15 (a) Show that

$$\sin x - \sin x \cos 2x \approx 2x^3$$

for small values of x.

[3 marks]

15 (b) Hence, show that the area between the graph with equation

$$y = \sqrt{8(\sin x - \sin x \cos 2x)}$$

the positive x-axis and the line $x = 0.25$ can be approximated by

$$\text{Area} \approx 2^m \times 5^n$$

where m and n are integers to be found.

[4 marks]

15 (c) (i) Explain why

$$\int_{6.3}^{6.4} 2x^3 \, \mathrm{d}x$$

is **not** a suitable approximation for

$$\int_{6.3}^{6.4} (\sin x - \sin x \cos 2x) \, \mathrm{d}x$$

[1 mark]

15 (c) (ii) Explain how

$$\int_{6.3}^{6.4} (\sin x - \sin x \cos 2x) \, \mathrm{d}x$$

may be approximated by

$$\int_{a}^{b} 2x^3 \, \mathrm{d}x$$

for suitable values of a and b.

[2 marks]