

Math 20-2
Quadratic Functions Quiz

Name: Key

1. Given the graph of the function:

a) Identify and write the coordinates of the vertex. $(-3, 4)$

b) Sketch in the axis of symmetry and write the equation for the axis of symmetry.

$$x = -3$$

c) Identify and write the coordinates of the x - intercepts. $(-5, 0)$ and $(-1, 0)$

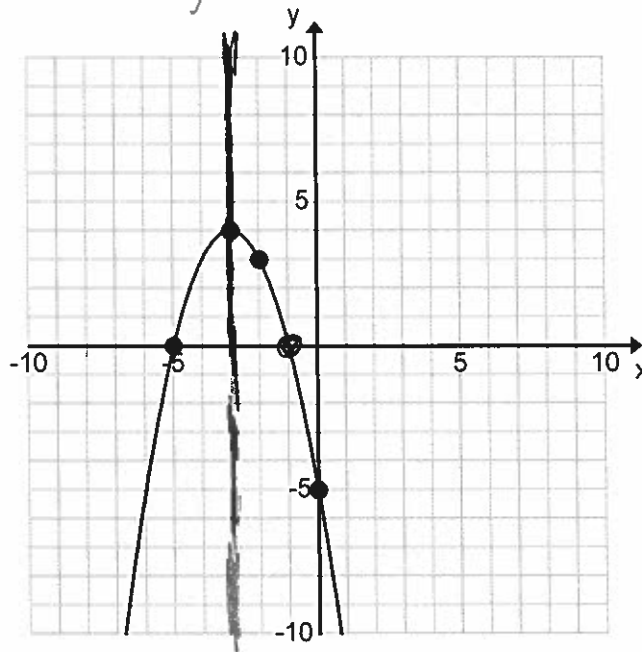
d) Identify and write the coordinates of the y - intercept. $(0, -5)$

e) Write the domain and range.

$$D: x \in \mathbb{R}$$

$$R: y \leq 4$$

[5]



2. Given the equation of the quadratic function: $y = x^2 - 6x + 5$

a) Find points to plot using an algebraic method and/or calculator skills.
Sketch the graph.

b) Identify and write the coordinates of the x - intercepts. $(1,0)$ and $(5,0)$

c) Identify and write the coordinates of the y - intercept. $(0,5)$

d) Identify and write the coordinates of the vertex. $(3,-4)$

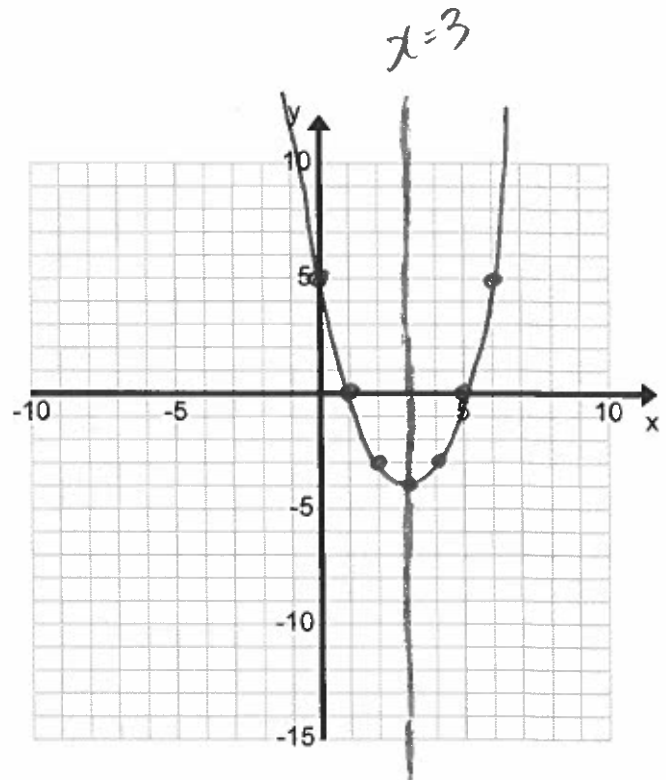
e) Sketch in the axis of symmetry and write the equation for the axis of symmetry. $x=3$

f) What is the range of the function? $y \geq -4$

[6]

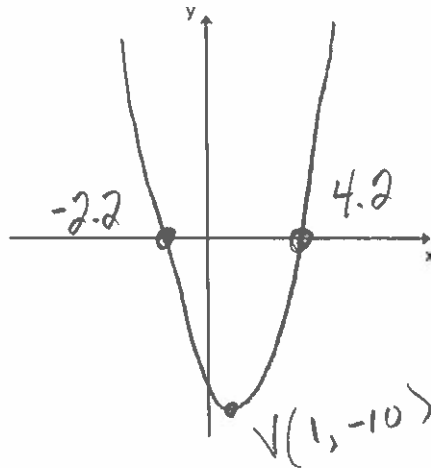
$$y = x^2 - 6x + 5$$

X	Y
-1	12
0	5
1	0
2	-3
3	-4
4	-3
5	0
6	5



3. Given the $y = x^2 - 2x - 9$

a) Sketch the function.



b) Determine the coordinates of the x - intercepts, rounded to nearest tenth.

