Quadratics and Parabolas - Applications

Name: _____ Date: _____

16 questions | 47 marks | 60 minutes

Applications using area, financial models, domains and model checks.

A scientific calculator may be used.

1. A square has side x cm. Write its area rule and find its area when $x = 5$. [2 marks]

2. A rectangle has sides $x + 1$ cm and $x + 3$ cm. Expand its area rule. [2 marks]

3. A square poster has side $n + 2$ cm. Correct the area claim $A = n^2 + 4$. [2 marks]

4. A garden is x m wide and $x + 4$ m long with area $45\ \text{m}^2$. Find its dimensions. [3 marks]

5. Two consecutive positive whole numbers have product 72. Find them. [3 marks]

6. A toy rocket has height $h = -t^2 + 4t + 5$ metres. Find its starting height and height after 1 second. [2 marks]

7. For $h = -t^2 + 4t + 5$, find when the rocket reaches the ground, with $t \geq 0$. [3 marks]

8. A toy rocket follows $h = -t^2 + 4t + 5$ metres for $t \geq 0$ seconds. Find its maximum height and when it occurs. [3 marks]

9. A ticket model is $R = n(16 - n)$ dollars. Find revenue for $n = 6$. [2 marks]

10. Find both whole-number counts giving $R = 60$ in $R = n(16 - n)$. [3 marks]

11. Revenue is $R = n(16 - n)$ dollars. Counts $n = 6$ and 10 both give $R = 60$, but the venue takes at most 8 people. Which count is feasible? [2 marks]

12. A square garden of side x m has a 1 m wide path around its outside. Total outer area is $100\ \text{m}^2$. [5 marks]

(a) Write an equation for x. [2 marks]

(b) Find the garden side and the path area. [3 marks]

13. A model for a positive count is $n^2 + 2n - 35 = 0$. Find the feasible count. [3 marks]

14. A graph experiment uses $y = a(x-2)^2 + 3$ with $a = 1, 2, -1$. Give the shared turn and each opening. [3 marks]

15. A model requires $x^2 + 2x = 10,\ x > 0$. Locate x between consecutive tenths. [3 marks]

16. Quotes are $C_A = n^2 + 4n + 30$ and $C_B = 14n + 14$ dollars for n items. [6 marks]

(a) Find the two counts where the quotes are equal. [3 marks]

(b) Which is cheaper for 5 items, and by how much? [3 marks]