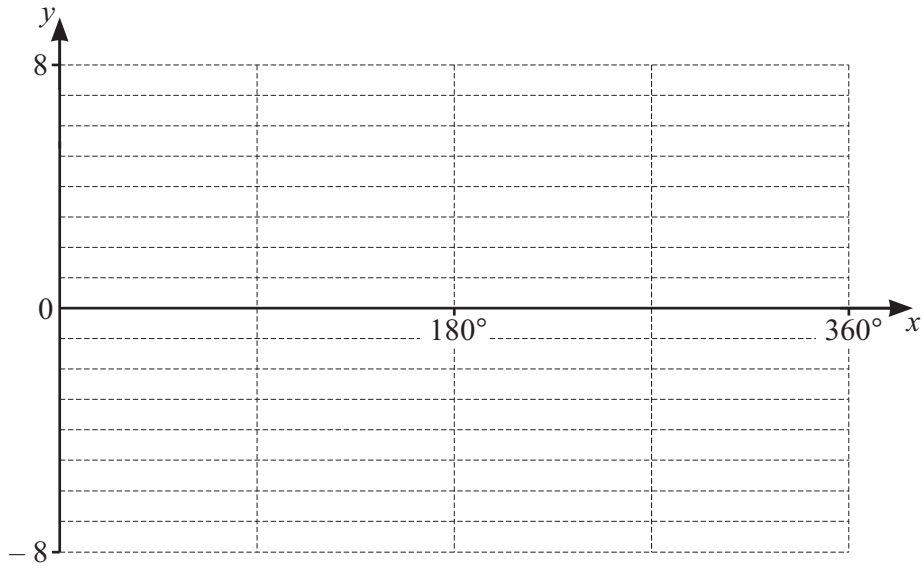
4037 Additional Mathematics Paper 1 - Trigonometry

Topical questions | 12 questions

1. Question | 4037 May-June 2025 P1 V1 Q5

5 **(a)** Solve the equation $5|2x-1|+8=23$. [3]

(b) On the axes, sketch the graph of $y=5\sin x-2$ for $0° \leqslant x \leqslant 360°$. [2]



2. Question | 4037 May-June 2025 P1 V1 Q10

10 **(a)** Given that $0 \leqslant \theta < \frac{\pi}{2}$, show that $\frac{\sin\theta}{\sqrt{\text{cosec}^2\theta - 1}} + \frac{1}{\sqrt{1+\tan^2\theta}}$ can be written as $\sec\theta$. [4]

(b) Given that $\sec x = \alpha$, where $\frac{3\pi}{2} < x \leqslant 2\pi$, find $\sin x$ in terms of α. [3]

3. Question | 4037 May-June 2025 P1 V2 Q4

4 **(a)** Find $\int_0^{\pi} \sin\theta \, \mathrm{d}\theta$. [2]

(b) Given that $0 < \alpha < \frac{\pi}{2}$, show that $\frac{\sec\alpha}{\cot\alpha + \tan\alpha}$ can be written as $\sin\alpha$. [3]

4. Question | 4037 Oct-Nov 2025 P1 V2 Q10

10 Show that $\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \left((\sin\theta + \cos\theta)^2 + (\sin\theta - \cos\theta)^2 \right) \mathrm{d}\theta = k\pi$, where k is an integer to be found. [5]

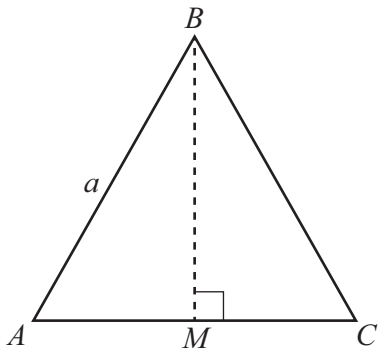
5. Question | 4037 Oct-Nov 2025 P1 V2 Q13

13 For $-1 \leqslant x \leqslant 1$ it is given that $x = 2 - 3\sin\theta$ and $y = 3\cot^2\theta$.

Find y in terms of x. [4]

6. Question | 4037 Oct-Nov 2025 P1 V3 Q6

6 **(a)**



The diagram shows an equilateral triangle ABC with side a.
M is the midpoint of AC and angle $AMB = 90°$.

