QUESTION 1

Solve the equation

$$\frac{\sin\theta}{\cos\theta+1}+\frac{\cos\theta}{\sin\theta+1}=1$$

for $0^o \le \theta \le 360^o$.

QUESTION 2

Solve $17 = 4\cos^2\theta + 17\sin\theta$ where $0° < \theta < 360°$.

QUESTION 3

Here are the first five terms of a sequence:

$$\frac{3}{3}, \frac{20}{15}, \frac{49}{35}, \frac{90}{63}, \frac{143}{99}$$

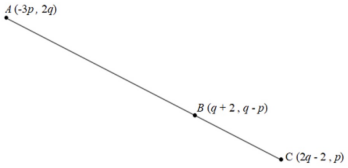
The n^{th} term of the sequence is u_n. Find the limiting value of u_n as $n \to \infty$.

QUESTION 4

Given that $f(x) = x^3 - kx^2 - 13x + 5k$ and $f(5) = 0$, find the other two solutions to $f(x) = 0$.

QUESTION 6

ABC is a straight line where BC is 20% of AC. In the diagram below, the coordinates of A, B and C are shown. p and q are positive numbers.



Find the value of p and q.

QUESTION 5

$sinx = \frac{\sqrt{11}}{6}$ and it's **obtuse**

What is $cosx$ =?

QUESTION 7

The transformation matrix $\mathbf{P}^3$ represents a clockwise rotation of 150^o about the origin.

$\mathbf{Q} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$

The unit vector $\begin{pmatrix} 0 \\ 1 \end{pmatrix}$ is transformed by the matrix $\mathbf{QP}$ to give the vector $\begin{pmatrix} -\cos\theta \\ \cos\alpha \end{pmatrix}$.

Find the value of θ and α.

QUESTION 8

The nth term of a sequence is n^2 + n

two consecutive terms in the sequence have a difference of 32

work out the two terms

QUESTION 9

Simplify:

$$\frac{(x^2-xy)^2-(xy-y^2)^2}{(x+y)}$$

QUESTION 10

A function f is defined by $f(x) = x^2 - 3x - 4$ and $-2 \le x \le 6$.

Find the range of $f(x)$.

QUESTION 11 & 12

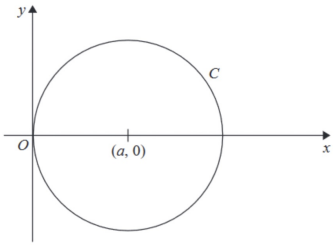
1.Prove $\tan^2\theta + \cos^2\theta = \tan^2\theta\sin^2\theta + 1$

2. Let $f(x) = \sqrt{\frac{-1}{x}}$

a. Find a suitable domain for f

b. Find the range of f

QUESTION 13



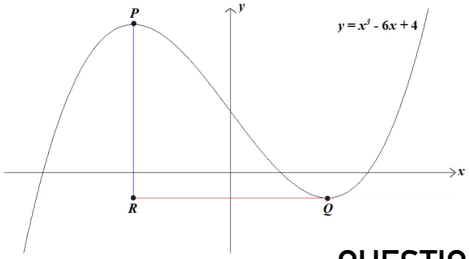
The diagram shows a circle which touches the y-axis and has a centre at the point $(a, 0)$ where a is a positive constant.

Given that the point $(4, -3)$ lies on the circle, find the value of a.

QUESTION 14

(Calculator allowed but this can be done without a calculator)

The graph of $y = x^3 - 6x + 4$ is shown below, where P and Q are stationary points of the curve.



The tangent to the curve at Q and the normal to the curve at P intersect at the point R. Find the area of triangle PRQ

QUESTION 16

$$675x^4 - 2505x^3 + 2407x^2 - 63x - 162 \equiv (ax-b)(cx+d)(ex-c)^2$$

a, b, c, d and e are different positive integers. Find their values.

QUESTION 15

a) Factorise $2x^2 - 3x - 14$

b) Hence or otherwise solve the equation

$$2(4x^2+9x-2)^2 - 3(4x^2+9x-2) - 14 = 0$$

This is NOT official paper from AQA.
Questions taken from the "Student Room" website.
Some of them are very much harder than those in the real exams!

CALCULATORS MAY BE USED