SECTION B
ALL questions should be attempted

Marks

21. Find the equation of the tangent to the curve with equation $y = 9x - 2x^2$ at the point where $x = 3$. **5**

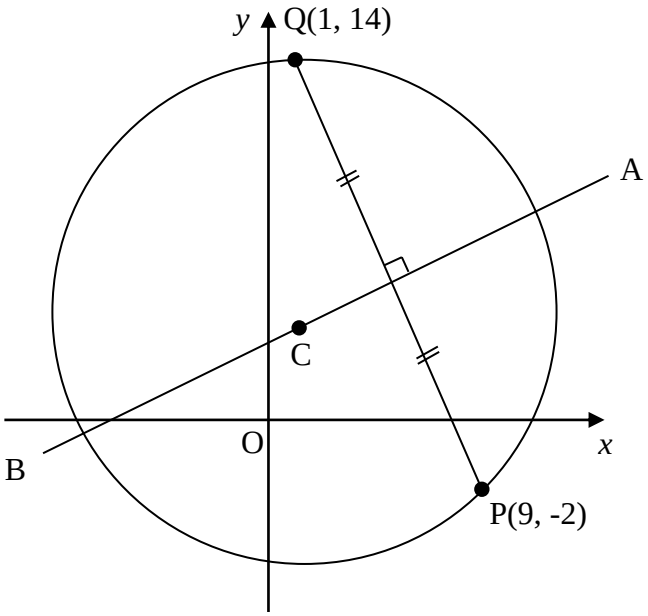
22. The first three terms of a sequence are 10, 20 and 28.
The sequence is generated by the recurrence relation $u_{n+1} = au_n + b$.

(a) Find the values of a and b. **3**
(b) Find the limit of the recurrence relation. **2**

23. A function $f(x)$ is defined by $f(x) = 3x^3 - 16x^2 + kx + 10$.

(a) Given that $x - 5$ is a factor of $f(x)$, find the value of k. **2**
(b) Express $f(x)$ in its fully factorised form. **3**
(c) How many integer roots are there to the equation $f(x) = 0$? **1**

24.



(a) Find the equation of AB, the perpendicular bisector of the line joining the points P(9, -2) and Q(1, 14), as shown in the diagram above. **4**

(b) C is the centre of a circle passing through P and Q. Given that QC is parallel to the y-axis, determine the equation of the circle. **3**

(c) The tangents at P and Q intersect at point T.
Write down the equation of the tangent at Q and the co-ordinates of T **2**

25. By writing $\cos 3\theta$ as $\cos(2\theta + \theta)$, show that $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$. **5**

[*END OF QUESTION PAPER*]