Use the diagram to find $\sec 30°$. [3]

(b) Show that $\dfrac{1}{\sec x - 1} + \dfrac{1}{\sec x + 1}$ can be written as $2\,\mathrm{cosec}\,x \cot x$. [4]

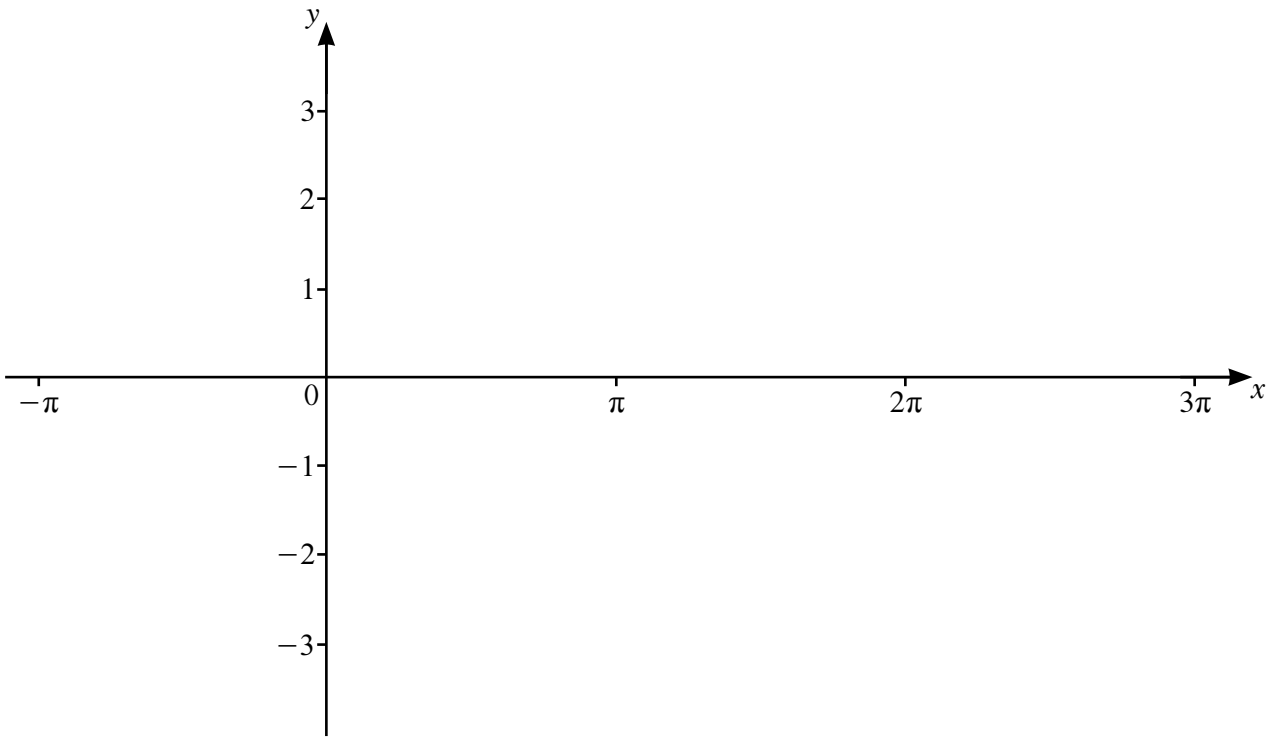
7. Question | 4037 Specimen 2025 P1 Q3

3 In this question, all angles are in radians.

(a) Write down the amplitude of $2\cos\frac{x}{3}-1$. [1]

(b) Write down the period of $2\cos\frac{x}{3}-1$. [1]

(c) On the axes below, sketch the graph of $y=2\cos\frac{x}{3}-1$ for $-\pi \leqslant x \leqslant 3\pi$. [3]



