Name	Date started	Target end date

WJEC Level 2 Additional Mathematics — Question Pack

Sketching y = a·sin(bx) and y = a·cos(bx)+d over 0°–360°, reading off amplitude, period and shifts.

REVISE
.wales

Trigonometric graph sketching

Trigonometry · Level 2 Certificate (9550) · calculator allowed

Sketching y = a·sin(bx) and y = a·cos(bx)+d over 0°–360°, reading off amplitude, period and shifts.

LEVEL 2 · 9550

Estimated time for entire question pack: ~56 minutes

*At the Additional Maths pace of **~1.2 min/mark** (47 marks across 12 questions).*

*You are advised to **not** attempt to complete all of this in one sitting.*

ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. It gathers every question on this topic from the 2011–2024 papers.

Questions are ordered by year, newest first.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working — method marks are awarded for clear setup.

A calculator is allowed throughout this qualification.

Trigonometric graph sketching — what's examined

WJEC Level 2 Additional Mathematics (9550) · single written paper, calculator allowed.

Sine & cosine shape Trig.

- Know the basic sin and cos curves on 0–360°.
- sin starts at 0; cos starts at its peak.
- Both repeat every 360°.

Transformations Trig.

- a stretches vertically (amplitude).
- b changes the period (360°/b).
- +d shifts the curve up.

Sketching Method

- Mark key points: max, min, zeros.
- Label the axes and scale.
- Keep within the stated range.

Crib sheet »

Trigonometric graph sketching in one page

Quick-reference notes — revisit before each question. Don’t use during the questions.

Amplitude & period

$y = a\sin(bx)$: amplitude a, period $360°/b$

Starting points

sin(0) = 0 (rises first); cos(0) = 1 (starts at the top).

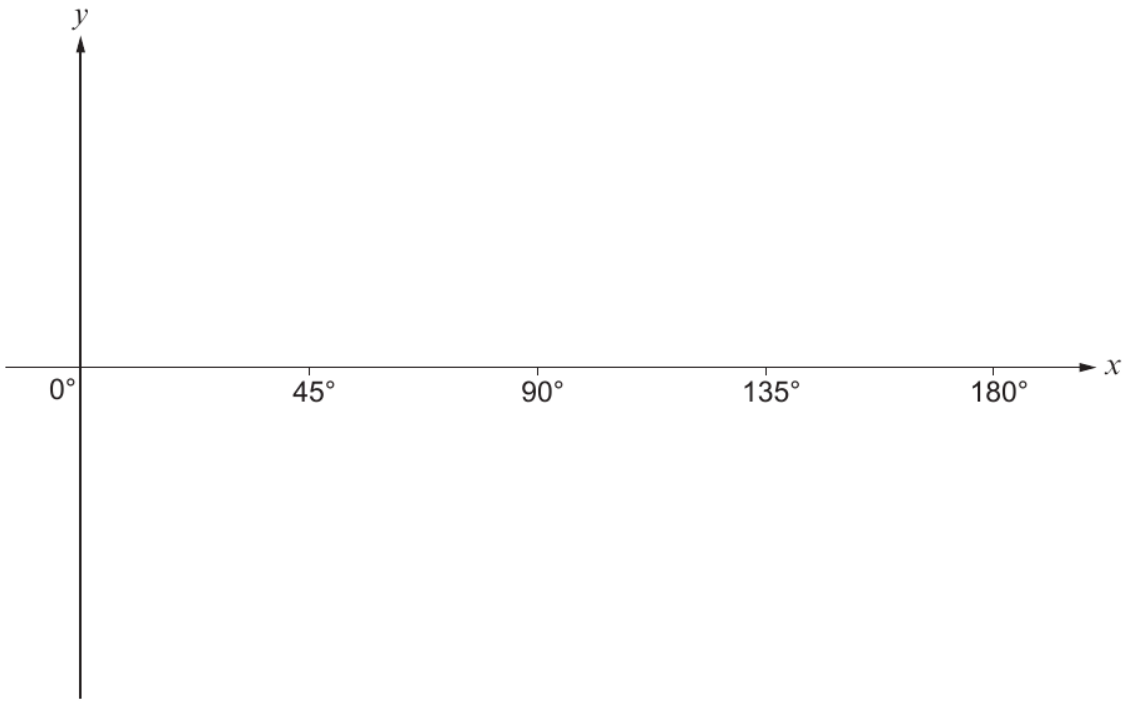
Vertical shift

+d moves the whole curve up by d; the midline becomes y = d.