[4]

$$x = -2.2 \quad x = 4.2$$

c) Determine the coordinates of the vertex, rounded to the nearest tenth.

$$V(1, -10)$$

4. Use Quadratic Regression to determine the quadratic equation for the following data:

X	Y
-3	1
-2	-3.5
0	-9.5
2	-11.5
5	-7

Identify the parameters:

$$y = ax^2 + bx + c$$

$$a = 0.5$$

$$b = -2$$

$$c = -9.5$$

[2]

Write the equation:

$$y = 0.5x^2 - 2x - 9.5$$

5. A concert sells all 5000 seats to stadium when the price of a ticket is \$40. The concert manager needs to increase the revenue from the sale of tickets, so she commissions a survey to predict ticket sales for different ticket prices. The results are shown in the table below.

Ticket Price	\$ 30.00	\$ 35.00	\$ 45.00	\$ 50.00	\$ 70.00
Expected Sales	5000	4500	3500	3000	1000

- a) Find the revenue generated for each ticket price.

Ticket Price	\$ 30.00	\$ 35.00	\$ 45.00	\$ 50.00	\$ 70.00
Revenue	150000	157500	157500	150000	70000

[4]

- b) Determine a best-fit Revenue function using **quadratic regression** for the manager's data. Round off your values to the nearest hundredth as necessary.

$$y = ax^2 + bx + c$$

$$a = -100$$

$$b = 8000$$

$$c = 0$$

$$y = -100x^2 + 8000x$$

6. The number of hamburgers sold at a concession stand is related to the price of the hamburgers as follows:

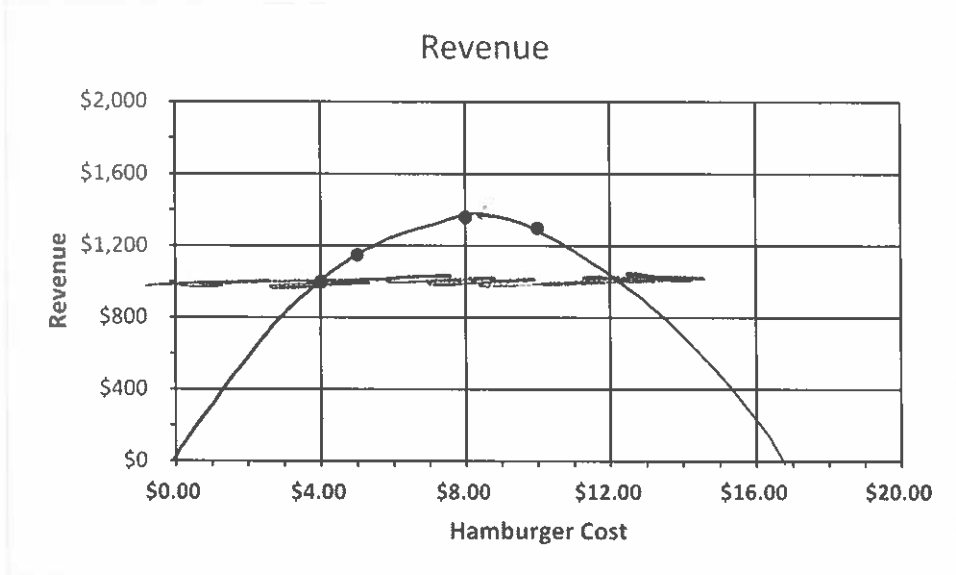
Price	\$4.00	\$5.00	\$8.00	\$10.00
Burgers Sold	250	230	170	130
Revenue	\$1000	\$1150	\$1360	\$1300

The Revenue Function for the sales data is: $R = -20P^2 + 330P + 0$, where R is revenue and P is the price/hamburger.

- a) State a window for this information and sketch your function:

X: [0 , 20 , 4]

Y: [0 , 2000 , 400]



[3]

- b) We know a \$4.00 hamburger price will generate revenue of \$1000. What other price will also generate revenue of \$1000?

intersect $x=12.5$

$y_2 = 1000$

set price to \$12.50

- c) If you were the manager of the concession, what price would you set for the hamburgers to maximize the concession revenue?

MAX $x=8.25$ $y=$

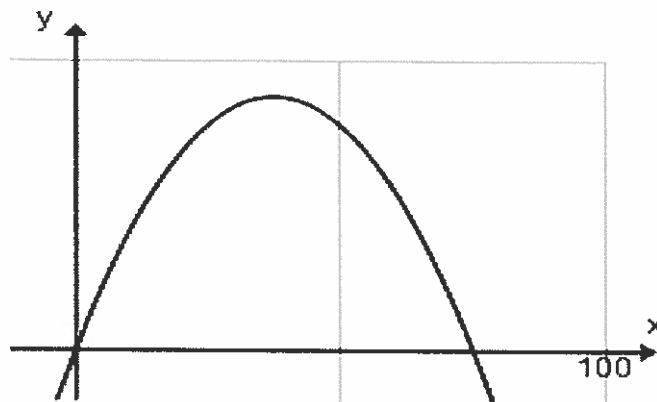
set price to \$8.25

7. The distance travelled and height of a golf ball is given by the equation:
 $y = -0.01x^2 + 0.75x$, where x is the distance the ball travels and y is the height of the ball, both in metres.

a) Determine a good y-window. Your graph should be similar to the sketch shown.

