

Full name:

Approximately how many hours have you spent revising for this assessment?	
What is your Aspirational Target Grade?	
What grade do you think you have achieved in this assessment?	

**L6 A Level Maths
Assessment 1
Time: 55 minutes**

Instructions

- Use black ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- Fill in your name at the top of this page
- Answer all questions and ensure that your answers to parts of questions are clearly labelled.
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.
- At the end of the assessment answer the 3 questions at the top of this page.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- The marks for each question are shown in brackets
 - use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total
6	4	4	8	5	7	4	7	45
							Grade	

1. $g(x) = 4x^3 - 12x^2 - 15x + 50$

(a) Use the factor theorem to show that $(x + 2)$ is a factor of $g(x)$. (2)

(b) Hence show that $g(x)$ can be written in the form $g(x) = (x + 2)(ax + b)^2$, where a and b are integers to be found. (4)

(Total 6 marks)

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4.

$$p(x) = 3 - \frac{1}{2}x, \quad q(x) = x^2 - 10x - 20$$

- (a) Sketch the graphs of $y = p(x)$ and $y = q(x)$ on the same set of axes. Label all points where the curves intersect the coordinate axes.

(4)

- (b) Use an algebraic method to find the coordinates of any point of intersection of the graphs $y = p(x)$ and $y = q(x)$.

(4)

(Total 8 marks)

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6. A train travels along a straight horizontal track between two stations, *A* and *B*. In a model of the motion, the train starts from rest at *A* and moves with constant acceleration 0.3 m s^{-2} for 80 s. The train then moves at constant velocity before it moves with a constant deceleration of 0.5 m s^{-2} , coming to rest at *B*.

- (a) For this model of the motion of the train between *A* and *B*,
- (i) state the value of the constant velocity of the train,
 - (ii) state the time for which the train is decelerating,
 - (iii) sketch a velocity-time graph.
- (3)**

The total distance between the two stations is 4800 m.

- (b) Using the model, find the total time taken by the train to travel from *A* to *B*.
- (3)**
- (c) Suggest one improvement that could be made to the model of the motion of the train from *A* to *B* in order to make the model more realistic.
- (1)**

(Total 7 marks)

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7. A man throws a tennis ball into the air so that, at the instant when the ball leaves his hand, the ball is 2 m above the ground and is moving vertically upwards with speed 9 m s^{-1} .

The motion of the ball is modelled as that of a particle moving freely under gravity and the acceleration due to gravity is modelled as being of constant magnitude 10 m s^{-2} .

The ball hits the ground T seconds after leaving the man's hand.

Using the model, find the value of T .

(Total 4 marks)

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8. A car is moving along a straight horizontal road with constant acceleration. There are three points A , B and C , in that order, on the road, where $AB = 22$ m and $BC = 104$ m. The car takes 2 s to travel from A to B and 4 s to travel from B to C . Find

- (i) the acceleration of the car,
- (ii) the speed of the car at the instant it passes A .

(Total 7 marks)

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