

## Questions taken from the AQA Specimen Papers (AS)

	From Paper 1					From Paper 2				
Question	5	6	8	12	14	7	11	13	115	Total
Marks										
Max Marks	2	4	6	9	3	5	10	1	2	42

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

From Paper 1

- 5** Jessica, a maths student, is asked by her teacher to solve the equation  $\tan x = \sin x$ , giving all solutions in the range  $0^\circ \leq x \leq 360^\circ$

The steps of Jessica's working are shown below.

$$\begin{array}{l} \tan x = \sin x \\ \text{Step 1} \quad \Rightarrow \quad \frac{\sin x}{\cos x} = \sin x \quad \text{Write } \tan x \text{ as } \frac{\sin x}{\cos x} \\ \text{Step 2} \quad \Rightarrow \quad \sin x = \sin x \cos x \quad \text{Multiply by } \cos x \\ \text{Step 3} \quad \Rightarrow \quad 1 = \cos x \quad \text{Cancel } \sin x \\ \Rightarrow \quad x = 0^\circ \text{ or } 360^\circ \end{array}$$

The teacher tells Jessica that she has not found all the solutions because of a mistake.

Explain why Jessica's method is not correct.

**[2 marks]**

- 6** A parallelogram has sides of length 6 cm and 4.5 cm.  
The larger interior angles of the parallelogram have size  $\alpha$

Given that the area of the parallelogram is  $24 \text{ cm}^2$ , find the exact value of  $\tan \alpha$

**[4 marks]**

8 (a) Find the first **three** terms, in ascending powers of  $x$ , of the expansion of  $(1-2x)^{10}$   
**[3 marks]**

8 (b) Carly has lost her calculator. She uses the first three terms, in ascending powers of  $x$ , of the expansion of  $(1-2x)^{10}$  to evaluate  $0.998^{10}$   
 Find Carly's value for  $0.998^{10}$  and show that it is correct to **five** decimal places.  
**[3 marks]**

12 A curve has equation  $y = 6x\sqrt{x} + \frac{32}{x}$  for  $x > 0$

12 (a) Find  $\frac{dy}{dx}$   
**[4 marks]**

12 (b) The point  $A$  lies on the curve and has  $x$ -coordinate 4  
 Find the coordinates of the point where the tangent to the curve at  $A$  crosses the  $x$ -axis.  
**[5 marks]**

14 In this question use  $g = 10 \text{ m s}^{-2}$ , giving your final answers to an appropriate degree of accuracy.

A man of mass 80 kg is travelling in a lift.  
 The lift is rising vertically.



The lift decelerates at a rate of  $1.5 \text{ m s}^{-2}$

Find the magnitude of the force exerted on the man by the lift.  
**[3 marks]**

From Paper 2

7 Solve the equation

$$\sin\theta \tan\theta + 2\sin\theta = 3\cos\theta \quad \text{where } \cos\theta \neq 0$$

Give **all** values of  $\theta$  to the nearest degree in the interval  $0^\circ < \theta < 180^\circ$

Fully justify your answer.

[5 marks]

11 The circle with equation  $(x-7)^2 + (y+2)^2 = 5$  has centre  $C$ .

11 (a) (i) Write down the radius of the circle.

[1 mark]

11 (a) (ii) Write down the coordinates of  $C$ .

[1 mark]

11 (b) The point  $P(5, -1)$  lies on the circle.

Find the equation of the tangent to the circle at  $P$ , giving your answer in the form  
 $y = mx + c$

[4 marks]

11 (c) The point  $Q(3, 3)$  lies outside the circle and the point  $T$  lies on the circle such that  $QT$  is a tangent to the circle. Find the length of  $QT$ .

[4 marks]

- 13 The number of pots of yoghurt,  $X$ , consumed per week by adults in Milton is a discrete random variable with probability distribution given by

$x$	0	1	2	3	4	5	6	7 or more
$P(X=x)$	0.30	0.10	0.05	0.07	0.03	0.16	0.09	0.20

Find  $P(3 \leq X < 6)$

Circle the correct answer.

[1 mark]

0.26

0.31

0.35

0.40

- 15 A school took 225 children on a trip to a theme park.  
After the trip the children had to write about their favourite ride at the park from a choice of three.

The table shows the number of children who wrote about each ride.

		Ride written about			Total
		The Drop	The Beanstalk	The Giant	
Year group	Year 7	24	45	23	<b>92</b>
	Year 8	36	17	22	<b>75</b>
	Year 9	20	13	25	<b>58</b>
Total		<b>80</b>	<b>75</b>	<b>70</b>	<b>225</b>

Three children were randomly selected from those who went on the trip.  
Calculate the probability that one wrote about 'The Drop', one wrote about 'The Beanstalk' and one wrote about 'The Giant'.

[2 marks]