Key features

Plot maxima, minima and where it crosses the axis, then join smoothly.

19. (a) On the axes below, sketch the graph of $y = \tan 2x$ for values of x from 0° to 180°. [2]



(b) Find all the solutions of the equation $\tan 2x = 10$ for values of x from 0° to 180°. [2]

20. The diagram below shows a slanted cone with a circular base, diameter 10·8 cm.

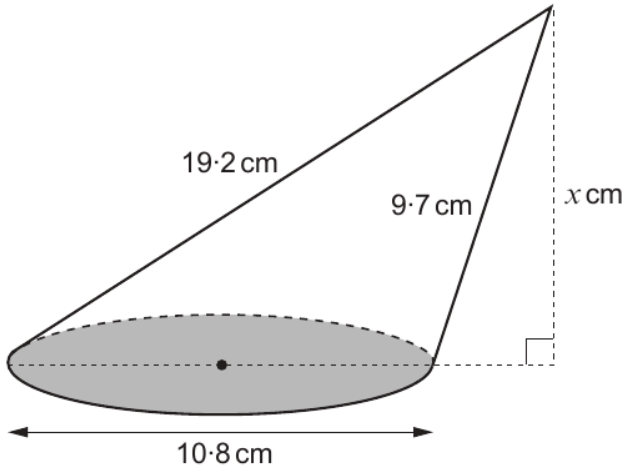
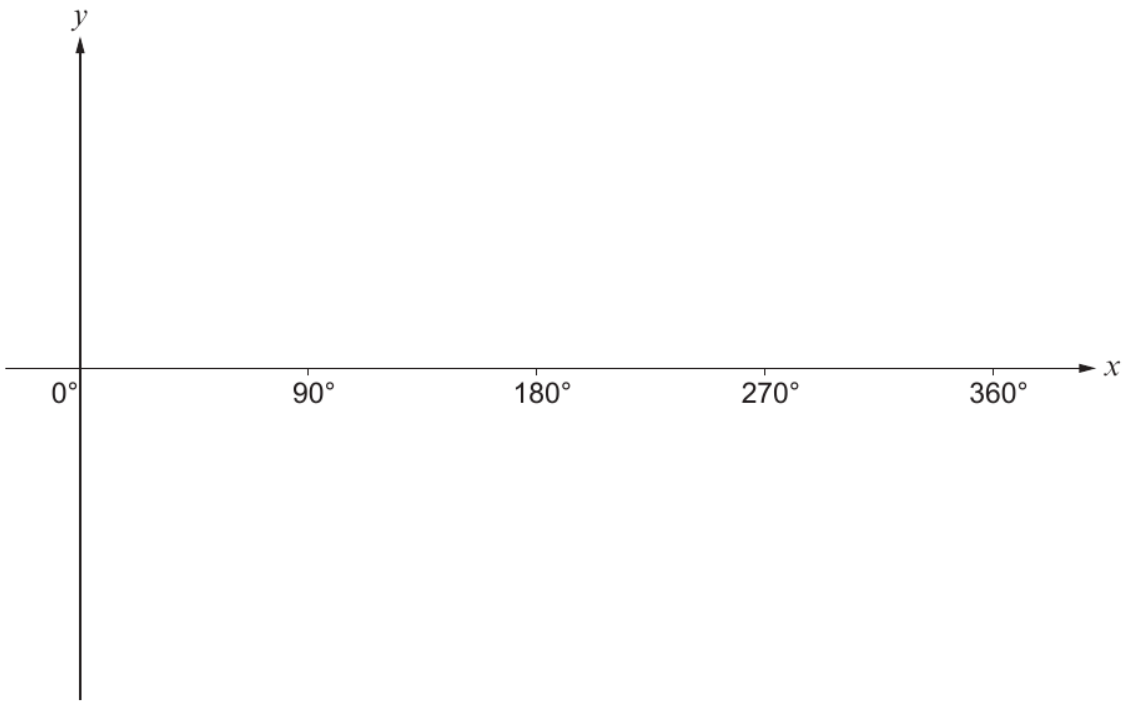


Diagram not drawn to scale

Calculate the value of x. [5]

