

TEST PAPER H

1. If $\int_a^2 (x^2 - 1) dx = 0$, find a .

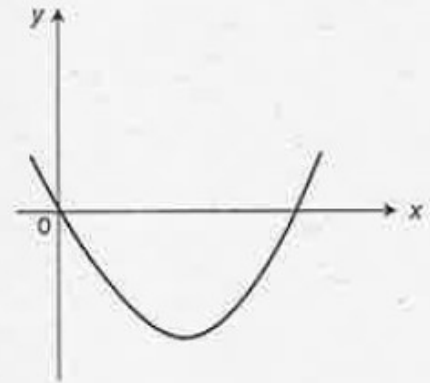
2. Find all the roots of the equation:

$$f(x) = x(x^2 - 3)(x^2 + 4)(x^2 - 1), x \in \mathbb{R}.$$

State the answer in a solution set.

3. The vertices of a triangle are $P(-2, 5)$, $Q(2, -1)$ and $R(4, 2)$. Find the equation of the altitude AQ .

4. Give two reasons why this graph cannot be the graph of $f(x) = 6 + x - x^2$.



5. Find the coordinates of the centre and length of the radius of the circle with equation:

$$x^2 + y^2 + 12x - 4y + 15 = 0.$$

6. Simplify and evaluate $\log_{10}40 + \log_{10}20 - \log_{10}80$.

7. If $x^3 - 3x^2 - x + a$ is divisible by $(x - 3)$, find a .

8. $f(x) = 3x^2 - 2x - c$. Find the value of c if the function has equal roots.

9. $P = (1, 4, -1)$, $Q = (1, -2, 3)$. Find the cosine of angle POQ .

10. (a) If $u_{r+1} = mu_r + c$ and $u_0 = 2$, $u_1 = -1$ and $u_2 = 14$, find m and c and state the relationship in the form $u_{r+1} = mu_r + c$.
- (b) Find u_3 and u_{-1} .
- (c) Find a value for u_r such that $u_{r+1} = u_r$.
11. Find the coordinates of the maximum and minimum turning points of the equation $f(x) = 3 \sin(2x + 30^\circ)$ where $0 \leq x \leq 360$.
12. Solve $2 \sin 2x + 1 = 0$, $0 < x < 360$.