Name: _____ Date: _____

Chapter 4 Practice Test

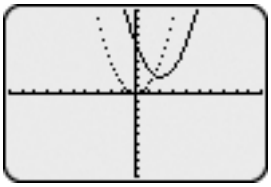
1. Is each statement true (T) or false (F)?
- **a)** The relation $y = 3x^3 + 2$ is quadratic.
- **b)** The relation $y = (x - 5)^2$ has been translated 5 units to the right compared to $y = x^2$.
- **c)** The relation $y = -2(x + 4)^2 - 1$ has been translated 4 units to the right and down one unit compared to $y = -2x^2$.
- **d)** The graph of $y = -(x + 4)^2 - 2$ is the reflection of $y = (x + 4)^2 + 2$ in the x-axis.
- **e)** The relation $y = x^2$ is vertically compressed by a factor of 2 in $y = 0.5x^2$.
- **f)** The order in which a series of translations to $y = x^2$ are performed can affect the final graph of $y = a(x - h)^2 + k$.

2. Marilyn was asked to determine if the data in a table of values represented a quadratic relation. She calculated the first differences and found that they were not constant, but every entry differed by –3 from the one above it in the first differences column. Is the relation quadratic? Explain.

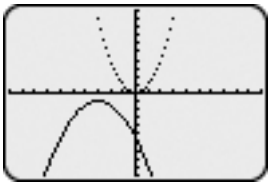
3. Describe the graph of each parabola relative to the graph of $y = x^2$. Sketch each graph.
- **a)** $y = 2(x - 3)^2$
- **b)** $y = (x + 4)^2 - 1$
- **c)** $y = -0.5x^2 + 3$
- **d)** $y = 0.3(x - 2)^2 - 1$

4. In each standard viewing window, the graph of $y = x^2$ is shown as a dotted parabola and the graph of a relation in the form $y = a(x - h)^2 + k$ is shown as a solid parabola. For each solid parabola, identify the value of a, h, and k, and the coordinates of the vertex.

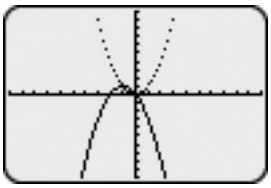
a)



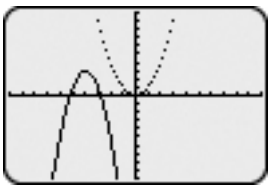
b)



c)



d)



5. For each parabola
- **i)** identify the coordinates of the vertex
- **ii)** determine the x-values of the points 2 units to each side of the vertex
- **iii)** use these x-values to find two points on the parabola
- **iv)** graph the parabola
- **a)** $y = -2(x + 3)^2 - 2$
- **b)** $y = 0.5(x - 7)^2 + 3$

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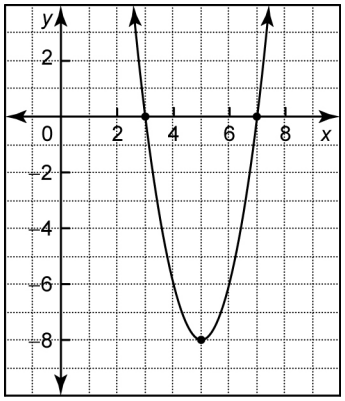
6. Consider this parabola.



a) State the coordinates of the vertex.
b) Identify the coordinates of the other two points shown on the graph.
c) Find the value of a.
d) Write an equation to represent the parabola.

7. A small child dropped a stone from a bridge over a river. The path of the stone can be modelled by the relation $h = -4.9t^2 + 45$, where h is the height above the water in metres and t is the time in seconds after the stone was dropped.
a) Graph the relation and describe the shape, position, and orientation of the graph.
b) From what height was the stone dropped?
c) How far had the stone fallen after 2 s?

8. A goalie held a soccer ball 0.5 m above the ground and kicked it. The ball reached a maximum height of 42 m at a horizontal distance of 22 m from the goalie.
a) Write an equation for the quadratic relation that models the path of the soccer ball.
b) At what horizontal distance from the goalie does the ball hit the ground?

9. A car agency rents 40 cars for \$80 each. A survey suggests that for every \$5 increase in price, rentals will decrease by 2 cars.
a) Complete the table of values.

Price (\$)	Cars Rented	Revenue (\$)
80	40	3200
85	38	
90		
95		
100		

b) Draw a graph comparing price and revenue.
c) Which price results in maximum revenue?
d) What is the maximum revenue?