A Level: **Exam Countdown** | CM

Worksheet 2 — 9 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 (a) Expand $(5x - 2)^4$.

(b) Hence, evaluate $\int_0^1 (5x-2)^4\,dx$.

2 A circle C has the equation $4x^2 + 2 = 5y - ay^2 + k$, where a and k are constants.

(a) Write down the value of a.

(b) Find the coordinates of the centre of C.

(c) Show that $k > \frac{7}{16}$.

3 Given that the equation $16x^2 + 8kx + 8k = 15$, where k is a constant, has two distinct real roots,

(a) show that $k^2 - 8k + 15 > 0$.

(b) Hence, find the range of possible values of k.

(c) Write down the number of solutions to the equation $16x^2 + 16x + 1 = 0$.

4 The particle P moves along the x-axis. The velocity v m s^{-1} of P at time t s is given by

$$v = t^2 - k,\ t \geq 0$$

where k is a positive constant.

Given that the **magnitude** of the initial velocity of P is 4 m s^{-1},

(a) write down the value of k.

(b) Calculate the acceleration of the particle P at $t = 2$.

(c) Calculate the total distance travelled by the particle in the first five seconds of its motion.

END OF WORKSHEET