

## Chapter 4 Practice Test

1. The equation of the axis of symmetry for the parabola defined by  $y = -2(x - 6)^2 + 2$  is

A  $x = -6$       B  $y = 2$   
C  $x = 6$       D  $y = -2$

2. The  $x$ -intercepts of the parabola

$$y = 5(x - 6)(x + 4)$$
 are

A 4 and 6      B 5 and 6  
C 5, 6, and  $-4$       D 6 and  $-4$

3.  $-5^0$  is equal to

A  $-5$       B 5  
C  $-1$       D 1

4. An equation for the parabola  $y = x^2$  after it is reflected in the  $x$ -axis and translated 3 units to the right and 4 units down is

A  $y = -(x - 3)^2 + 4$   
B  $y = -(x - 3)^2 - 4$   
C  $y = (x - 3)^2 - 4$   
D  $y = (x + 3)^2 + 4$

5. The fraction of the surface area of a pond covered by algae cells doubles every week. Today the pond surface is fully covered with algae. When was the pond half-covered?

A yesterday  
B 1 week ago  
C 1 month ago  
D it depends on the size of the pond

6. Evaluate.

a)  $\left(\frac{1}{4}\right)^{-2} + 3$       b)  $3^{-1} + 1^{-3}$   
c)  $2^{-2} + 3^{-2}$       d)  $(3^{-2} - 4^{-1})^0$

7. The table shows the growth pattern for Michael, measured every 3 months for the past 2 years since his 8th birthday.

Month	Height (cm)
0	135
3	138
6	139
9	141
12	143
15	145
18	146
21	148
24	151

- a) Plot the points on a grid and draw a line or curve of best fit.  
b) What type of relation does this line or curve of best fit represent?  
c) Use the graph to determine Michael's height in another year from the end of the data.  
d) What assumption do you need to make to answer part c)?
8. For the parabola  $y = -\frac{1}{2}(x - 3)^2 - 1$ , state
- a) the equation of the axis of symmetry  
b) the stretch or compression factor relative to  $y = x^2$   
c) the direction of opening  
d) the values  $x$  may take  
e) the values  $y$  may take
9. Sketch an example of a linear relation, a quadratic relation, and a relation that is neither linear nor quadratic. Label each graph.

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10. Use finite differences to determine whether each relationship is linear, quadratic, or neither.

a)

x	y
1	-8
2	-5
3	-2
4	1
5	4

b)

x	y
-2	51
-1	33
0	19
1	9
2	3

11. A flying bird drops a seed. The height,  $h$ , in metres, of the seed above the ground can be modelled by the relation  $h = -5t^2 + 125$ , where  $t$  is in seconds.
- Sketch the relation.
  - How far above the ground is the bird when it drops the seed?
  - How long does the seed take to hit the ground?
12. The path of a flying disc can be modelled by the relation  $h = -0.0625d(d - 112)$ , where  $h$  is the height, in metres, above the ground, and  $d$  is the horizontal distance, in metres.
- Sketch a graph of the relation.
  - At what horizontal distance does the disc land on the ground?
  - At what horizontal distance does the disc reach its maximum height?
  - What is the maximum height?

13. Richard plans to divide his money among his six children when he dies, according to the following formula:

The oldest child will get  $\frac{1}{2}$  of the estate, the second-oldest child will get  $\frac{1}{2}$  of what is left, the third child will get  $\frac{1}{2}$  of what is left after the first two children get their inheritance, and so on down the line.

- What fraction of the estate will each child get?
  - If Richard dies with a net worth of \$6.4 million, how much will each child get?
  - Will there be any money left over once the estate is settled? If so, how much remains?
14. To increase revenue, a sports store has decided to increase the cost of a baseball glove. They expect that for every \$5 increase in price from the current price of \$40, three fewer gloves will be sold per week than the current 60 per week.
- The revenue relation is  $R = (60 - 3x)(40 + 5x)$ , where  $R$  represents the revenue, in dollars, and  $x$  represents the number of price increases.
- Graph the relation and label the  $x$ -intercepts.
  - Determine the maximum revenue per week for the store.
  - How many times was the price increased for this maximum revenue?
  - What is the price of a glove when revenue is at its maximum?
  - How many gloves were sold per week to generate this maximum revenue?