

AEM questions are taken from past exam papers - they have been carefully chosen to represent a typical exam question at each level of difficulty. If you can do these questions, you're ready to move onto past papers for this topic.

APPRENTICE

Given $y = \frac{1}{2}x^4 - (x+1)^3 - 3x^2$, find the x coordinates of the inflection points of the graph of y = f(x).

Fully justify that the points you have found are inflection points.

EXPERT

Given $y = 2x(x^2 - 1)^5$,

- a. show that $\frac{dy}{dx} = g(x)(x^2 1)^4$ where g(x) is a function to be determined.
- b. Hence find the set of values of x for which the graph of y = f(x) is convex.

MASTER

Given that k is a **negative** constant, and the function f(x) is defined by $f(x) = 2 - \frac{(x - 5k)(x - k)}{x^2 - 3kx + 2k^2}$, $x \ge 0$

a. Show that $f(x) = \frac{x+k}{x-2k}$.

- b. Hence find f'(x), giving your answer in its simplest form.
- c. State, with a reason, whether f(x) is an increasing or a decreasing function. Justify your answer.