8. Question | 4037 Specimen 2025 P1 V2 Q1

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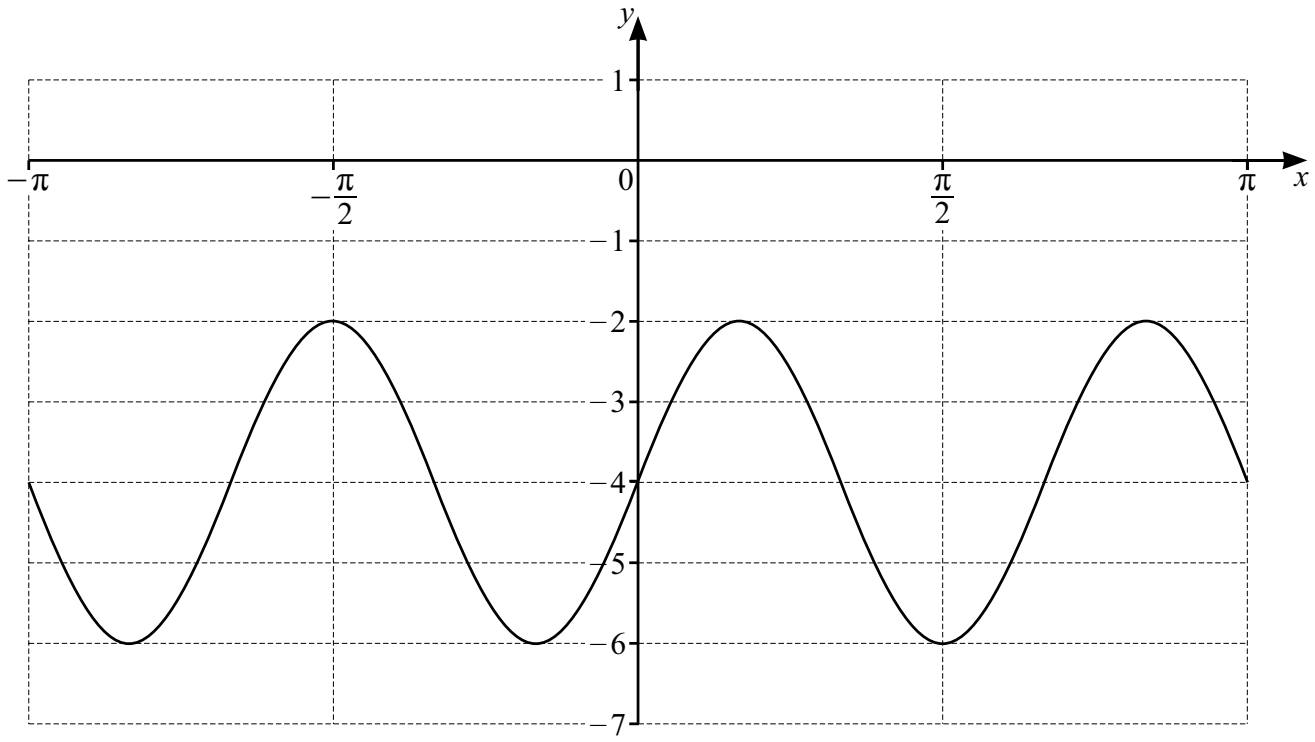


The diagram shows the graph of $y = a\sin bx + c$, where a, b and c are integers.

Find the values of a, b and c. [3]

9. Question | 4037 Specimen 2025 P1 V2 Q4

4 It is given that $\cot\theta = -2\sqrt{6}$ for $\pi < \theta < 2\pi$.

(a) Find the value of $\sin\theta$. [3]

