

Introduction to Quadratic Relations Review

Answer key Final answers only. Try first, then check.

CORE SKILLS

K1 a) First: 3, 1, -1, -3; second: -2, -2, -2; quadratic, opens down

b) First: 3, 3, 3, 3; second: 0, 0, 0; linear

c) First: 2, 6, 18, 54; second: 4, 12, 36; neither

K2 a) Vertex (3, -4); axis $x = 3$

b) Zeros 1 and 5; y -intercept 5

c) Minimum value -4

K3 a) $x = \frac{1}{2}$

b) $x = 3$; $y = 2$; $x = 4$; $y = -4$

c) Vertex $(\frac{1}{2}, \frac{33}{4}) = (0.5, 8.25)$; maximum value 8.25

K4 a) Zeros 3 and -5; opens up; y -intercept -30

b) $x = -1$; vertex (-1, -32)

c) Zeros 0 and 6; vertex (3, 9)

K5 a) $x^2 + 4x - 12$

b) $4x^2 - 12x + 9$

c) $y = -3x^2 + 9x + 12$

REAL WORLD

A1 a) $L = 60 - 3w$; $A(w) = w(60 - 3w) = -3w(w - 20)$

b) $w = 10$ m, $L = 30$ m; 300 m²

c) $w = 12$ m, $L = 24$ m; 288 m² (the vertex $w = 10$ would need $L = 30$ m)

A2 a) $R(x) = (40 + x)(100 - 5x) = -5(x + 40)(x - 20)$; zeros $x = -40$ and $x = 20$

b) $x = 20$: price \$60, no passes sold. $x = -40$: price \$0, passes given away. Both give \$0 revenue.

c) Vertex (-10, 4500): lower the price by \$10 to \$30; 150 passes; \$4500 per week

A3 a) $a \approx -4.98$, so $h = -5t(t - 3)$

b) 8.8 m; $t = 2.2$ s

c) -6.8 m. Not realistic: the ball landed at $t \approx 3$ s, so the model only applies for $0 \leq t \leq 3$.

THINK IT THROUGH

T1 a) -8 and -8; $a = -2$

b) Vertex (1, 5), since $y = 3$ at both $x = 0$ and $x = 2$; (0, 3) is the y -intercept

c) -16. No: with steps of 2 it is $4 \times 2a = 8a$

T2 a) $y = -\frac{1}{2}(x + 2)(x - 6)$

b) $y = -3x(x - 6)$

c) $y = 2(x + 3)(x - 1)$

BOSS LEVEL

Boss a) $k = 16$ (the points are (0, 16) and (10, 16))

b) $k = -9$

c) $a = -\frac{16}{5}$

