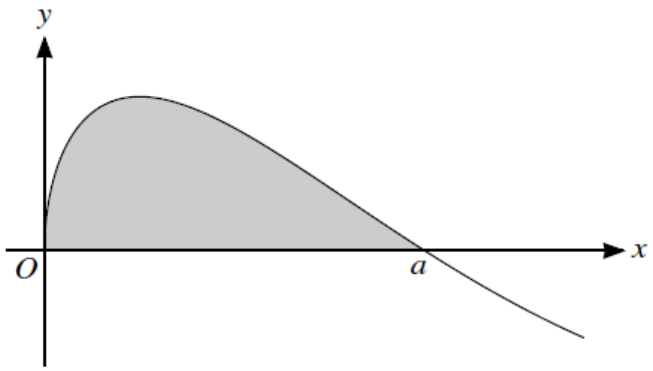
Integration – 2022 A2 Nov Math

1. Nov/2022/Paper_9709_31/No.9(b)

(b) Find the area of the shaded region bounded by the curve and the axes, giving your answer in terms of e. [5]

2. Nov/2022/Paper_9709_32/No.8



The diagram shows part of the curve $y = \sin\sqrt{x}$. This part of the curve intersects the x-axis at the point where $x = a$.

(a) State the exact value of a. [1]

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(b) Using the substitution $u = \sqrt{x}$, find the exact area of the shaded region in the first quadrant bounded by this part of the curve and the x-axis. [7]

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3. Nov/2022/Paper_9709_32/No.10

Let $f(x) = \dfrac{4 - x + x^2}{(1 + x)(2 + x^2)}$.

(a) Express $f(x)$ in partial fractions. [5]

(b) Find the exact value of $\int_0^4 f(x)\,dx$. Give your answer as a single logarithm. [5]

4. Nov/2022/Paper_9709_33/No.3

Find the exact value of $\int_0^{\frac{1}{4}\pi} x \sec^2 x \, dx$. [5]

5. Nov/2022/Paper_9709_33/No.11

Let $f(x) = \dfrac{5 - x + 6x^2}{(3 - x)(1 + 3x^2)}$.

(a) Express $f(x)$ in partial fractions. [5]

(b) Find the exact value of $\int_0^1 f(x)\,dx$, simplifying your answer. [5]