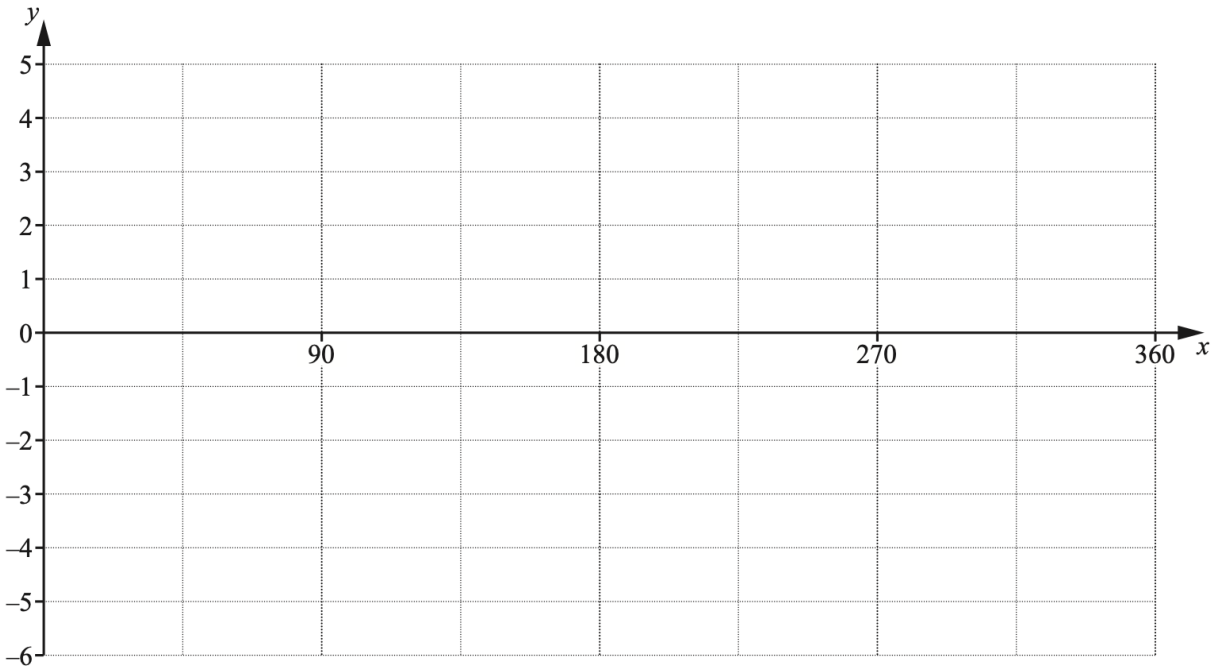
A Maths CH 1 to 9

_____/74 marks

1. (a) On the axes below, sketch the graph of $y = 3cos2x - 1$, for $0° \leq x° \leq 360°$.



[3]

(b) Given that $y = 4sin\ 6x$, write down

(i) the amplitude of *y*,

[1]

(ii) the period of *y*.

[1]

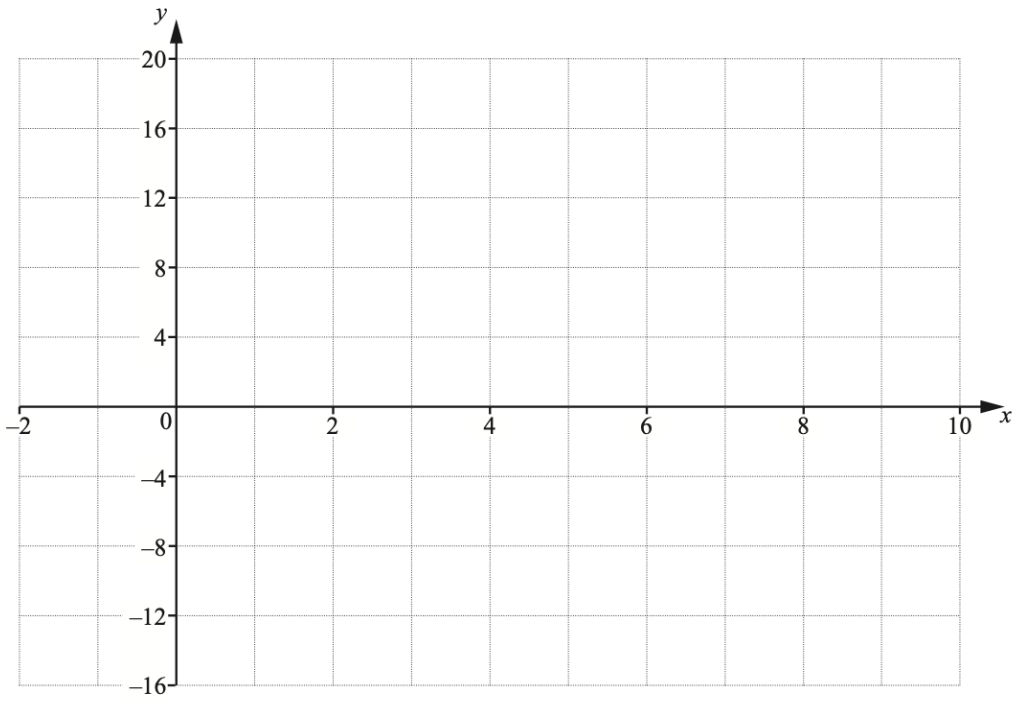
2. (i) Write $x^2 - 9x + 8$ in the form $(x - p)^2 - q$.where *p* and *q* are constants.

