Review Pg 226 # 1-12

4 Review

4.1 Modelling With Quadratic Relations, pages 168–179

1. Is each relation quadratic? How do you know?

a) $y = 3x - 15$

b) $y = 4x^2 - 2x + 8$

c)

x	y
−5	1
0	4
5	16
10	64
15	256

2. A baseball is thrown upward. The path of the ball is modelled by the relation $h = -4.9t^2 + 15t + 2$, where h is the baseball's height above the ground, in metres, and t is the time, in seconds.

a) Copy and complete the table.

Time (s)	Height (m)
0.0	
0.5	
1.0	
1.5	
2.0	
2.5	
3.0	

b) How long will it take the baseball to reach its maximum height?

c) After how many seconds will the baseball land?

d) How can you tell that this relationship is quadratic? List as many reasons as possible.

4.2 The Quadratic Relation $y = ax^2 + k$, pages 180–193

3. Describe the shape and position of each parabola relative to the graph of $y = x^2$.

a) $y = x^2 - 3.4$

b) $y = -0.35x^2$

c) $y = 0.005x^2 + 15$

d) $y = 6.5x^2 - 3.4$

4. Sketch the graph of each relation in question 3.

5. Write a relation that models each table of values.

a)

x	y
−1	−88
0	−100
1	−88
2	−52
3	8
4	92

b)

x	y
−5.0	19.5
0.0	20.0
5.0	19.5
10.0	18.0
15.0	15.5
20.0	12.0

4.3 The Quadratic Relation $y = a(x - h)^2$, pages 194–203

6. Write a relation that models each table of values.

a)

x	y
8	−32
10	0
12	−32
14	−128
16	−288
18	−512

b)

x	y
−26	60
−16	15
−6	0
4	15
14	60
24	135

4.4 The Quadratic Relation $y = a(x - h)^2 + k$, pages 204–217

7. Describe the shape and position of each parabola relative to the graph of $y = x^2$.

a) $y = -0.004(x - 18)^2 + 15$

b) $y = 7(x + 1)^2 - 2$

c) $y = -80(x + 9)^2 + 10.8$

d) $y = 0.6(x - 40)^2$

8. Sketch the graph of each relation in question 7.

9. A computer repair technician is deciding what hourly rate to charge for her services. She knows that if she charges \$60/h, she will get 30 h of work per week. She also knows that for every \$5 increase in her hourly rate, she will lose 4 h of work per week.

a) Copy and complete the table.

Hourly Rate (\$)	Expected Number of Hours per Week	Weekly Revenue (\$)
45		
50		
55		
60	30	(60)(30) = \$1800
65	26	
70		

b) Graph the relation between hourly rate and weekly revenue.

c) Write a relation in the form $y = a(x - h)^2 + k$ to represent the graph.

d) What hourly rate should the technician charge to earn the maximum weekly revenue?

10. Sketch the graph of each parabola. Then, determine its equation.

a) opens upward, vertex is (3, −5), passes through point (13, 20)

b) opens downward, vertex is (−4, 7), passes through point (0, −39)

4.5 Interpret Graphs of Quadratic Relations, pages 218–225

11. One of the largest solar furnaces in the world is in Odeillo, France. The parabolic mirror is 54 m wide and 10 m deep. Write a relation to model the parabolic shape of the mirror.

12. A water balloon is thrown upwards. The balloon follows a path modelled by the relation $h = -2.6d^2 + 7.8d + 2.15$, where h is the balloon's height above the ground and d is the balloon's horizontal distance from the release point, both in metres.

a) Copy and complete the table. Graph the relation.

d	0.0	0.5	1.0	1.5	2.0	2.5	3.0
h							

b) What was the balloon's initial height above the ground?

c) Write a relation in the form $y = a(x - h)^2 + k$ to model the balloon's path.