END OF PAPER

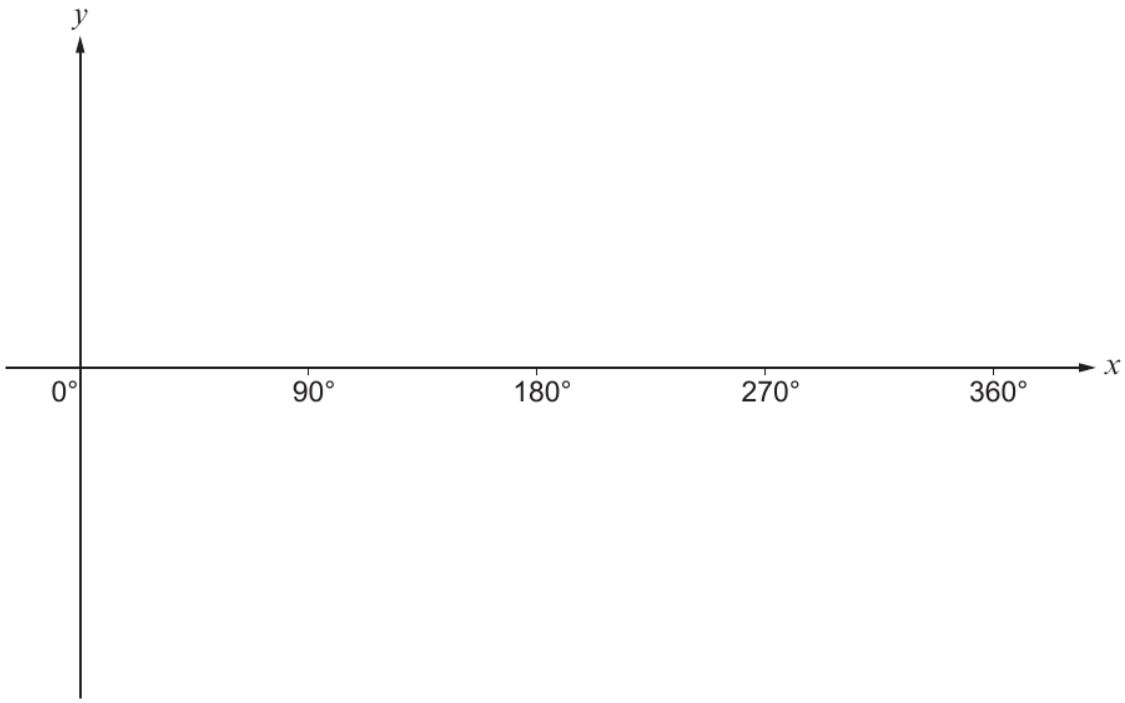
15. (a) On the axes below, sketch the graph of $y = 3\sin 2x$ for values of x from 0° to 360°. [2]



(b) Find all the solutions of the equation $3\sin 2x = 0 \cdot 777$ for values of x from 0° to 360°.

Give your solutions correct to 1 decimal place. [2]

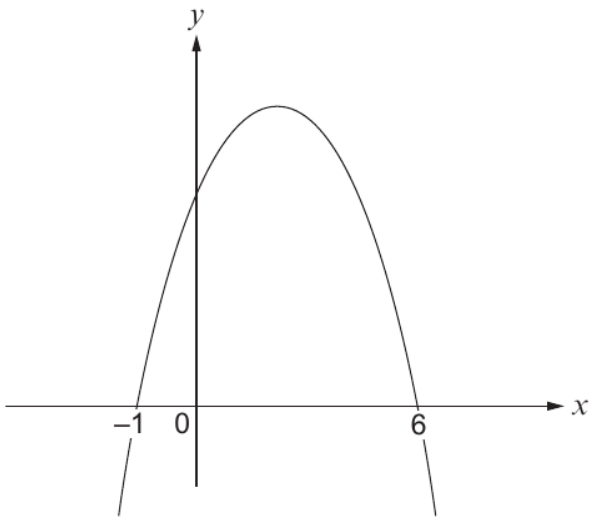
15. (a) On the axes below, sketch the graph of $y = \sin 2x$ for values of x from 0° to 360°. [2]



(b) Find all the solutions of the equation $\sin 2x = 0 \cdot 47$ for values of x from 0° to 360°.

Give your solutions correct to the nearest degree. [2]

16. The diagram shows a sketch of $y = -x^2 + 5x + 6$.



Calculate the area of the region defined by $y \leqslant -x^2 + 5x + 6$, $x \geqslant 2$ and $y \geqslant 0$.

You must show all your working. [5]

9. **Do not use a calculator** to answer this question.
You **must** show all your working.

