

1 Solve the inequality $|2x + 1| < |2x - 5|$. [3]

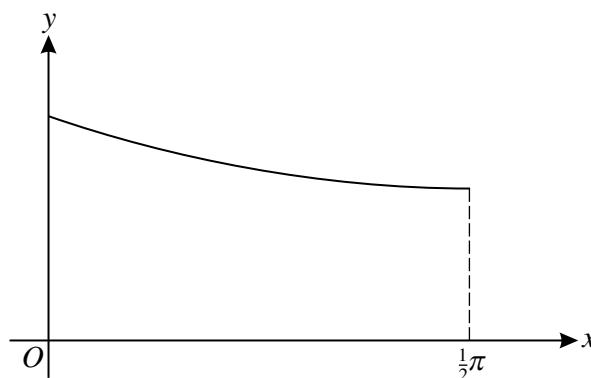
2 The curve with equation $y = \frac{\sin 2x}{e^{2x}}$ has one stationary point in the interval $0 \leq x \leq \frac{1}{2}\pi$. Find the exact x -coordinate of this point. [4]

3 The polynomial $x^4 - 4x^3 + 3x^2 + 4x - 4$ is denoted by $p(x)$.

(i) Find the quotient when $p(x)$ is divided by $x^2 - 3x + 2$. [3]

(ii) Hence solve the equation $p(x) = 0$. [3]

4



The diagram shows the part of the curve $y = \sqrt{2 - \sin x}$ for $0 \leq x \leq \frac{1}{2}\pi$.

(i) Use the trapezium rule with 2 intervals to estimate the value of

$$\int_0^{\frac{1}{2}\pi} \sqrt{2 - \sin x} \, dx,$$

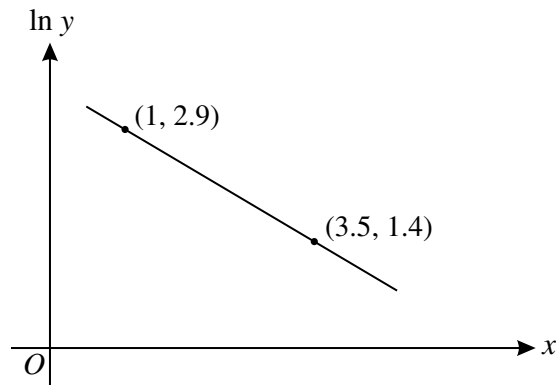
giving your answer correct to 2 decimal places. [3]

(ii) The line $y = x$ intersects the curve $y = \sqrt{2 - \sin x}$ at the point P . Use the iterative formula

$$x_{n+1} = \sqrt{2 - \sin x_n}$$

to determine the x -coordinate of P correct to 2 decimal places. Give the result of each iteration to 4 decimal places. [3]

5



The variables x and y satisfy the equation $y = A(b^{-x})$, where A and b are constants. The graph of $\ln y$ against x is a straight line passing through the points $(1, 2.9)$ and $(3.5, 1.4)$, as shown in the diagram. Find the values of A and b , correct to 2 decimal places. [6]

6 (a) Find $\int 4e^{-\frac{1}{2}x} dx$. [2]

(b) Show that $\int_1^3 \frac{6}{3x-1} dx = \ln 16$. [5]

7 The equation of a curve is

$$3x^2 - 4xy + 2y^2 - 6 = 0.$$

(i) Show that $\frac{dy}{dx} = \frac{3x-2y}{2x-2y}$. [4]

(ii) Find the coordinates of each of the points on the curve where the tangent is parallel to the x -axis. [5]

8 (a) Given that $\tan A = t$ and $\tan(A+B) = 4$, find $\tan B$ in terms of t . [3]

(b) Solve the equation

$$2 \tan(45^\circ - x) = 3 \tan x,$$

giving all solutions in the interval $0^\circ \leq x \leq 360^\circ$. [6]

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