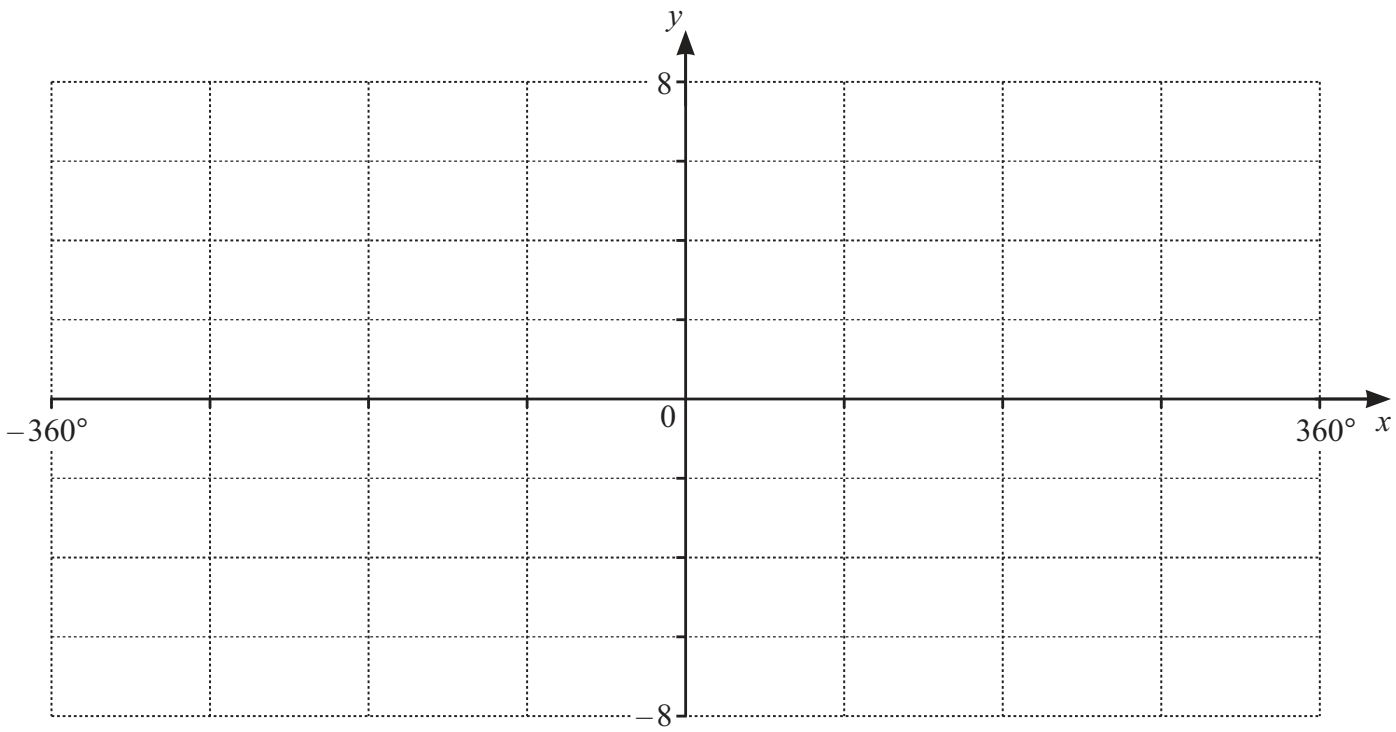
(b) Find the value of $\cos\theta$, giving your answer in surd form. [2]

10. Question | 4037 May-June 2026 P1 V1 Q3

3 Show that $(3+5\cot\theta)^2+(3-5\cot\theta)^2-50\,\text{cosec}^2\theta$, where $0 < \theta < \frac{\pi}{2}$, can be simplified to a constant. [4]

11. Question | 4037 May-June 2026 P1 V2 Q1

1 **(a)** On the axes, sketch the graph of $y = 4\cos x - 2$ for $-360° \leqslant x \leqslant 360°$. [2]



(b) Write down the amplitude of $4\cos x - 2$. [1]

(c) Write down the period of $4\cos x - 2$. [1]

(d) Write down the set of values of the constant k for which the equation $4\cos x - 2 = k$ has at least two solutions. [1]

12. Question | 4037 May-June 2026 P1 V2 Q7

7 Show that $\operatorname{cosec} x - \sin x$ can be written as $\frac{\cos x}{\tan x}$. [3]