Simplify $\sin 60° \times \cos 60°$. [1]

11. *(a)* Use the axes below to sketch the graph of $y = -5\sin x + 7$ for values of x from 0° to 360°. You must label any important values on the axes. [3]

(b) State the maximum value and the minimum value of $y = -5\sin x + 7$. [1]

Maximum value .....

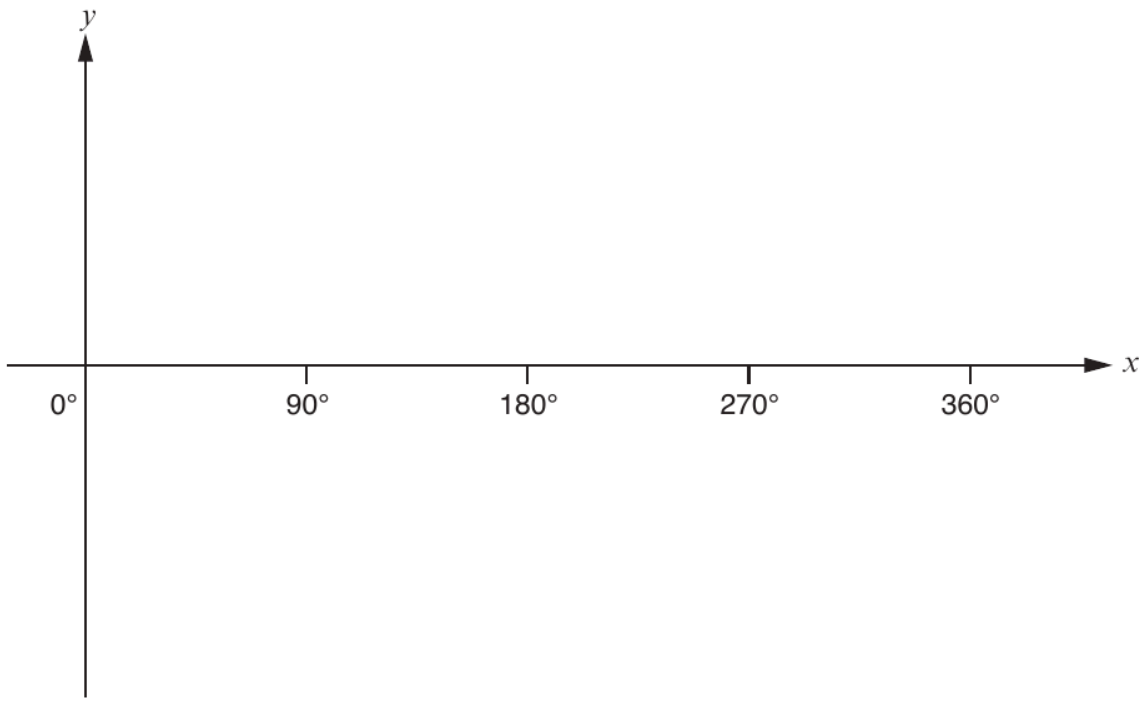
Minimum value .....

12. *(a)* Find $\frac{d^2y}{dx^2}$ when $y = 2x^8 + 4x^2 + 6$. [2]

(b) Find $\int\left(5x^4 + 3x^{-2} - \frac{2}{x^3}\right)\mathrm{d}x$. [4]

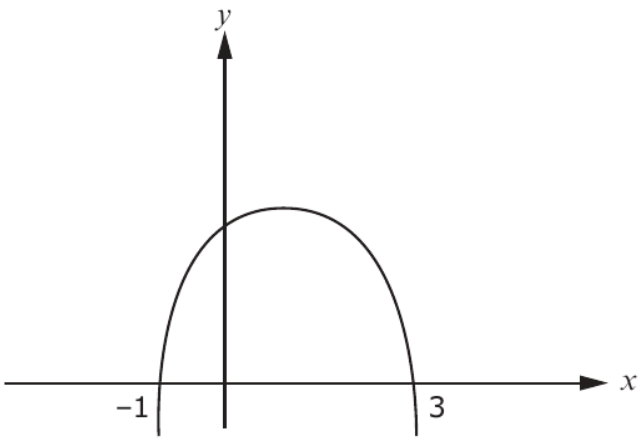
(c) Showing all your working, evaluate $\int_2^3 (6x + 10)\,\mathrm{d}x$. [5]

15. *(a)* On the axes below, sketch the graph of $y = 6\cos x$ for values of x from 0° to 360°. [2]



