SKILLS CHECK

QUESTION 1

Find the gradient of the curve $y = \sqrt{x} + \frac{1}{x^2}$ at the point where x = 4

QUESTION 2

p = 3i + 2j **q** = 2i – 3j
Find 2**p** - **q**

QUESTION 3

Write the expression $\frac{1}{5}\log 32 - 2\log 4 + \log 64$ in the form log x

QUESTION 4

Solve $3^{3x+1} = 6$ leaving your answer in exact form

QUESTION 5

Find $\int 3x^2 - 2x + 4\, dx$

WEEK 1

SKILLS CHECK

QUESTION 1

$y = \left(x + \frac{1}{x}\right)\left(\frac{1}{x^2} - x\right)$ find $\frac{dy}{dx}$

QUESTION 2

$p\begin{pmatrix}4\\3\end{pmatrix} + q\begin{pmatrix}1\\-2\end{pmatrix} = \begin{pmatrix}-1\\-9\end{pmatrix}$

Find the values of p and q

QUESTION 3

What is the value of $\log_4 64 + \log_3 27$?

QUESTION 4

Solve $2^{3x-2} = 6$ leaving your answer in exact form

QUESTION 5

Find $\int_1^2 6x^2 + 4x - 3\, dx$

WEEK 2

SKILLS CHECK

QUESTION 1

Find coordinates of the stationary point of the curve $y = \frac{4}{x^2} + x$

QUESTION 2

a = -2i + 3j b = 6i – j

Find |a - 2b|

QUESTION 3

Write as a single log

3log x + 4log y – 2log (xy)

QUESTION 4

M starts with a mass of 30g. The mass undissolved after t seconds is given by m = $30e^{-0.4t}$. How long will it take for the mass to become half its original mass? (Answer correct to 3 s.f.)

QUESTION 5

Find $\int_0^2 4x - 3x^2 + 1 \, dx$

WEEK 3

SKILLS CHECK

QUESTION 1

Find the coordinates of the point on the curve $y = 2\sqrt{x} - 1$ where the gradient of the curve is 3

QUESTION 2

a $\begin{pmatrix} 5 \\ 2 \end{pmatrix} - \begin{pmatrix} -2b \\ b \end{pmatrix} = \begin{pmatrix} 19 \\ 8 \end{pmatrix}$

Find the values of a and b

QUESTION 3

Solve $\log_3(4x + 1) = 2$

QUESTION 4

The value of a car is depreciating. After t years it is worth (£V) is given by $V = 15000e^{-0.3t}$. After how many years will it be worth less than £5000 (3 s.f.)

QUESTION 5

Find $\int_{-1}^{1} 2(x + 3)^2 dx$

SKILLS CHECK

QUESTION 1

Find the gradient(s) of the curve $y = \frac{1}{x^2} - 4$ at the points where the curve intersects the x axis

QUESTION 2

Calculate the angle between **a** = -2**i** + 5**j** and **j**

QUESTION 3

Solve $2\log_a 4 - \log_a 4 + \frac{1}{2}\log_a 16 = \frac{1}{2}\log_a x$

QUESTION 4

The value, £*V*, of an investment of £4000 in a fixed rate scheme after *t* years is given by $V = 4000 \times 1.035^t$. Find the value of *t* when £V reaches £10000. Give your answer to 3 significant figures.

QUESTION 5

Find $\int_1^2 3x^2 + 10x - 2\ dx$

SKILLS CHECK

QUESTION 1

Find the gradient of the curve $y = \frac{x^2+2x}{\sqrt{x}}$ at the point where x = 9

QUESTION 2

$\overrightarrow{OA} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\overrightarrow{OB} = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$. Find $\overrightarrow{CD}$ when $\overrightarrow{CD} = 5\overrightarrow{AB}$

QUESTION 3

Solve $2\log_2 x + \log_2 4 = 3$

QUESTION 4

The mass m of a radio active substance is given by the formula $m = m_0 e^{-kt}$ when t is in seconds and m_0 is the original mass. If the substance has a half life of 1 minute find the value of k (3 s.f.)

QUESTION 5

Find $\int (4 - x)(3x + 2)\, dx$

WEEK 6

SKILLS CHECK

QUESTION 1

Find the gradient of the tangent to the curve
$y = \sqrt{x}\left(x^3 + \frac{1}{x^2}\right)$ at the point where x = 4

QUESTION 2

$p\begin{pmatrix}2\\-1\end{pmatrix} + q\begin{pmatrix}5\\2\end{pmatrix} = \begin{pmatrix}14\\11\end{pmatrix}$
Find the values of p and q

QUESTION 3

Solve $log_a(x+3) - log_a 2 = \log_a 3x$

QUESTION 4

200 ml of water is left in a glass. It evaporates and the volume left in the glass after t hours is given by $V = 200e^{-kt}$. If it takes 10 hours for 80 ml to evaporate find the value of k (3 s.f.)

QUESTION 5

Find $\int x(x-3)(2x+1)\,dx$

WEEK 7