X: set your X max at 100

Y: [-5, 20, 5]



b) Find the maximum height of the ball. $x = 37.5$ $y = 14.1$

[4]

height = 14.1

c) What distance does the ball travel in the air? "zero"

$x = 75$

d) Determine distance the ball travels when it first reaches a height of 10.0 metres.

$x = 17.3$

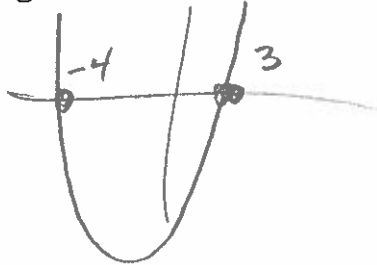
$x = 57.7$

$y_2 = 10$
intersect

FIRST AT 10.0 m when $x = 17.3$ m.

8. Use your quadratic function skills to solve or justify with **algebra and/or a sketch**:

a) The quadratic function $y = (x + 4)(x - 3)$ has x-intercepts of $(4,0)$ and $(-3,0)$. Explain or justify why you agree or disagree.

Disagree $x+4=0$ $x-3=0$ OR 

$x=-4$ $x=3$

b) A quadratic function has x-intercepts of $(-8,0)$ and $(12,0)$. Explain or justify why you agree or disagree that the axis of symmetry is $x = 10$. DISAGREE

[6]

$$\frac{-8+12}{2} = \frac{4}{2} = 2$$

sym $x=2$



c) The quadratic function $y = -0.5(x + 6)(x - 4)$ has an axis of symmetry $x = -1$.

- Determine the coordinates of the vertex for this function.
- Determine the range for this function.

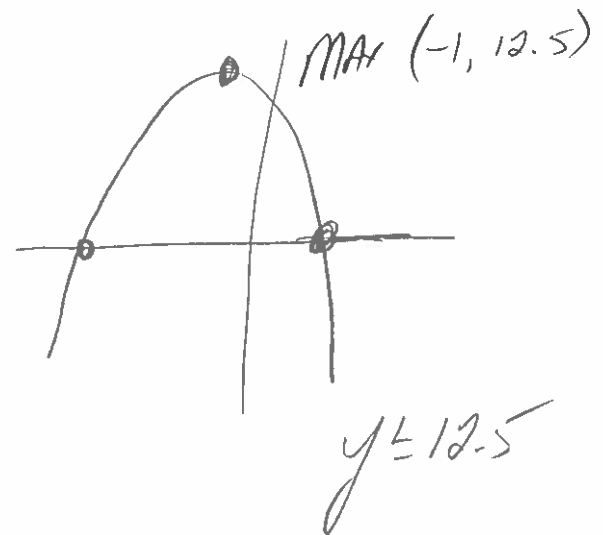
i. vertex

$$y = -0.5(-1+6)(-1-4)$$


$$y = -0.5(5)(-5)$$

$$y = 12.5$$

vertex $(-1, 12.5)$



ii. range $y \leq 12.5$



9. Solve at least three of the following puzzles:

[3]



Each row, column and diagonal add up to the values shown. Can you logically fill in the rest of the grid of numbers?

8	12	16	11	⇒	47	<i>47-36</i>
15	7	2	6	⇒	30	<i>30-23</i>
1	3	4	13	⇒	21	
9	5	14	10	⇒	38	<i>38-29</i>
↓ ↓ ↓ ↓						
33	27	36	40		29	<i>29-21</i>
↓ ↓ ↓ ↓						
33	27	36	40			
↓ ↓ ↓ ↓						
33	27	36	40			

8	16	15	1	⇒	40	
14	12	3	6	⇒	35	
4	2	5	10	⇒	21	<i>21-19</i>
7	11	13	9	⇒	40	<i>40-33</i>
↓ ↓ ↓ ↓						
33	41	36	26		34	<i>34-22</i>
↓ ↓ ↓ ↓						
33	41	36	26			
↓ ↓ ↓ ↓						
33	41	36	26			

33-32 *36-20* *33-25* *26-20*

Sudoku

Two-by-Three With Six Possible Values

5	4	1	6	3	2
6	2	3	4	5	1
2	1	5	3	6	4
3	6	4	1	2	5
1	5	6	2	4	3
4	3	2	5	1	6

4	5	2	1	3	6
3	6	1	2	5	4
5	2	6	3	4	1
1	3	4	6	2	5
2	1	5	4	6	3
6	4	3	5	1	2