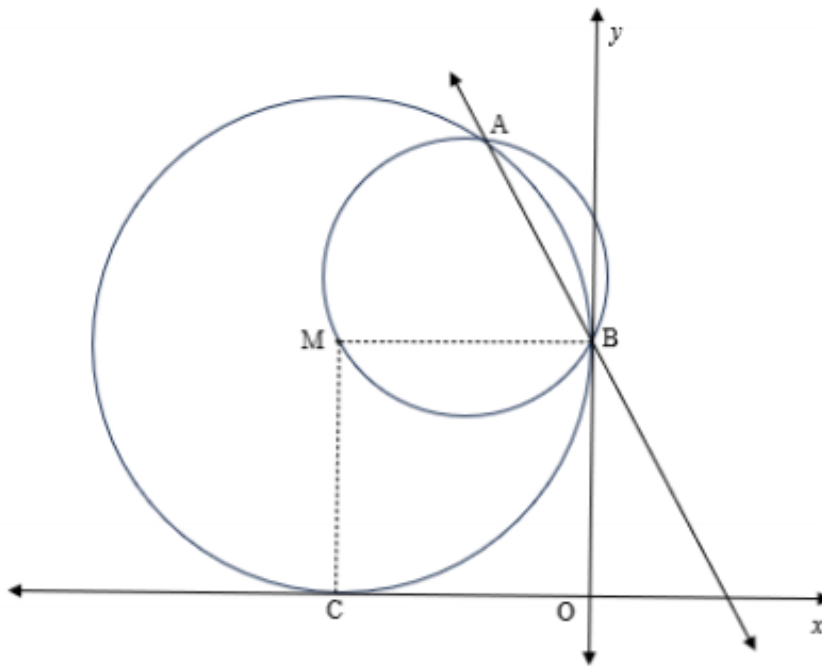


REVISION PAPER 2

QUESTION 4

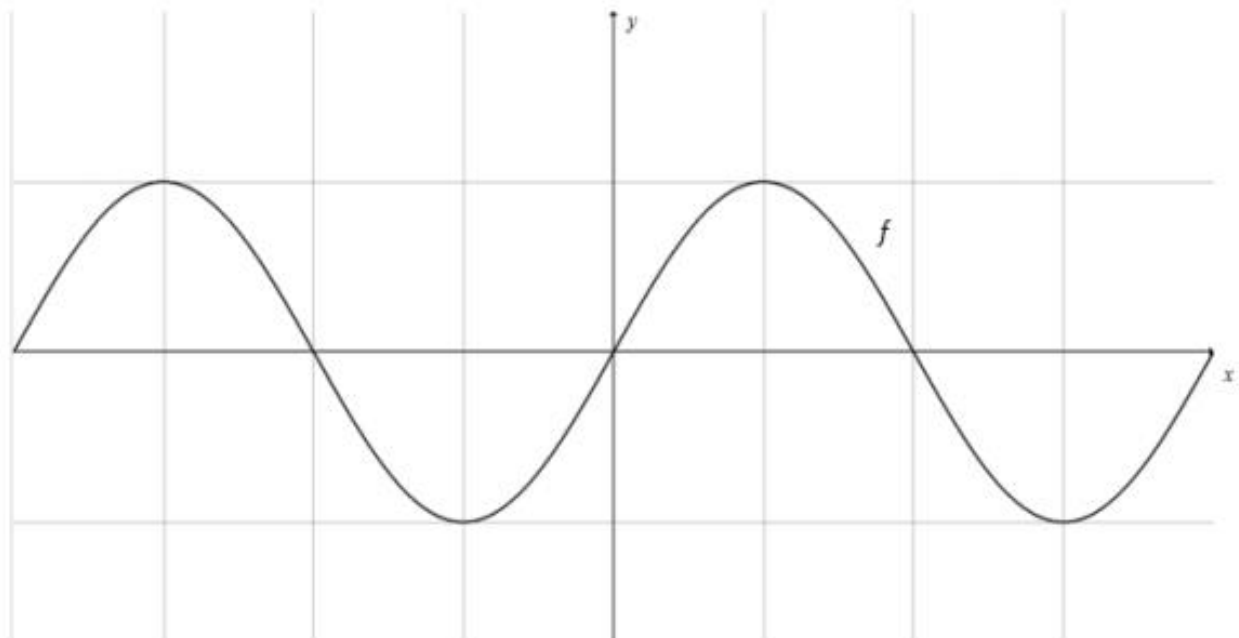
In the diagram, a circle centred at M touches the x -axis at C and the y -axis at point B. A second circle with equation $x^2 + y^2 + x - 3y + 2 = 0$ passes through A and M and intersects the circle M at A. The equation of the common chord AB is given by $y = -x + 1$.



- 4.1 Show that the equation of the circle centred at M, is $x^2 + y^2 + 2x - 2y + 1 = 0$ (5)
- 4.2 Determine the coordinates of the centre and the radius of the circle which passes through B, M and A. (4)
- 4.3 Calculate the coordinates of A. (5)
- 4.4 The straight line with equation $y = -x + k$ is a tangent to the circle with centre M.
 - 4.4.1 Show that this equation can be written as:
 $2x^2 + (4 - 2k)x + (k^2 - 2k + 1) = 0$ (3)
 - 4.4.2 Calculate the numerical value(s) of k . (5)

QUESTION 5

In the diagram below, the graph of $f(x) = \sin 2x$ is drawn for the interval $x \in [-180^\circ; 180^\circ]$.



Use the graphs to answer the following questions.

- 5.1 Sketch the graph of $g(x) = \cos(x - 45^\circ)$ on the same set of axes in the answer book provided. (3)
- 5.2 Determine the values of x in the interval $x \in [0^\circ; 180^\circ]$ for which.
- 5.2.1 $f(x) = g(x)$ (7)
- 5.2.2 $f(x + 30^\circ) = g(x + 30^\circ)$ (2)
- 5.2.3 $f(x) > g(x)$ (2)
- 5.3 Write down the period of g . (1)
- 5.4 Show how the graphs of f and g can be used to solve:
 $\sqrt{2} \sin 2x = \cos x + \sin x$. (3)

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QUESTION 6

6.1 If $\sqrt{3} \sin \theta + 2 = 0$ and $\theta \in [90^\circ; 270^\circ]$.

Determine without the use of a calculator the value of the following:

6.1.1 $\tan \theta$ (2)

6.1.2 $\cos 2\theta$ (2)

6.2 Simplify the following expression to ONE trigonometric ratio without the use of a calculator:

$$2 \cos^2 15^\circ - 1 + \frac{2 \sin 140^\circ}{\cos 310^\circ} \quad (5)$$

6.3 If $\sin \frac{x}{2} = p$, express $\sin x - 1$ in terms of p . (4)

6.4 Prove the following:

$$\frac{3 \sin x + 2 \sin 2x}{2 + 3 \cos x + 2 \cos 2x} = \tan x \quad (5)$$

6.5 Show that: $\frac{\sin x + \cos x}{\sin x - \cos x} = \frac{p+t}{p-t}$ if $\tan x = \frac{p}{t}$ (5)

[23]