SKILLS CHECK

QUESTION 1

A circle with equation $x^2 + y^2 - 6y - 4x = 12$ crosses the positive x-axis at point C. Find the equation of the tangent to the circle at C

QUESTION 2

Differentiate with respect to x $\frac{8x^2-1}{2\sqrt{x}}$

QUESTION 3

Express $x^2 + 6x + 16$ in the form $(x + a)^2 + b$.

State the greatest possible value of $\frac{1}{x^2+6x+16}$

QUESTION 4

A, B and C are the vertices of a triangle with coordinates (-4, 4) (2, 6) and (6, -6). Calculate the area of triangle ABC

QUESTION 5

Find the coefficient of the x^3 term in the expansion of $(2 - 3x^3)(2 + 3x)^4$

WEEK 1

SKILLS CHECK

QUESTION 1

Given that the equation $4x^2 - kx + k - 3 = 0$, where k is a constant, has real roots find the range of values of k

QUESTION 2

Given that $\cos\theta = \sqrt{2} - 1$ find the value of $\sin^2\theta$ in the form $a + b\sqrt{2}$

QUESTION 3

A curve has equation $y = x + \frac{4}{x}$. Point A on the curve has an x coordinate of 1. Find the x- coordinate of the point at which the normal to the curve at point A intersects the x- axis.

QUESTION 4

Solve for n

$$2\log_a(n) - \log_a(3 - n) = \log_a(4)$$

QUESTION 5

Describe the transformation that maps the graph of $y = 2^x$ on to $y = \left(\frac{1}{2}\right)^x$

SKILLS CHECK

QUESTION 1

Solve simultaneously $2y = 3x + 1$ $\quad 9x^2 - 4y^2 + 9x - 4y = 1$

QUESTION 2

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

QUESTION 3

Solve the equation $9^x - 3(3^{x+1}) = 0$

QUESTION 4

Solve the equation for $0^o < x < 360^o$ $\quad \sin x = 1 - 2\cos^2 x$

QUESTION 5

Find the area of the finite region enclosed by the curve $y = 4x - x^2$ and the x-axis

SKILLS CHECK

QUESTION 1

Point C (2,4) lies on a circle $x^2 + y^2 - 8x - 6y + 20 = 0$.
Find the equation of the tangent to the circle at C

QUESTION 2

Find the first 3 terms in the expansion of $(2 - 3x)^8$

QUESTION 3

Given that (x+3) is a factor of $f(x) = x^3 + 6x^2 + 5x - 12$ factorise f(x) and sketch the graph of y = f(x)

QUESTION 4

$\overrightarrow{OA} = -2i + 3j$ $\overrightarrow{OB} = 4i + 6j$ Calculate $|\overrightarrow{AB}|$

QUESTION 5

20 g of a substance is dropped into a solution. The mass not dissolved after t seconds is modelled by $M = Ae^{-kt}$ .After 5 seconds 10g remains.
Find the value of A and k (3 s.f.)

WEEK 4

SKILLS CHECK

QUESTION 1

Solve the equation $\left(\frac{1}{8}\right)^{2x} = 16^{3x-1}$

QUESTION 2

Calculate the area enclosed by the line y = 10 the curve $y = x^2 + 1$

QUESTION 3

Solve $\tan 2\theta = -1$ for $0° \leq x < 360°$

QUESTION 4

Find the equation of the normal to the curve $y = \frac{(x+2)^2}{x}$ at the point where x = 1

QUESTION 5

Find the coefficient of the term x^4 in the expansion of $(x - 4)(1 + 2x)^7$

WEEK 5

SKILLS CHECK

QUESTION 1

If $\sin\theta = \frac{5}{13}$ and θ is acute, find the value of cos θ

QUESTION 2

Solve for n $\log_4(n+6) + \log_4(n) = 2$

QUESTION 3

Simplify $\frac{3+\sqrt{2}}{\sqrt{2}+1} - \frac{1}{1-\sqrt{2}}$

QUESTION 4

Find the coordinates of the local minimum point of $y = x^3 + 3x^2 + 72$

QUESTION 5

If $\frac{dy}{dx} = 3 + \frac{12}{x^4}$ and the curve y = f(x) passes through the point (1,1), find f(x)

WEEK 6

SKILLS CHECK

QUESTION 1

Solve $4\sin^2\theta - 2 = 7\cos\theta$ for $-180° \leq \theta < 180°$ correct to 3 significant figures

QUESTION 2

Find the area enclosed by $y = x^2 + 2$ and the line $y = 2x + 5$

QUESTION 3

$ai + bj$ is a vector of magnitude of 10 the direction of $2i - 4j$

QUESTION 4

Solve $e^{3x-2} = 20e^x$ giving your answer correct to 3 decimal places

QUESTION 5

P(2, -2) lies on the circle $x^2 + y^2 + 4(x - y) = 24$
Find the equation of the tangent to the circle of P

WEEK 7