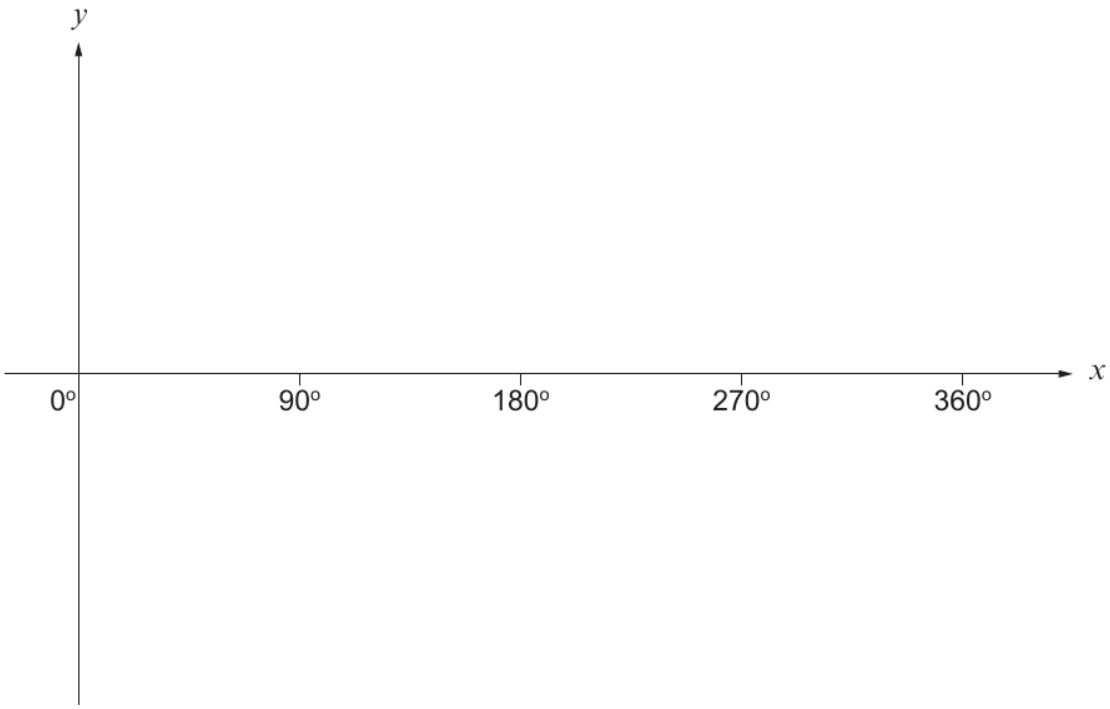
(b) Find all the solutions of the equation $6\cos x = -1$ for values of x from 0° to 360°. [2]

16. The diagram shows a sketch of $y = -x^2 + 2x + 3$.



Showing all your working, calculate the area of the region bounded by the curve $y = -x^2 + 2x + 3$ and the x-axis. [5]

15. *(a)* On the axes below, sketch the graph of $y = 4\sin x$ for values of x from 0° to 360°. [2]



