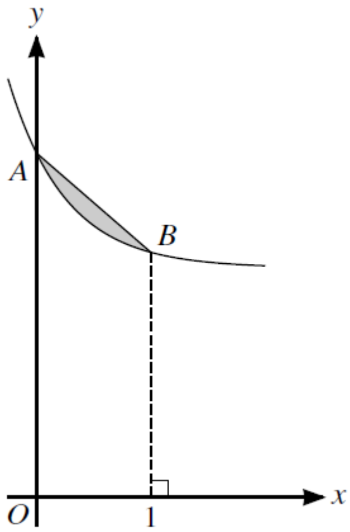
1. Nov/2020/Paper_9709/21/No.3



The diagram shows the curve $y = 2 + e^{-2x}$. The curve crosses the y-axis at the point A, and the point B on the curve has x-coordinate 1. The shaded region is bounded by the curve and the line segment AB.

Find the exact area of the shaded region. [5]

2. Nov/2020/Paper_9709/21/No.8b

(b) Divide $4x^3 + 8x - 4$ by $(2x - 1)$, and hence find $\int f(x)\,dx$. [5]

3. Nov/2020/Paper_9709/22/No.6

(a) Find $\int \left(\frac{8}{4x+1} + \frac{8}{\cos^2(4x+1)} \right) dx$. [4]

(b) It is given that $\int_0^{\frac{1}{2}\pi} (3 + 4\cos^2 \tfrac{1}{2}x + k \sin 2x)\, dx = 10$.

Find the exact value of the constant k. [6]

4. June/2020/Paper_9709/21/No.6c

(c) Find $\int \sin x \left(\operatorname{cosec} \tfrac{1}{2}x - \sec \tfrac{1}{2}x\right) \mathrm{d}x$. [3]

5. June/2020/Paper_9709/21/No.7b

(b) Hence find $\int_1^6 \frac{9x^3 - 6x^2 - 20x + 1}{3x + 2}\, dx$, giving the answer in the form $a + \ln b$ where a and b are integers. [5]

6. June/2020/Paper_9709/22/No.8c

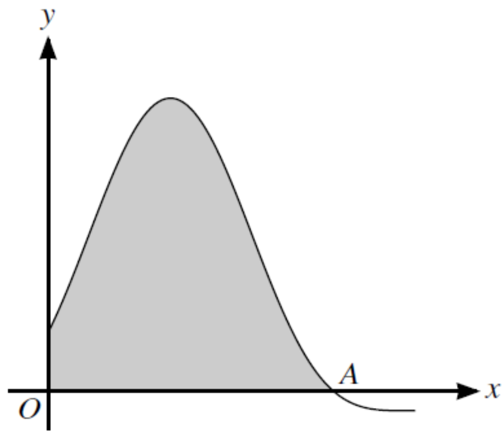
(c) Find the exact value of $\int_{\frac{1}{4}\pi}^{\frac{1}{2}\pi} 3\sin x \cot \tfrac{1}{2}x \, dx$. [5]

7. March/2020/Paper_9709/22/No.3

It is given that $\displaystyle\int_a^{3a} \frac{2}{2x-5}\,dx = \ln\frac{7}{2}$.

Find the value of the positive constant a. [6]

8. March/2020/Paper_9709/22/No.7



The diagram shows part of the curve with equation

$$y = 4\sin^2 x + 8\sin x + 3,$$

where x is measured in radians. The curve crosses the x-axis at the point A and the shaded region is bounded by the curve and the lines $x = 0$ and $y = 0$.

(a) Find the exact x-coordinate of A. [2]

(b) Find the exact gradient of the curve at A. [3]

(c) Find the exact area of the shaded region. [5]