

Worksheet 9

2 days until 1st exam

For the final ten days leading up to the first AS Maths exam paper (8MA0/01 for Edexcel), we will publish four exam questions. Three of the questions will focus on the Pure Mathematics content, and one of the questions will focus on Mechanics content. There will be no questions on Statistics content. The three questions will vary in difficulty, but they will usually increase in difficulty. You may use a calculator for any of the questions and solutions are provided on a separate document.

1 Find $\int (2p - 4)^2 dp$.

2 Find counter-examples to disprove all of the following statements:

(a) If p is an odd prime, then so is $p + 2$.

(b) The function $f(x) = \sin(x + 60^\circ)$ is positive for all $0 < x < 180^\circ$.

(c) $\sin(x + y) = \sin(x) + \sin(y)$

(d) The derivative of the product of two functions is the product of their derivatives.

3 The line l_1 has the equation $y = x - 4$.

The line l_2 is a normal to the curve $y = x^{-1} + 2x^2 + x(1 - x)$ at $x = 1$.

The line l_2 intersects y -axis at the point P and intersects the line l_1 at the point Q .

(a) Find the equation of the line l_2 . Give your answer in the form $y = mx + c$.

(b) Find the coordinates of P and the coordinates of Q .

The point R is where the line l_1 intersects the x -axis.

(c) Find the area of the quadrilateral $OPQR$, where O is the origin.

4 The particle P is moving to the right in a straight line and on a smooth horizontal table.

At time $t = 0$, the particle passes through the point A and is moving with a velocity of 8 m s^{-1} .

The particle P decelerates at 1 m s^{-2} until it passes through the point B , which is 2 m from A .

After the particle passes the point B , it moves with constant speed for 5 seconds until it passes through the point C .

(a) Find the total time taken for the particle to move from A to C .

(b) Find the total distance travelled by the particle between A and C .

END OF WORKSHEET