**AQA – Trigonometry – A2 Mathematics P1**

1.  June/2021/Paper_7357/1/No.8

   **(a)**     Given that

$$9\sin^2\theta + \sin 2\theta = 8$$

   show that

$$8\cot^2\theta - 2\cot\theta - 1 = 0$$

   **[4 marks]**

   **(b)**     Hence, solve

$$9\sin^2\theta + \sin 2\theta = 8$$

   in the interval $0 < \theta < 2\pi$

   Give your answers to two decimal places.

   **[3 marks]**

**2.** June/2021/Paper_7357/1/No.15

    **(a)**     Show that

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

         for small values of $x$.

**[3 marks]**

    **(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]**

**(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]**

**(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]**