Quadratics and polynomial graphs - Practice 1

Name: _____ Date: _____

10 questions | 49 marks | 65 minutes

A balanced paper progressing from products and equations to graphs and polynomial models.

A scientific calculator may be used.

1. Work with quadratic products. [5 marks]

(a) Expand $(2x-3)(x+5)$. [2 marks]

(b) Factorise $3x^2-11x+6$. [3 marks]

2. Solve the following equations, giving every real solution. [4 marks]

(a) $x^2 - 5x = 14$. [2 marks]

(b) $2x^2 = 9x$. [2 marks]

3. Let $f(x) = 2x^2 - 8x + 3$. [5 marks]

(a) Write f in vertex form. [3 marks]

(b) State the vertex and minimum value. [2 marks]

4. Consider $x^2 + 4x - 3 = 0$. [4 marks]

(a) Find both exact roots using the quadratic formula. [3 marks]

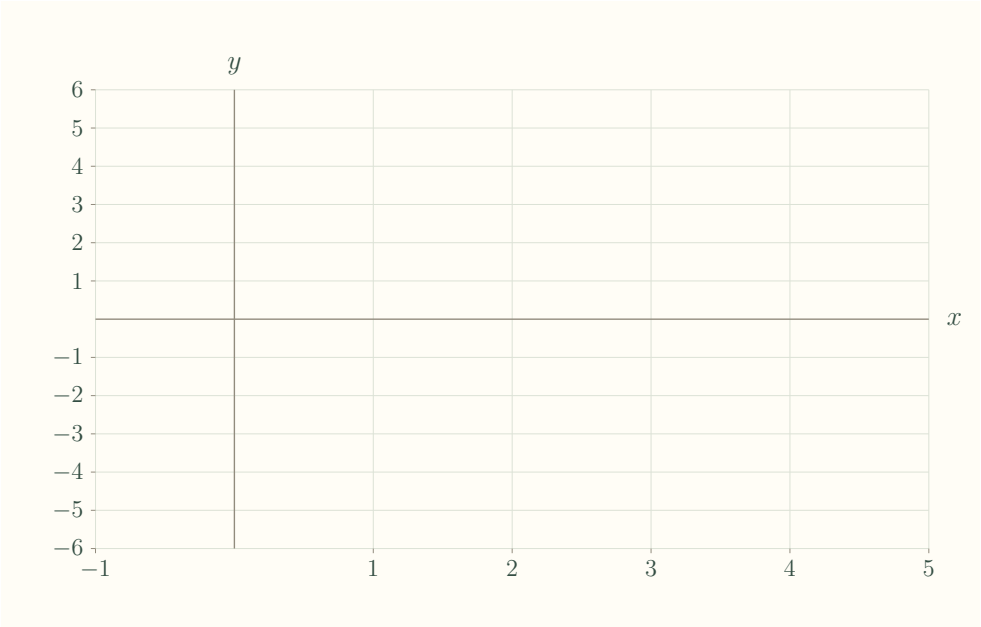
(b) Give the positive root to 3 decimal places. [1 mark]

5. A family of equations is $x^2 - 4x + k = 0$. [4 marks]

(a) Find k for one repeated real root. [2 marks]

(b) Find all k giving no real roots. [2 marks]

6. A parabola has equation $y = -(x-3)^2 + 4$. [5 marks]



(a) Find its intercepts and axis. [3 marks]

(b) Sketch it and state its range. [2 marks]

7. The roots of $3x^2 - 8x + 2 = 0$ are r and s. [5 marks]

(a) Find $r + s$ and rs without solving. [2 marks]

(b) Form a quadratic equation whose roots are $3r$ and $3s$. [3 marks]

8. A ball has height $h = -5t^2 + 15t + 2$ metres at t seconds after release. [6 marks]

(a) Find the maximum height and the time it occurs. [3 marks]

(b) Find when it reaches the ground, to 3 decimal places. [3 marks]

9. Let $p(x) = x^3 - 4x^2 + x + 6$. [5 marks]

(a) Show that $x - 2$ is a factor and find the quadratic quotient. [3 marks]

(b) Solve $p(x) = 0$. [2 marks]

10. Consider $g(x) = x^4 - 5x^2 + 4$. [6 marks]

(a) Solve $g(x) = 0$ over the reals. [3 marks]

(b) State the y-intercept, end behaviour and whether each root crosses or touches. [3 marks]