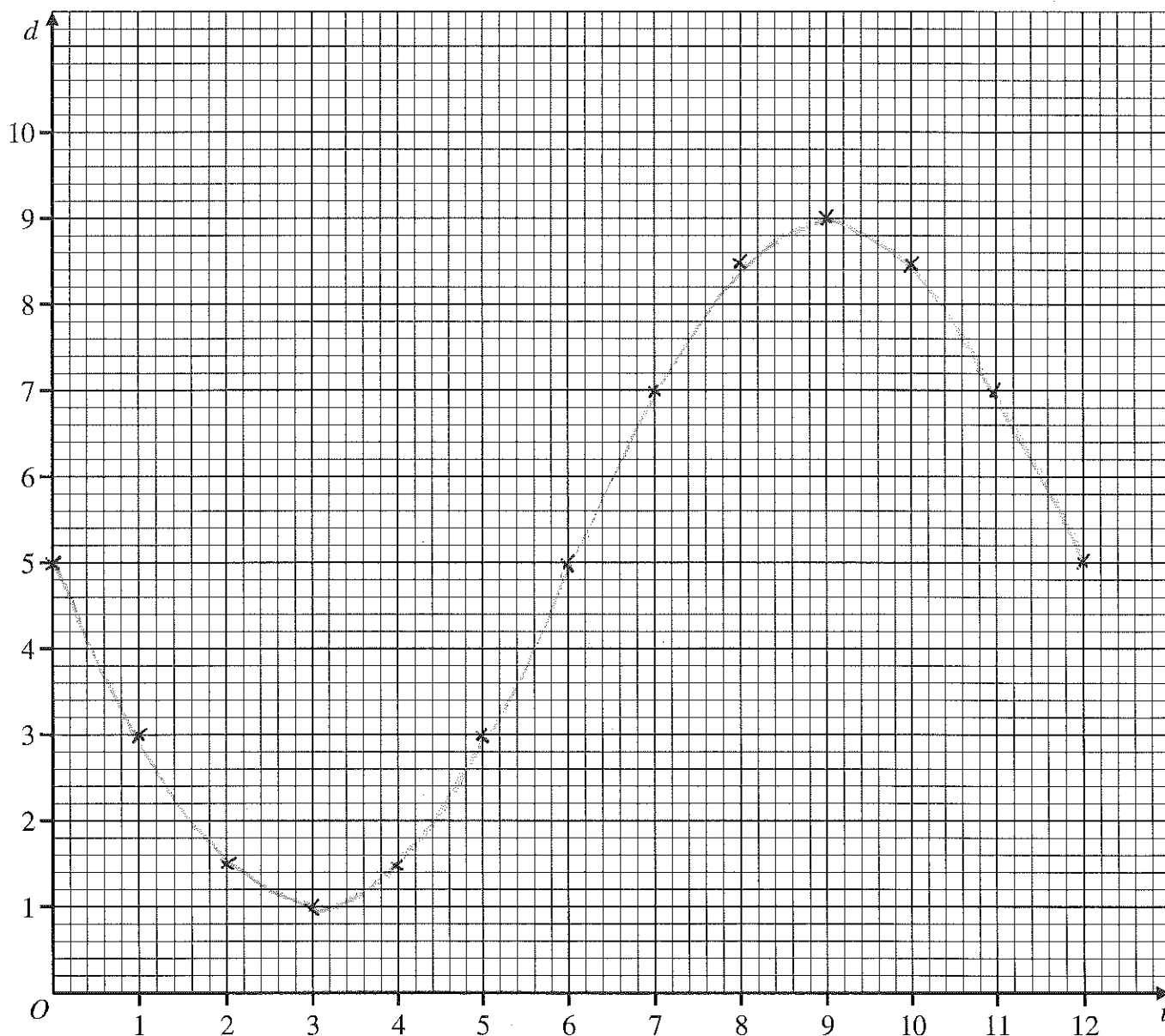
7.

The depth of water, d metres, at the entrance to a harbour is given by the formula: $d = 5 - 4 \sin(30t)$ where t is the time in hours after midnight on one day.

a) On the axes below, draw the graph of d against t for $0 \leq t \leq 12$. (4)

t	0	1	2	3	4	5	6	7	8	9	10	11	12
d	5	3	1.54	1	1.54	3	5	7	8.46	9	8.46	7	5

(2dp)



b) Find the two values of t , where $0 \leq t \leq 24$, when the depth is least.

.....3..... and15..... (1)