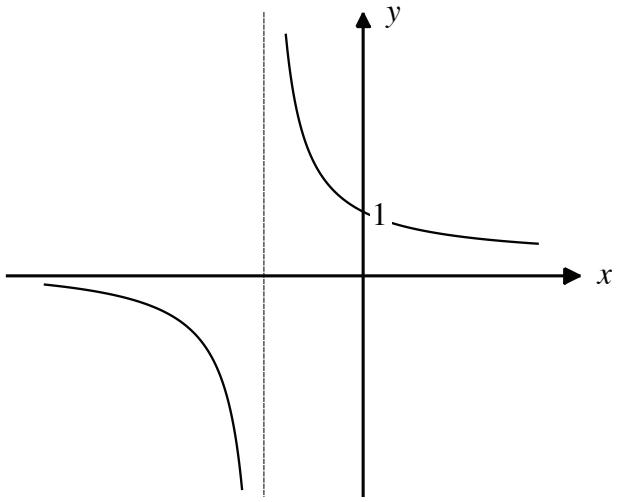
A Level: **Exam Countdown** | CM

Worksheet 5 **6 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



The diagram above shows a sketch of the curve with equation $y = \frac{2}{x+k}$.

The curve crosses the y-axis at the point $(0, 1)$.

(a) Write down the value of the constant k.

(b) Write down the equations of the asymptotes to the curve.

(c) Sketch the curve with equation $y = x^{-1} - 4$.

On your sketch, state clearly the coordinates of any points where the curve crosses or meets the coordinate axes. State also the equations of any asymptotes to the curve.

2 The curve C has the equation $y = x^3 - \sqrt{px}$, where p is a positive constant.

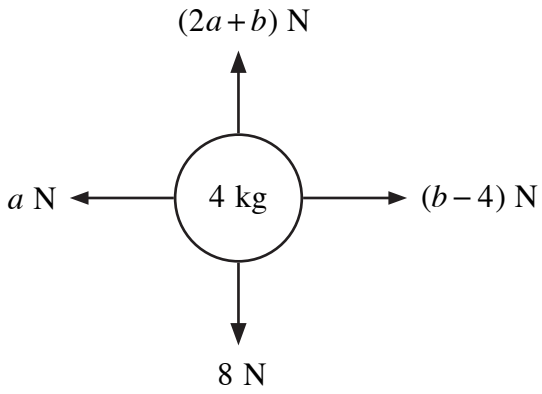
(a) Find an expression, in terms of p, for $\frac{dy}{dx}$.

The line $x + 2y + k = 0$ is a normal to C at $x = 1$.

(b) Find the value of p and the value of k.

3 Evaluate $\lim_{h\to 0}\left(\frac{(x+h)^{-1} - x^{-1}}{h}\right)$ by considering a suitable derivative.

4 The diagram below shows the forces that act on the particle P which has mass 4 kg.



The particle P accelerates to the left at 8 m s^{-2}.

Find the values of a and b.

END OF WORKSHEET