

10

$$f(x) = 2x^3 - px^2 - 13x - q$$

When $f(x)$ is divided by $(x - 2)$ the remainder is -20

Given that $(x - 3)$ is a factor of $f(x)$

(a) find the value of p and the value of q

(7)

(b) Hence use algebra to solve the equation $f(x) = 0$

(5)

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Question 10 continued

Handwritten solution for Question 10 continued:

Let $u = \frac{1}{x}$. Then $\frac{du}{dx} = -\frac{1}{x^2}$.

The differential equation becomes $\frac{du}{dx} = -u^2$.

Separating variables: $\frac{du}{u^2} = -dx$.

Integrating: $-\frac{1}{u} = -x + C$.

Substituting back $u = \frac{1}{x}$: $-\frac{1}{\frac{1}{x}} = -x + C$.

$-x = -x + C$.

$C = 0$.

Therefore, $\frac{1}{x} = 0$.

$x = \infty$.



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Question 10 continued

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Question 10 continued

Area for writing answers to Question 10. The area contains horizontal dotted lines for writing.

(Total for Question 10 is 12 marks)

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