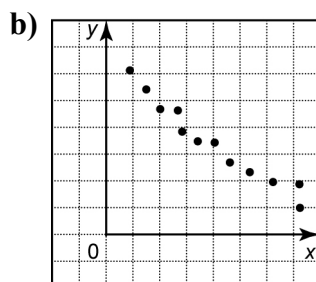
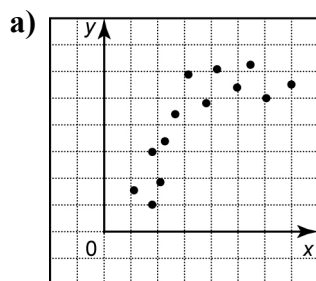


Chapter 4 Review

4.1 Investigate Non-Linear Relations

1. Identify whether each scatter plot can be modelled using a line of best fit or a curve of best fit.



2. Use the data in the table to answer the questions below.

Time (years)	Value of the Investment (\$)
0	100
1	105
2	108
3	114
4	121
5	135
6	150
7	171
8	195
9	225

- a) Make a scatter plot of the data and draw a curve of best fit.
 b) Describe the relation between value and time.
 c) Use your curve of best fit to estimate the value of the investment after 10 years.

4.2 Quadratic Relations

3. Use finite differences to determine whether each relation is linear, quadratic, or neither.

a)

x	y
1	3
2	10
3	29
4	66
5	127

b)

x	y
-2	12
-1	3
0	0
1	3
2	12

c)

x	y
1	5
3	13
5	21
7	29
9	37

4. Susan throws a rock off a cliff that is 210 m tall. The height, h , in metres, of the rock above the ground can be related to the time, t , in seconds by the equation $h = -5t^2 + 10t + 210$.
- a) Graph the relation.
 b) What is the maximum height of the rock?
 c) When does the rock reach its maximum height?

4.3 Investigate Transformations of Quadratics and 4.4 Graph $y = a(x - h)^2 + k$

5. Sketch the graph of each parabola and describe its transformations from the relation $y = x^2$.

a) $y = (x + 3)^2$ b) $y = x^2 + 2$

c) $y = \frac{1}{3}x^2$ d) $y = -3x^2$

6. Copy and complete the table for each parabola. Replace the heading for the second column with the equation for the parabola.

a) $y = (x + 2)^2 + 3$

b) $y = 4(x - 5)^2 - 1$

c) $y = -\frac{1}{3}(x + 2)^2 - 3$

d) $y = -(x - 3)^2 - 4$

Property	$y = a(x - h)^2 + k$
vertex	
axis of symmetry	
stretch or compression	
direction of opening	
values that x may take	
values that y may take	

7. Sketch each parabola in question 6.
8. A store can increase revenue by increasing the price of its T-shirts. The revenue, R , in dollars, can be modelled by the relation $R = -50(d - 3.5)^2 + 4000$, where d represents the dollar increase in price.
- Graph the relation for $0 \leq d \leq 10$.
 - What is the maximum revenue?
 - What dollar increase corresponds to the maximum revenue?

4.5 Quadratic Relations of the Form

$y = a(x - r)(x - s)$

9. Sketch a graph for each quadratic relation. Label the vertex and the x -intercepts.

a) $y = -(x - 2)(x + 6)$

b) $y = \frac{1}{2}(x + 8)(x - 2)$

c) $y = x(x + 10)$

10. The path of a jet plane in training manoeuvres is given by the relation $h = -5(t + 20)(t - 100)$, where h represents the height, in metres, above the ground and t is time, in seconds.

- a) Sketch a graph for this relation.

- b) At what time does the plane reach its maximum height?

- c) What is the maximum height?

4.6 Negative and Zero Exponents

11. Evaluate.

a) 6^{-3}

b) 8^{-2}

c) $-(-\frac{2}{3})^0$

d) $(\frac{1}{2})^{-4}$

e) $(-3)^{-2}$

f) $(-\frac{3}{5})^{-3}$

g) -7^0

h) $-(\frac{1}{3})^{-3}$

12. Evaluate.

a) $6^2 - 6^{-1}$

b) $(4 + 5)^0$

c) $4^{-2} + 4^{-1}$

13. Solve for x .

a) $3^x = \frac{1}{27}$

b) $(\frac{2}{5})^x = \frac{25}{4}$

c) $x^{-3} = \frac{27}{64}$

14. The half-life of sodium-24 is 16 h.

- a) What fraction of a sample of sodium-24 will remain after 32 h?

- b) What fraction of a sample of sodium-24 will remain after 4 days?

- c) Write the fractions in parts a) and b) with a negative exponent with a base of 2.