SKILLS CHECK

QUESTION 1

Calculate

$$\sum_{n=1}^{n=10} 3n + 2$$

QUESTION 2

Find the first four terms in ascending powers of x in the binomial expansion of $(1 + 2x)^{-2}$ for |x| < ½

QUESTION 3

Find the exact solutions of $sin^2\theta = \frac{3}{4}$ for $\theta \in [-2\pi, 2\pi]$

QUESTION 4

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

QUESTION 5

Evaluate $\int_{-1}^{3} 3x^2 - 6x + 7\ dx$

WEEK 1

SKILLS CHECK

QUESTION 1

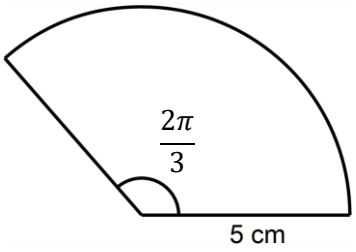
The first four terms of a geometric sequence are 12, 2.4, 0.48, 0.096
Write down a simplified expression for the sum of the first n terms

QUESTION 2

Find the first four terms in ascending powers of x in the binomial expansion of
$(1-4x)^{\frac{1}{2}}$ for |x| < ¼

QUESTION 3

Calculate the perimeter of the sector



QUESTION 4

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

QUESTION 5

$y = 2x^2\sqrt{x} + 3x^2$ Given than $2\frac{d^2y}{dx^2} + a\sqrt{x} = 12$ find the value of a

WEEK 2

SKILLS CHECK

QUESTION 1

The 10^{th} term of an arithmetic sequence is 104 and the 14^{th} term is 152. Which term has a value of 368?

QUESTION 2

Find the first four terms in ascending powers of x in the binomial expansion of $\frac{2}{1-2x}$ for $|x| < ½$

QUESTION 3

Find all solutions to $4sin\theta = \frac{2}{tan\theta}$ for $0 < \theta < 2\pi$

QUESTION 4

Express $3\cos x - 7\sin x$ in the form $Rcos(x + \theta)$ $R > 0$ $\theta \in \left[0, \frac{\pi}{2}\right]$

QUESTION 5

Evaluate $\int_1^3 (2x-1)^2 dx$

WEEK 3

SKILLS CHECK

QUESTION 1

A sequence is defined by $u_{n+1} = ku_n + 3$ $u_1 = 2$
The limit of the sequence as $n \to \infty$ is 5. Find the value of k

QUESTION 2

Find the first four terms in ascending powers of x in the binomial expansion of $\frac{(x+1)}{2-x}$ for $|x| < 2$

QUESTION 3

Solve $8sin^2 2\theta cos2\theta = tan^2 2\theta$ for $0 < \theta < \pi$

QUESTION 4

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

QUESTION 5

Given that $y = 4x^2 + \frac{5-x}{x}$ find the equation of the normal to the curve at the point where x = -1

WEEK 4

SKILLS CHECK

QUESTION 1

The 2nd and 4th terms of a geometric sequence are 10 and 62.5 respectively.
Find the sum of the first 5 terms

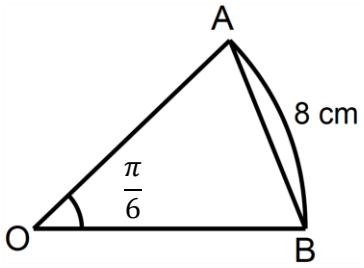
QUESTION 2

Find the first four terms in ascending powers of x in the binomial expansion of

$\frac{1}{3x+1} + \frac{3}{3+x}$ for $|x| < \frac{1}{3}$

QUESTION 3

Calculate the area of the triangle



QUESTION 4

Solve $5\sin 4\theta = 3\sin 2\theta \quad 0 < \theta < \pi$

QUESTION 5

Find the coordinates of the (local) maximum point of the curve $y = \frac{48}{x} + x^3$

WEEK 5

SKILLS CHECK

QUESTION 1

The sum of the first n terms of an arithmetic sequence is $S_n = 2n^2 + 23n$
Find the nth term u_n

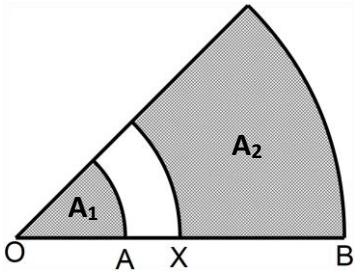
QUESTION 2

Find the first three terms in ascending powers of x in the binomial expansion of

$\sqrt{\frac{1-x}{1+x}}$ for $|x| < 1$

QUESTION 3

OA = 2cm and OB = 9cm. Given that area $A_2 = 5A_1$ calculate OX



QUESTION 4

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

QUESTION 5

Calculate the area enclosed by the curve $y = x^2 - 4x + 4$ and the line $y = 9$

WEEK 6

SKILLS CHECK

QUESTION 1

How many terms are needed for the sum of the geometric sequence 2, 6, 18, 54 to exceed 200000?

QUESTION 2

Find the first three terms in ascending powers of x in the binomial expansion of $\sqrt{\frac{4+x}{1-x}}$ for $|x| < 1$

QUESTION 3

Find the perimeter of a segment cut off by a chord of length 12 cm from a circle of radius 10 cm, correct to 3 significant figures

QUESTION 4

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

QUESTION 5

The curve with gradient given by $\frac{dy}{dx} = 4 - \frac{10}{x^2}$ passes through point (5, 16)

Find y in terms of x

WEEK 7