

1. March/2022/Paper_9709/22/No.5(b)

(b) Find the exact value of $\int_{\frac{1}{4}\pi}^{\frac{1}{3}\pi} (\tan x + \tan^2 x + \tan^3 x) dx$.

[6]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

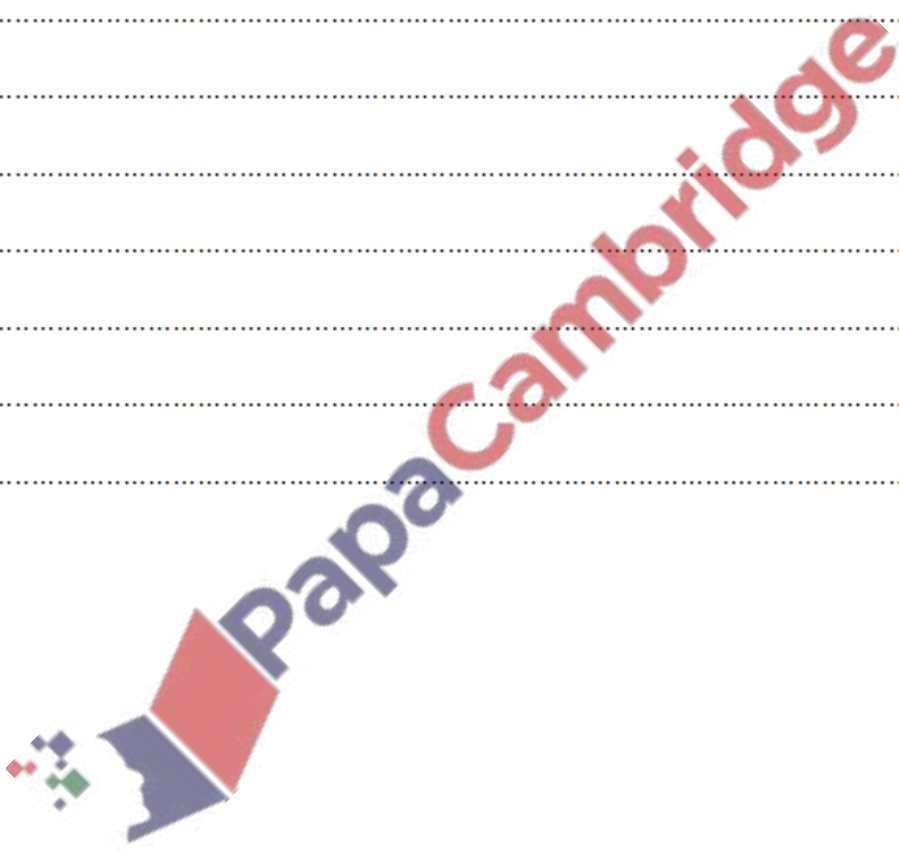
.....

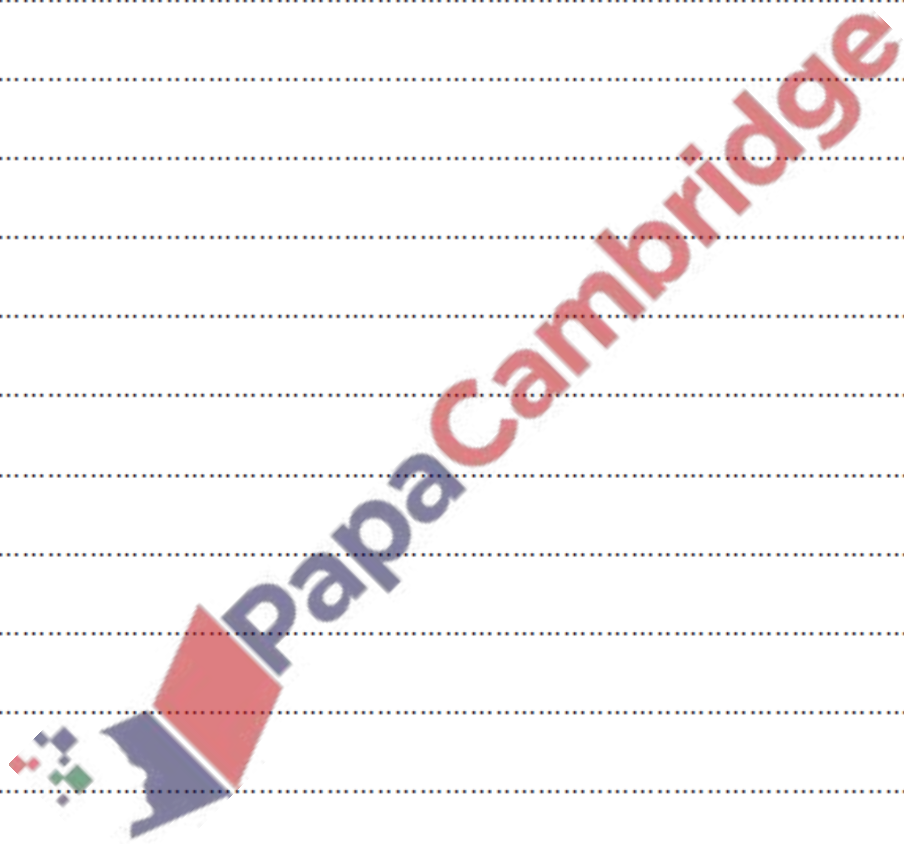
.....

