3. $$f(x) = 2x^3 - x^2 + Ax + B$$

where A and B are integers.

Given that when $f(x)$ is divided by $(x + 3)$ the remainder is 55

(a) show that

$$3A - B = -118$$

(2)

Given also that $(2x - 5)$ is a factor of $f(x)$,

(b) find the value of A and the value of B.

(3)

(c) Hence find the quotient when $f(x)$ is divided by $(x - 7)$

(2)

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Question 3 continued

Question 3 continued

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Question 3 continued

(Total for Question 3 is 7 marks)

4. **In this question you must show all stages of your working.**

Solutions relying entirely on calculator technology are not acceptable.

The curve C has equation

$$y = 4x^{\frac{1}{2}} + 9x^{-\frac{1}{2}} + 3 \qquad x > 0$$

(a) Find $\dfrac{dy}{dx}$ giving each term in simplest form.

(2)

(b) Hence find the x coordinate of the stationary point of C.

(2)

(c) (i) Find $\dfrac{d^2y}{dx^2}$ giving each term in simplest form.

(ii) Hence determine the nature of the stationary point of C, giving a reason for your answer.

(2)

(d) State the range of values of x for which y is decreasing.

(1)

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