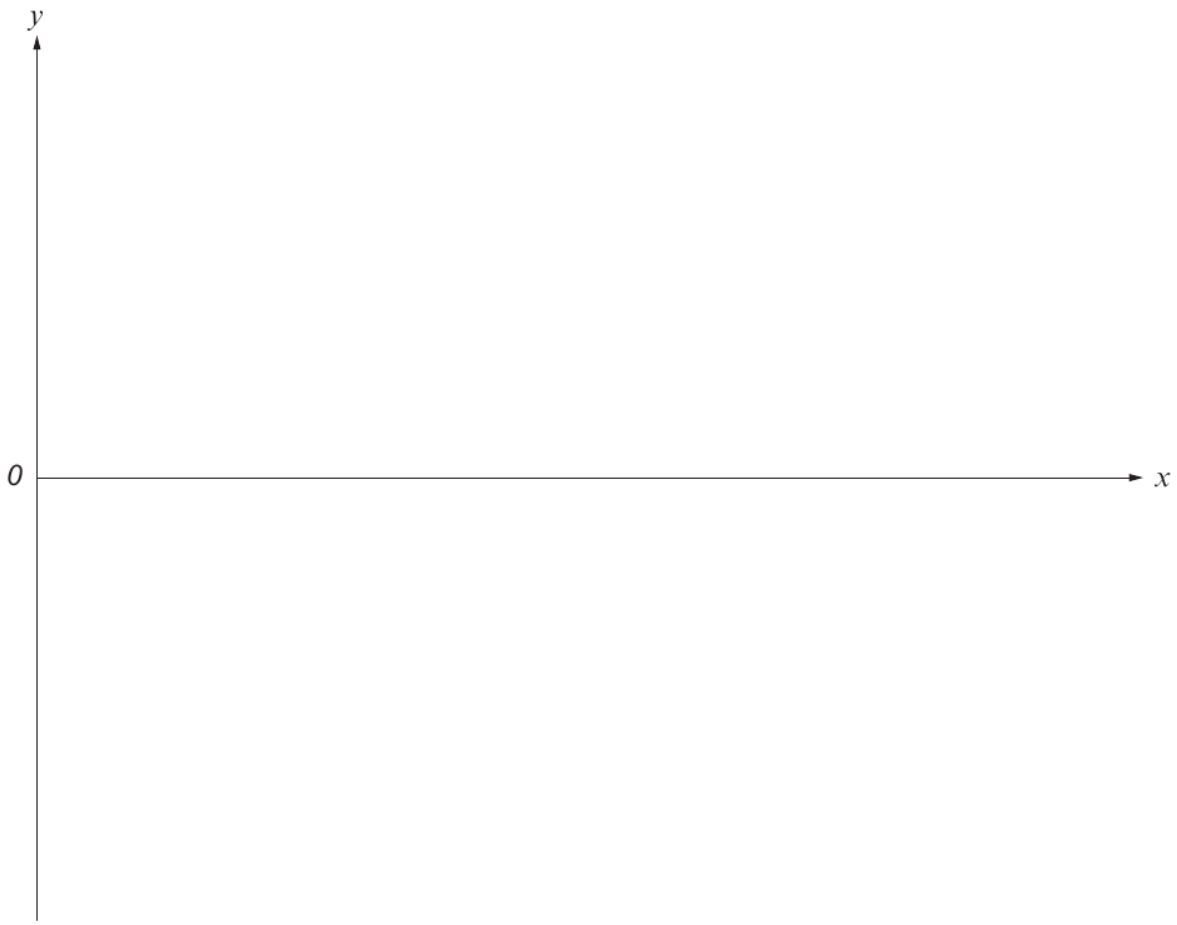
(b) Find all the solutions of the equation $4\sin x = 1$ for values of x from 0° to 360°. [2]

16. Showing all your working, simplify each of the following.

(a) $\dfrac{6x^{\frac{13}{8}} \times 10x^{\frac{3}{8}}}{x^{\frac{1}{5}}}$ [2]

(b) $\dfrac{18x^{\frac{2}{5}} + 9x^{\frac{4}{5}}}{9x^{\frac{1}{5}}}$ [2]

11. *(a)* Use the axes below to sketch the graph of $y = -3\cos x + 5$ for values of x from 0° to 360°. You must label any important values on the axes. [3]



(b) State the maximum and minimum values of $y = -3\cos x + 5$. [2]

Maximum value .....

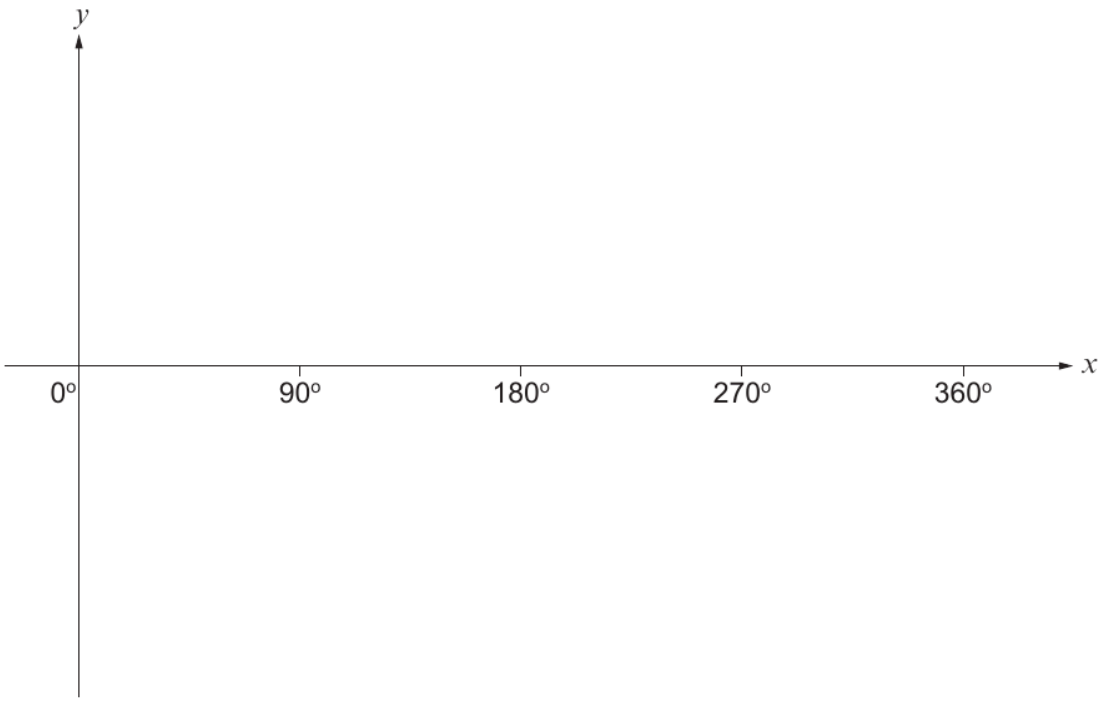
Minimum value .....

