Quadratics and Parabolas - Practice test 2

Name: _____ Date: _____

16 questions | 51 marks | 55 minutes

A second balanced paper using construction, error analysis, intersections and quadratic applications.

No calculator needed.

1. A student writes $(x-3)^2 = x^2 + 9$. Correct the expansion and identify the missing term. [2 marks]

2. Write a monic quadratic expression with roots -2 and 5, then expand it. [3 marks]

3. Factorise $4x^2 - 25$. [2 marks]

4. Solve $4x^2 - 25 = 0$. [2 marks]

5. Solve $2(x + 1)(x - 3) = 16$ exactly. [4 marks]

6. Write $y = -2x^2 + 8x + 1$ in vertex form and state its greatest value. [3 marks]

7. Use the quadratic formula to solve $3x^2 - 2x - 5 = 0$. [3 marks]

8. Consider $x^2 + kx + 4 = 0$, where k is real. [4 marks]

(a) State the k-values giving two distinct real roots. [2 marks]

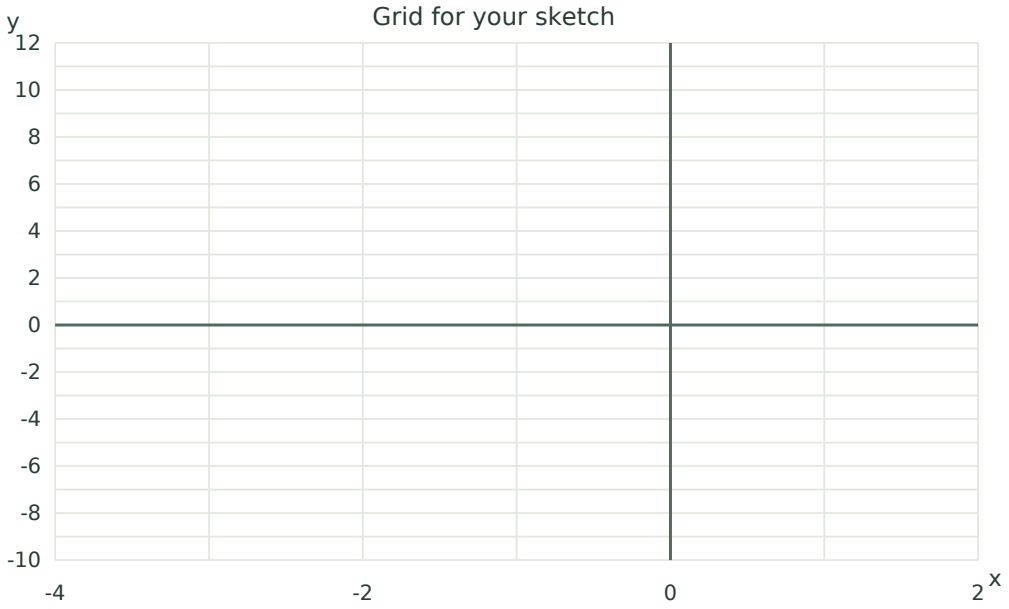
(b) State the k-values giving one repeated real root. [1 mark]

(c) State the k-values giving no real roots. [1 mark]

9. A parabola has vertex $(-1, -8)$ and passes through $(0, -6)$. Find its rule and its roots. [4 marks]

10. The rule is $y = -x^2 + 6x - 5$. Find its roots, vertex and y-intercept. [4 marks]

11. Sketch $y = 2x^2 + 4x - 6$. Label the vertex and all intercepts. [4 marks]



12. Use the table to locate a positive root of $x^2 + x - 4 = 0$ between two listed values.
[3 marks]

x	1.56	1.57
x^2+x-4	-0.0064	0.0349

13. Find all intersections of $y = x^2 + 1$ and $y = 2x$. Explain how many distinct intersections there are. [3 marks]

14. A triangle has height x cm and base $(x + 3)$ cm. Its area is 20 cm². Find the height and base. [4 marks]

15. The function $y = 2x^2 + kx - 12$ has a root at x=3. Find k and the other root. [4 marks]

16. A student says the vertex of $y = (x - 4)^2 + 7$ is $(-4, 7)$. Explain and correct the mistake. [2 marks]