[2]

(ii) Hence write down the coordinates of the minimum point on the curve $y = x^2 - 9x + 8$.

[1]

(iii) On the axes below, sketch the graph of $y = |x^2 - 9x + 8|$, showing the coordinates of the points where the curve meets the coordinate axes.



[3]

(iv) Write down the value of *k* for which $k = |x^2 - 9x + 8|$ has exactly 3 solutions.

[1]

3. (a) $f(x) = 3 - cos2x$ for $0 \leq x \leq \frac{\pi}{2}$.

i. Write down the range of f.

[2]

ii. Find the exact value of $f^{-1}(2.5)$.

[3]

(b) $g(x) = 3 - x^2$ for $x \in R$.

Find the exact solutions of $g^2(x) = -6$

[4]

4. Solve the equation $|5x - 3| = -3x + 13$.

[3]

5. Solve the simultaneous equations

$$log_2(x + 2y) = 3,$$

$$log_2 3x - log_2 y = 1.$$

[5]

6. Variables *x* and *y* are such that when y^2 is plotted against e^{2x} a straight line is obtained which passes through the points (1.5, 5.5) and (3.7, 12.1). Find

   a. *y* in terms of e^{2x},

[3]

   b. the value of *y* when *x* = 3,

[1]

   c. the value of *x* when *y* = 50.

[3]

7. (a) Solve $2sin\,(x + \frac{\pi}{4}) = \sqrt{3}$ for $0 < x < \pi$ radians.

[3]

(b) Solve $3sec\,y = 4\,cosec\,y$ for $0° < y < 360°$.

[3]

(c) Solve $7\ cot\ z\ -\ tan\ z\ =\ 2cosec\ z$ for $0° < z < 360°$.

[6]

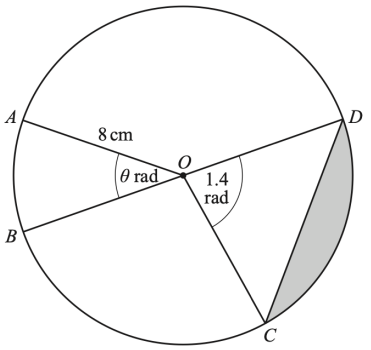
8. The line $y = 2x + 5$ intersects the curve $y + xy = 5$ at the points *A* and *B*. Find the coordinates of the point where the perpendicular bisector of the line *AB* intersects the line $y = x$.

[9]

9. The remainder obtained when the polynomial $p(x) = x^3 + ax^2 - 3x + b$ is divided by $x + 3$ is twice the remainder obtained when p(x) is divided by $x - 2$. Given also that p(x) is divisible by $x + 1$, find the value of ***a*** and of ***b***.

[5]

10.



The diagram shows a circle with centre *O* and radius 8 cm. The points *A*, *B*, *C* and *D* lie on the circumference of the circle. Angle *AOB* = θ radians and angle *COD* = 1.4 radians. The area of sector *AOB* is 20 cm^2

a. Find angle θ.

[2]

b. Find the length of the arc *AB*.

[2]

c. Find the area of the shaded segment.

[3]

12. Determine the set of values of *k* for which the equation $(3 - 2k)x^2 + (2k - 3)x + 1 = 0$ has no real roots.

[5]

.