12. *(a)* Find $\frac{d^2y}{dx^2}$ when $y = 3x^7 + 4x$. [2]

(b) Find $\int (4x^3 + 2x + 4x^{-2})\,dx$. [4]

(c) Showing all your working, evaluate $\int_2^3 (8x + 2)\,dx$. [5]

15. *(a)* On the axes below, sketch the graph of $y = 5\cos x$ for values of x from 0° to 360°. [2]



(b) Find all the solutions of the equation $5\cos x = 0$ for values of x from 0° to 360°. [1]

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16. Without using a calculator, find the value of $(12^{\frac{1}{2}})^4$.
Show all your working. [1]

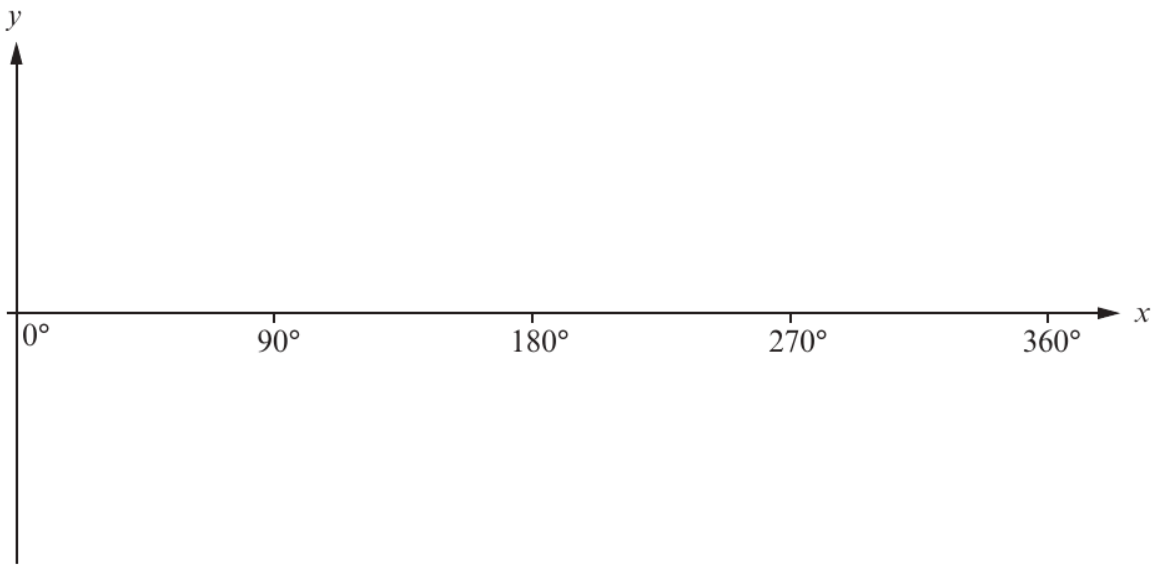
17. Showing all your working, simplify each of the following.

(a) $\dfrac{5x^{\frac{5}{8}} \times 4x^{\frac{3}{8}}}{x^{\frac{2}{3}}}$ [2]

(b) $\dfrac{6x^{\frac{1}{4}} + 3x^{\frac{3}{4}}}{3x^{\frac{1}{4}}}$ [2]

END OF PAPER

15. *(a)* On the axes below, sketch the graph of $y = 4\sin x$ for values of x from 0° to 360°.



