A Level: **Exam Countdown** | CM

Worksheet 7 — 4 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) Solve the equation $5^x = 10$. Give your answer to 2 decimal places.

(b) Solve the equation $2(4^x) - 5(2^x) + 3 = 0$.

2 (a) In descending powers of x, find the first three terms in the expansion of $\left(3-\frac{1}{\sqrt{x}}\right)^8$.

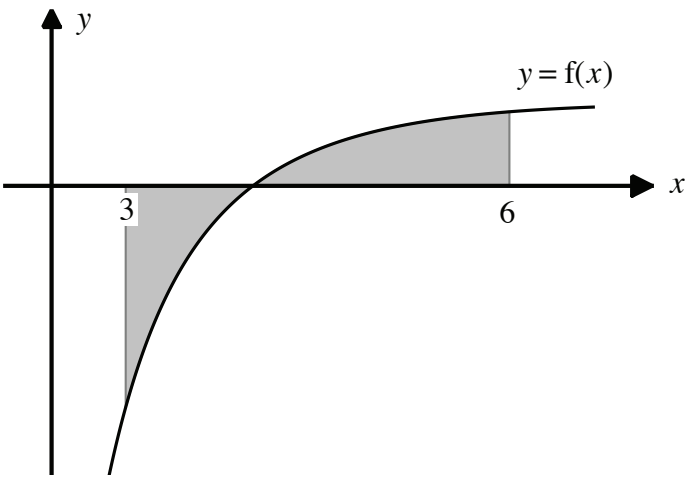
(b) Given that n is a positive integer, prove directly from the definition of ${}^nC_r$ that

$$ {}^nC_2 = \frac{n(n-1)}{2} $$

In the expansion of $(5x + 1)^p$, the coefficient of x^2 is 700 , where p is a positive integer.

(c) Find the value of p.

3



The diagram below shows a sketch of the curve C with equation $y = f(x)$, where

$$ f(x) = \frac{1}{\sqrt{x}} - \frac{p}{x^2}, \quad x > 0, p > 0 $$

The shaded region R is bounded by C, the x-axis and the lines $x = 3$ and $x = 6$.

(a) Given that the x coordinate of the maximum point on C is $\sqrt[3]{32^2}$, show that $p = 8$.

(b) Find the **exact** area of the shaded regon R.

Give your answer in the form $a\sqrt{6}+b\sqrt{3}+c$, where a, b and c are integers to be found.

4 At time $t = 0$, a train passes through the point A with a speed of 48 km h^{-1}. The train then accelerates at a constant rate until it reaches a velocity of 69 km h^{-1} at time $t = T$ minutes and then moves at a constant velocity of 69 km h^{-1}. After 10 minutes, the train passes through the point B.

(a) Draw a velocity-time graph for the motion of the train.

Given that the train travels a distance of 11.325 km between A and B,

(b) find the value of T.

END OF WORKSHEET