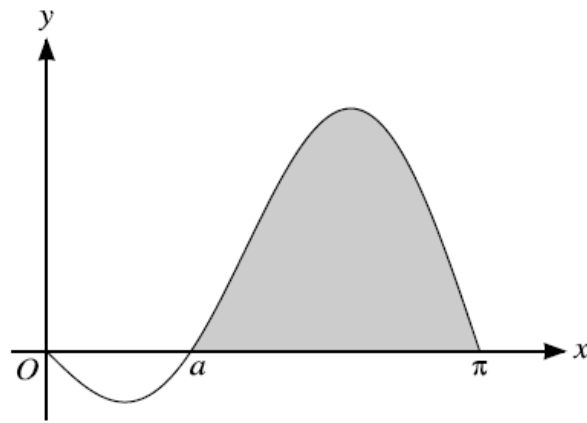
.....

.....

.....







The diagram shows the curve with equation $y = 3 \sin x - 3 \sin 2x$ for $0 \leq x \leq \pi$. The curve meets the x -axis at the origin and at the points with x -coordinates a and π .

- (a) Find the exact value of a . [3]

.....

.....

.....

.....

.....

.....

.....

.....

- (b) Find the area of the shaded region. [4]

.....

.....

.....

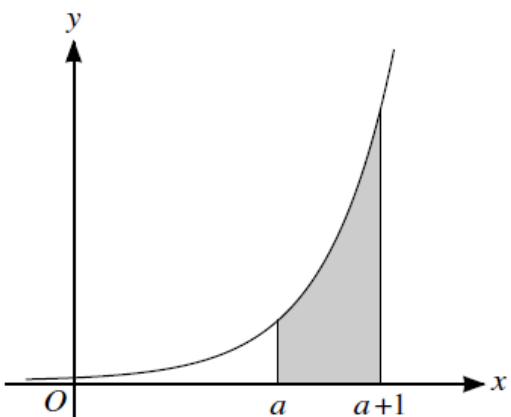
.....

.....

.....

.....

.....



The diagram shows the curve $y = 3e^{2x-1}$. The shaded region is bounded by the curve and the lines $x = a$, $x = a + 1$ and $y = 0$, where a is a constant. It is given that the area of the shaded region is 120 square units.

- (a) Show that $a = \frac{1}{2} \ln(80 + e^{2a-1}) - \frac{1}{2}$. [5]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

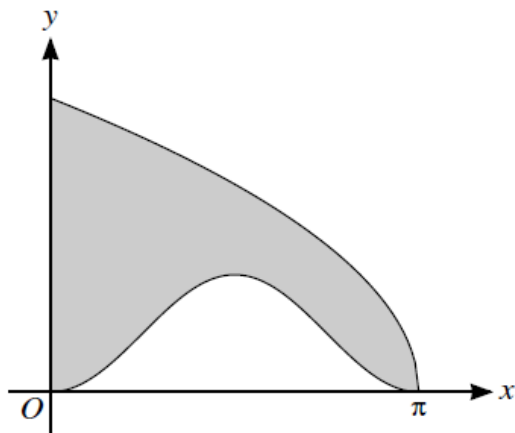
.....

.....

.....

.....

.....



The diagram shows the curves $y = \sqrt{2\pi - 2x}$ and $y = \sin^2 x$ for $0 \leq x \leq \pi$. The shaded region is bounded by the two curves and the line $x = 0$.

Find the exact area of the shaded region.

[8]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

