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2. Find

$$\int (12x^5 - 3x^2 + 4x^{\frac{1}{3}}) dx$$

giving each term in its simplest form.

(5)

Q2

(Total 5 marks)

3

Turn over



5.

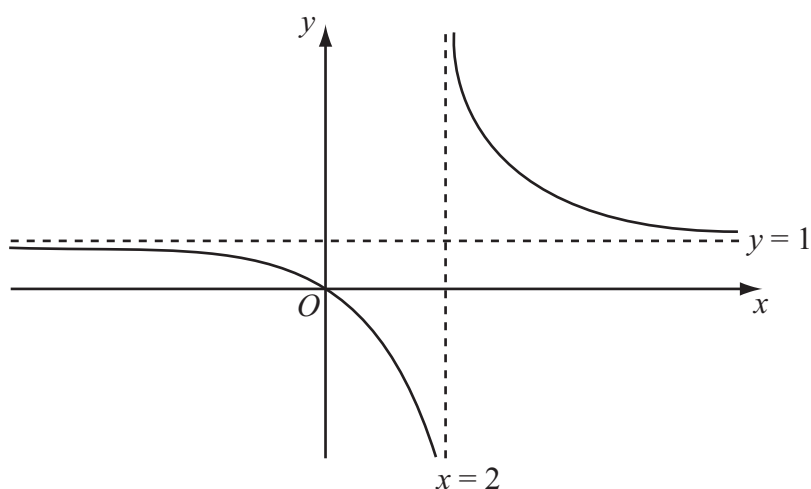
**Figure 1**

Figure 1 shows a sketch of the curve with equation $y = f(x)$ where

$$f(x) = \frac{x}{x-2}, \quad x \neq 2$$

The curve passes through the origin and has two asymptotes, with equations $y = 1$ and $x = 2$, as shown in Figure 1.

- (a) In the space below, sketch the curve with equation $y = f(x-1)$ and state the equations of the asymptotes of this curve. **(3)**
- (b) Find the coordinates of the points where the curve with equation $y = f(x-1)$ crosses the coordinate axes. **(4)**



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10. (a) On the axes below, sketch the graphs of

(i) $y = x(x+2)(3-x)$

(ii) $y = -\frac{2}{x}$

showing clearly the coordinates of all the points where the curves cross the coordinate axes.

(6)

(b) Using your sketch state, giving a reason, the number of real solutions to the equation

$$x(x+2)(3-x) + \frac{2}{x} = 0$$

(2)

