SKILLS CHECK

QUESTION 1

Work out

$$\int_1^2 \frac{3x - 6x^2}{x^5}\,dx$$

QUESTION 2

The points A and B have position vectors $\begin{bmatrix}1\\1\end{bmatrix}$ and $\begin{bmatrix}-3\\11\end{bmatrix}$ respectively. M is the midpoint of the line joining A and B. Find $|\overrightarrow{BM}|$

QUESTION 3

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

QUESTION 4

Solve $3^{3x+1} = 18$ leaving your answer in exact form

QUESTION 5

Find the centre and radius of the circle given by
$x^2 + y^2 - 6x - 4y - 23 = 0$

SKILLS CHECK

QUESTION 1

$y = 2x\sqrt{x} - \frac{4}{x}$. Find the gradient of the tangent to the curve at the point where x = ¼

QUESTION 2

Given that A has position vector 3**i** – 2**j** and b has position vector 6**i** + 10**j** find $|\overrightarrow{AB}|$

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

A circle with centre (-1,3) has a radius of 5. Find the points where the circle intersects the x-axis.

SKILLS CHECK

QUESTION 1

f(x) = $\frac{1-3x^7}{x^3}$ x > 0

Show that f(x) is decreasing function

QUESTION 2

The angle between the vector **i** and the vector $4\sqrt{3}$**i** + aj is 30°. Find the value of a

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

The circle with centre (0,0) and radius 5 intersects the line x + y = 1. Find the coordinates of the points of intersection.

SKILLS CHECK

QUESTION 1

Find the coordinates of the stationary point of $y = 2x(x^3 + 32)$

QUESTION 2

Write down a vector parallel to the vector $\begin{bmatrix} 3 \\ -4 \end{bmatrix}$ with magnitude 20

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

Points A (-1,2) and B(3,5) are end points of a radius of a circle. The x-axis is a tangent to the circle. Find the equation of the circle.

SKILLS CHECK

QUESTION 1

Work out $\int_1^2 3\sqrt{x} - \frac{1}{x^2}\, dx$ giving your answer in the form $a\sqrt{2} + b$

QUESTION 2

A and B have position vectors $\begin{bmatrix}-1\\2\end{bmatrix}$ and $\begin{bmatrix}3\\4\end{bmatrix}$ respectively. Calculate the angle between $\overrightarrow{\boldsymbol{AB}}$ and **i**

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 £8000. Give your answer to 3 significant figures.

QUESTION 5

A (7,-1) and B(-1,5) are end points of a diameter of a circle. Find the points where the circle intersects the y – axis.

SKILLS CHECK

QUESTION 1

Work out $\int_1^2 \left(3 - \frac{1}{x^2}\right)^2 dx$

QUESTION 2

A, B and C have coordinates (2,5) (6, -3) and (-1, 4). M is the midpoint of the line joining A and B . Find the vector $\overrightarrow{CM}$

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 the equation of the tangent to the $x^2 + y^2 - 4x + 2y - 8 = 0$ at the point (0, 2)

SKILLS CHECK

QUESTION 1

Find the equation of the tangent to the curve $y = 8x\sqrt{x} + \frac{64}{x}$ at the point where x = 4

QUESTION 2

Given that $p\begin{bmatrix}1\\3\end{bmatrix} + q\begin{bmatrix}3\\4\end{bmatrix} = \begin{bmatrix}5\\5\end{bmatrix}$ 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 the equation of the tangent to the circle $x^2 + y^2 - 2x - 2y - 23 = 0$ at the point (5,4)