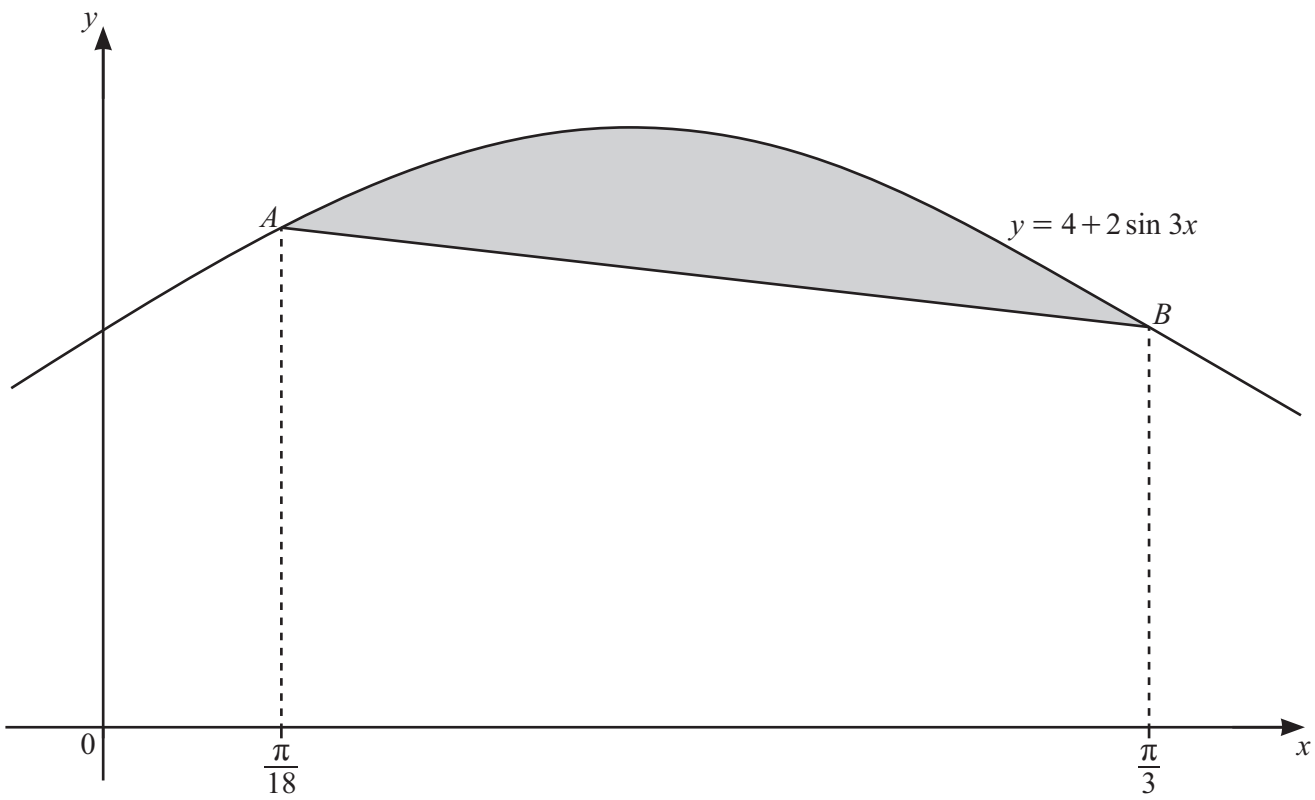
10 **(a)** The 3rd and 8th terms of a geometric progression are 6 and 1458 respectively. Find the common ratio and the first term of this progression. [4]

(b) The first 3 terms of a second geometric progression are $\cos\theta$, $2\cos^2\theta$, $4\cos^3\theta$, where $-90° < \theta < 90°$. Find the values of θ for which this geometric progression has a sum to infinity. [4]

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The diagram shows part of the curve $y = 4 + 2\sin 3x$ and the straight line AB. The points A and B lie on the curve. The x-coordinate of A is $\frac{\pi}{18}$ and the x-coordinate of B is $\frac{\pi}{3}$. Find the area of the shaded region, giving your answer in exact form. [9]

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