1. Find the first 4 terms of the binomial expansion, in ascending powers of x, of

$$(8 + 32x)^{\frac{1}{3}} \qquad |x| < \frac{1}{4}$$

giving each term in simplest form.

(4)

(Total for Question 1 is 4 marks)

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2. Given that

$$\frac{2x^2 - x + 11}{(x + 2)(2x - 3)} \equiv A + \frac{B}{x + 2} + \frac{C}{2x - 3}$$

(a) find the value of each of the constants A, B and C.

(4)

(b) Hence find

$$\int \frac{2x^2 - x + 11}{(x + 2)(2x - 3)} \mathrm{d}x$$

(3)

(Total for Question 2 is 7 marks)

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3. A solid metal cube is being heated and is expanding.

The volume of the cube is increasing at a constant rate of $0.085\ \text{cm}^3\,\text{s}^{-1}$

At time t seconds,

- the side length of the cube is x cm
- the volume of the cube is V cm^3

At the instant the volume of the cube is $100\ \text{cm}^3$, the side length is increasing at a rate of $k\ \text{cm}\,\text{s}^{-1}$

Find the value of k, giving your answer to 3 significant figures.

(4)

(Total for Question 3 is 4 marks)