[2]

(b) Find all the solutions of the equation $4\sin x = 0$ for values of x from 0° to 360°.

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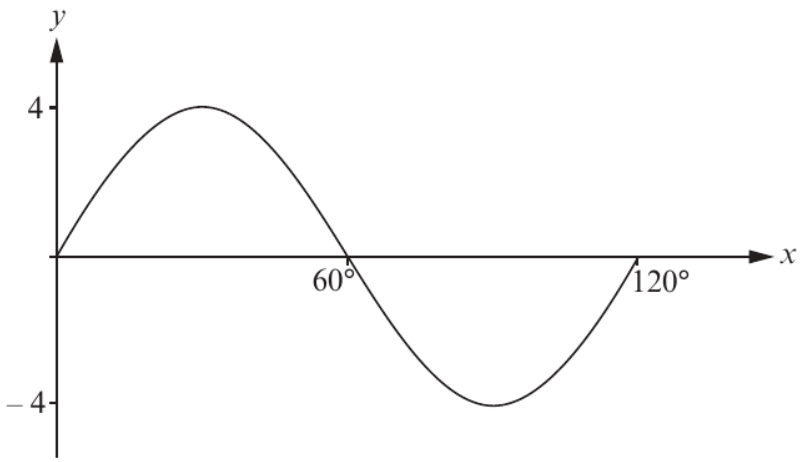
[1]

END OF PAPER

16. *(a)* Select one of the following equations to match the sketch shown below.

$y = 2\sin 3x$ $y = 3\sin 3x$ $y = 4\sin 3x$

$y = 4\sin 4x$ $y = 3\sin 4x$ $y = 3\sin 2x$



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Equation .....

[1]

(b) (i) Write down the minimum value of $y = \sin 5x$.

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[1]

(ii) Find all solutions of the equation $\sin 5x = 1$ for values of x from 0° to 100°.

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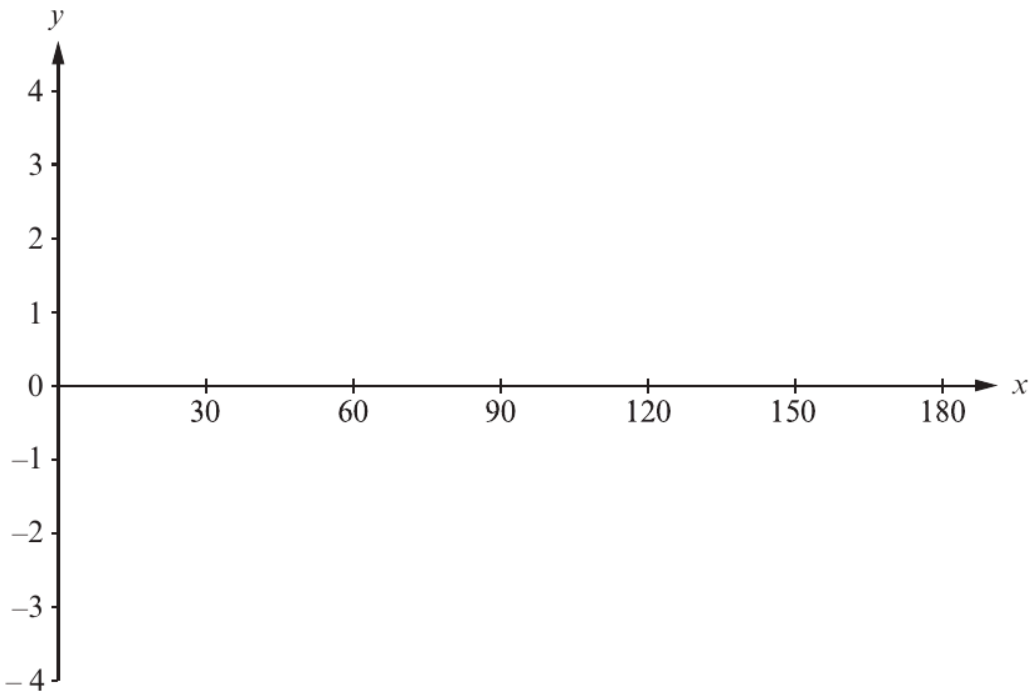
14. *(a)* On the axes below, sketch the graph of $y = 3\sin 2x$ for values of x from 0° to 180°.



[2]

(b) Find all the solutions of the equation $3\sin 2x = 1$ for values of x from 0° to 180°, giving your answers correct to one decimal place.

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[3]

End of question pack