

Questions taken from the AQA Practice Paper 1 Set 1 (AS)

Question	2	3	6	7	8	9	10	11	13	15	Total
Marks											
Max Marks	1	5	6	11	9	7	1	1	6	4	51

SPEND ABOUT AN HOUR ON THE QUESTIONS
 THEN
 CHECK AND CORRECT YOUR ANSWERS USING THE MARK SCHEME

- 2 The lines $y = \frac{a}{3}x - 4$ and $y = 3 - \frac{b}{4}x$ are perpendicular.

Find the value of ab .
 Circle your answer.

[1 mark]

$\frac{3}{4}$ -12 $-\frac{4}{3}$ 12

- 3 The curve, C , has equation $y = 2x^2 + 5x + k$. The minimum value of C is $-\frac{3}{4}$

- 3 (a) Find the value of k .

[4 marks]

- 3 (b) The curve C is translated by $\begin{pmatrix} 1 \\ d \end{pmatrix}$ to obtain the curve C'

The curve C' touches the x -axis.

State the value of d .

[1 mark]

- 6 $f(x) = \frac{1-2x^9}{x^5}$ for $x > 0$

Prove that $f(x)$ is a decreasing function.

[6 marks]

7 A curve has equation $x^2 + y^2 + 12x = 64$

A line has equation $y = mx + 10$

7 (a) (i) In the case that the line intersects the curve at two distinct points, show that

$$(20m + 12)^2 - 144(m^2 + 1) > 0$$

[4 marks]

7 (a) (ii) Hence find the possible values of m .

[2 marks]

7 (b) (i) On the same diagram, sketch the curve and the line in the case when $m = 0$

[4 marks]

7 (b) (ii) State the relationship between the curve and the line.

[1 mark]

8 $(x - 3)$ is a common factor of $f(x)$ and $g(x)$ where:

$$f(x) = 2x^3 - 11x^2 + (p - 15)x + q$$

$$g(x) = 2x^3 - 17x^2 + px + 2q$$

8 (a) (i) Show that $3p + q = 90$ and $3p + 2q = 99$

Fully justify your answer.

[4 marks]

8 (a) (ii) Hence find the values of p and q .

[1 mark]

8 (b) $h(x) = f(x) + g(x)$

Using your values of p and q , fully factorise $h(x)$

[4 marks]

- 9 Martin tried to find all the solutions of $4 \sin^2 \theta \cos^2 \theta - \cos^2 \theta = 0$ for $0^\circ \leq \theta \leq 360^\circ$

His working is shown below:

$$4 \sin^2 \theta \cos^2 \theta - \cos^2 \theta = 0$$

$$\Rightarrow 4 \sin^2 \theta \cos^2 \theta = \cos^2 \theta$$

$$\Rightarrow 4 \sin^2 \theta = 1$$

$$\Rightarrow \sin^2 \theta = \frac{1}{4}$$

$$\Rightarrow \sin \theta = \frac{1}{2}$$

$$\Rightarrow \theta = 30^\circ, 150^\circ$$

Martin did not find all the correct solutions because he made **two** errors.

- 9 (a) Identify the two errors and explain the consequence of each error. [4 marks]
- 9 (b) Find all the solutions that Martin did not find. [3 marks]

- 10 A block is at rest on a horizontal playground. The normal reaction force acting on the block has magnitude 400 N.

Find the approximate mass of the block.

Circle your answer.

[1 mark]

4 kg 40 kg 400 kg 4000 kg

- 11 A car travels 2.4 km in 6 minutes.

Find the average speed of the car.

Circle your answer.

[1 mark]

0.4 m s⁻¹ 6.67 m s⁻¹ 24 m s⁻¹ 400 m s⁻¹

- 13** A toy train travels on a straight track, of length 11 metres.
It is initially at rest with the back of the train at one end of the track.
It accelerates uniformly for 8 seconds and reaches a speed of 2 m s^{-1} .
It then travels at this speed until it reaches the end of the track.
- 13 (a)** Sketch a velocity-time graph for the train. **[2 marks]**
- 13 (b)** Find the time it takes the train to reach the end of the track. **[2 marks]**
- 13 (c) (i)** Describe how the model that you have used could be refined. **[1 mark]**
- 13 (c) (ii)** Explain how your refinement would affect your answer to part (b). **[1 mark]**
-
- 15** **In this question use $g = 9.8 \text{ m s}^{-2}$.**
- A crate of mass 19 kg is attached to a cable, which is used to lift the crate vertically.
The tension in the cable is 204 N.
- 15 (a)** Assuming that there is no air resistance on the crate, find the acceleration of the crate. **[3 marks]**
- 15 (b)** In reality, there is air resistance on the crate.

State what can be deduced about the acceleration when the effect of air resistance is considered. **[1 mark]**