Worksheet | Quadratics & Parabolas

Quadratic models and applications

Name: _____ Date: _____

6 questions | 24 marks

1. A rectangle is x m wide and $(x + 2)$ m long. Its area is 48 m². Form an equation and find its dimensions. [4 marks]

2. A square picture has side length x cm. A frame is 2 cm wide all the way around it. The picture and frame together form a square of area 81 cm². Find x. [4 marks]

3. A discount plan charges $(12 - n)$ dollars per item when n items are bought. Here n is a whole number from 1 to 11. The total price is $R = n(12 - n)$. [4 marks]

(a) Find R for $n = 4$.

(b) Find both values of n for which $R = 35$.

4. A rectangle has perimeter 24 m and area 32 m². Let its width be w m. [4 marks]

(a) Show that its length is $(12 - w)$ m.

(b) Find both roots of $w(12 - w) = 32$.

(c) State the rectangle's dimensions.

5. A height model is $h = t(8 - t)$ metres for $0 \le t \le 8$ seconds. [4 marks]

(a) Find both times when $h = 12$ m.

(b) Explain why two times are possible in this model.

6. One model is linear and the other is quadratic. For inputs $x = 0, 1, 2, 3$, model A gives $1, 4, 9, 16$ and model B gives $2, 5, 8, 11$. [4 marks]

(a) Which is quadratic? Explain using differences.

(b) Predict each model's output for $x = 4$.