SKILLS CHECK

QUESTION 1

Differentiate $y = (4x^2 - x^3)^4$ with respect to x

QUESTION 2

Solve $cos2x - 3cosx = 4$ for $x \in [-2\pi, 2\pi]$

QUESTION 3

Find the equation of the tangent to the curve defined by
x = 2t and $y = 3 + \sqrt{t}$ at the point where t = 1

QUESTION 4

$f(x) = \frac{x+2}{x-2}$. Find $f^{-1}(x)$ and state the range of $f^{-1}(x)$

QUESTION 5

Find the equation of the perpendicular bisector of (1, -4) and (-5, 4)

WEEK 1

SKILLS CHECK

QUESTION 1

Find $\frac{dy}{dx}$ when $y = \ln(2x - 2x^3)$

QUESTION 2

Write $2sinx - 5\,cosx$ in the form $Rsin(x - \theta)$ $R > 0$ $\theta \in \left[0, \frac{\pi}{2}\right]$

QUESTION 3

Find the cartesian equation of the curve defined by
$x = 1 - \frac{1}{t}$ and $y = 1 + \frac{1}{t}$

QUESTION 4

Express $4x^2 + 6x - 3$ in the form $a(x + b)^2 + c$
State the range of the function $f(x) = 4x^2 + 6x - 3$

QUESTION 5

The line $x + y = k$ where k is a constant is a tangent to the circle $x^2 + y^2 = 2x$. Find the possible values of k (leave your answers in surd form)

WEEK 2

SKILLS CHECK

QUESTION 1

Differentiate $\sqrt{2x^3 - 2x}$ with respect to x

QUESTION 2

Express $3cosx - 7sinx$ in the form $Rcos(x + \theta)$

$R > 0 \quad \theta \in \left[0, \frac{\pi}{2}\right]$

QUESTION 3

Find the equation of the normal to the curve defined by
$x = t^2 + 2$ and $y = t - 2$ at the point where $t = 4$

QUESTION 4

Given that $f(x) = x^2 + 1$ and $g(x) = 3x$, solve the equation
$fg(x) = gf(x)$

QUESTION 5

A circle has equation $x^2 + y^2 - 4y - 14 = 0$. A chord of the circle has length 8. Find the perpendicular distance from the chord to the centre of the circle.

SKILLS CHECK

QUESTION 1

Find $\frac{dy}{dx}$ when $y = (2e^{2x} - 1)^3$

QUESTION 2

Prove that $\frac{cosec\theta}{cosec\theta - sin\theta} = sec^2\theta$

QUESTION 3

Find the coordinates of the point where the normal to the curve defined by $x = 3t^2$ and $y = 6t$ at $t = 2$, crosses the curve again

QUESTION 4

The function $f(x) = 16 - 6x - x^2 \qquad x \in \mathbb{R}$

Find the range of $f(x)$

QUESTION 5

Find the equation of the tangent to the circle
$(x + 1)^2 + (y - 3)^2 = 13$ at the point (2 , 5)

WEEK 4

SKILLS CHECK

QUESTION 1

Find $\frac{dy}{dx}$ when $y = \cos^3 x$

QUESTION 2

Solve $5sin4\theta = 3sin2\theta \quad 0 < \theta < \pi$

QUESTION 3

Find the cartesian equation of the curve defined by

$x = \sqrt{2}sint$ and $y = 2cost$

QUESTION 4

$f(x) = \frac{ax+b}{x-b} \quad x \neq b$

Find $f^{-1}(x)$

QUESTION 5

The line with equation y = x + c is a tangent to the circle

$x^2 + y^2 - 8x + 6y + 17 = 0$

Find the 2 possible values of x

WEEK 5

SKILLS CHECK

QUESTION 1

Differentiate $y = (\ln x + 4)^{-3}$ with respect to x

QUESTION 2

Prove that $\frac{1-tan^2\theta}{1+tan^2\theta} = 1 - 2sin^2\theta$

QUESTION 3

Find $\frac{dy}{dx}$ for the curve defined by the parametric equations

$$x = \frac{1}{2t} \quad y = \frac{1}{2t+2}$$

QUESTION 4

$f(x) = 2e^{3x} + 1$

State the range and domain of $f^{-1}(x)$

QUESTION 5

The curve C has equation $y = x^2(x - 1)$ The points A and B lie on the curve and have x coordinates -1 and 2 respectively. Find the length of the line AB

WEEK 6

SKILLS CHECK

QUESTION 1

Find $\frac{dy}{dx}$ when y = ln(2 – sin 2x)

QUESTION 2

Solve $2cot^2\theta + cosec\theta + 1 = 0 \quad -2\pi < \theta < 2\pi$

QUESTION 3

A curve is defined by the parametric equations $x = 2 - e^t$ and $y = 5 + e^{2t}$. Find the equation of the tangent to the curve where t = 0

QUESTION 4

Solve gf(x) = 0 where f(x) = ln (3x -1) and $g(x) = e^{2x} - 1$

QUESTION 5

The straight line l_1 has gradient ⅓ and passes through (6,5)
The straight line l_2 is given by 4x + py – 6 = 0 intersects l_1 at (q, 2). Find the value of p and q

WEEK 7