

Math 11

Properties of Parabolas

SOLUTIONS

1.

• Vertex: (2, -1)

• x-intercept(s): (1, 0) (3, 0)

• y-intercept: (0, 3)

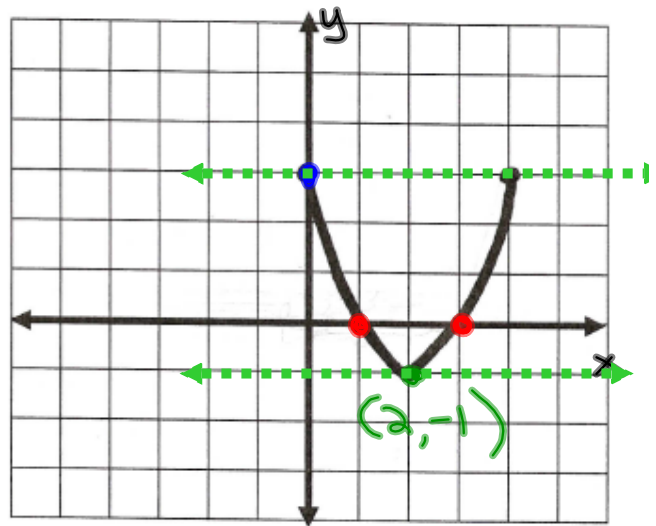
Maximum or Minimum: Minimum

• Max./Min. Value: (2, -1)

Axis of Symmetry: $x = 2$

Domain: $\{x \mid 0 \leq x \leq 4, x \in \mathbb{R}\}$

Range: $\{y \mid -1 \leq y \leq 3, y \in \mathbb{R}\}$



2.

Vertex: $(-1, 2)$

x-intercept(s): $(0, 0)$ $(-2, 0)$

y-intercept: $(0, 0)$

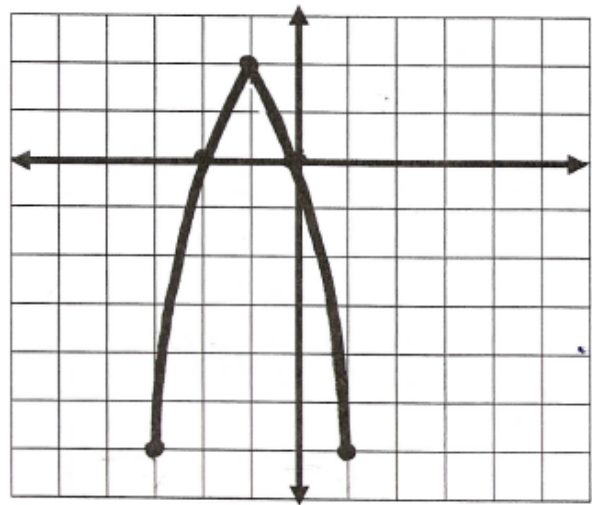
Maximum or Minimum: Maximum

Max./Min. Value: $(-1, 2)$

Axis of Symmetry: $x = -1$

Domain: $\{x \mid -3 \leq x \leq 1, x \in \mathbb{R}\}$

Range: $\{y \mid -6 \leq y \leq 2, y \in \mathbb{R}\}$



3.

Vertex: $(2, 1)$

x-intercept(s): No x-intercepts.

y-intercept: $(0, 4)$

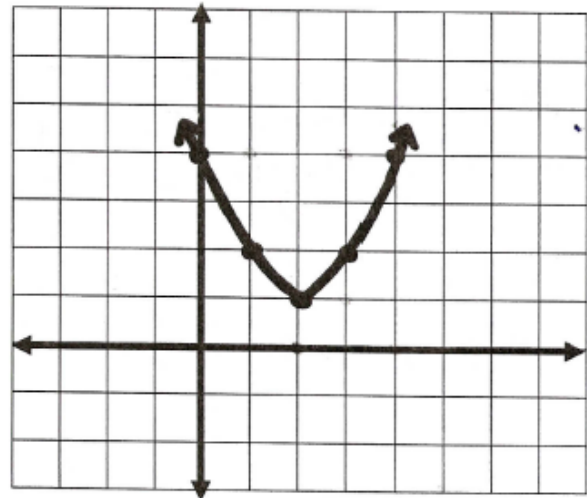
Maximum or Minimum: Minimum

Max./Min. Value: $(2, 1)$

Axis of Symmetry: $x = 2$

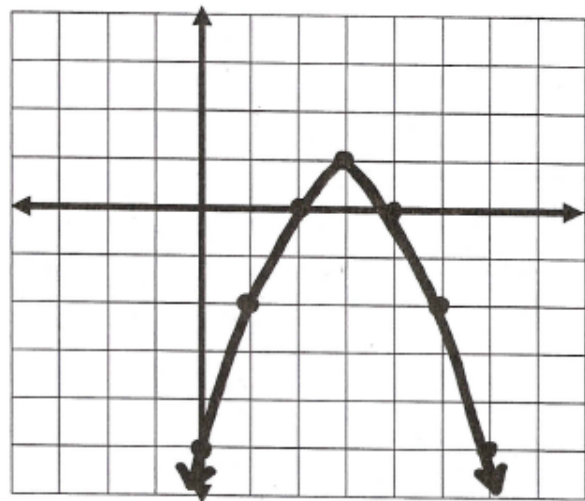
Domain: $\{x | x \in \mathbb{R}\}$

Range: $\{y | y \geq 1, y \in \mathbb{R}\}$



4.

Vertex: (3, 1)
x-intercept(s): (2, 0) (4, 0)
y-intercept: (0, -5)
Maximum or Minimum: Maximum
Max./Min. Value: (3, 1)
Axis of Symmetry: $x = 3$
Domain: $\{x | x \in \mathbb{R}\}$
Range: $\{y | y \leq 1, y \in \mathbb{R}\}$



5.

Vertex: $(0,0)$

x-intercept(s): $(0,0)$

Max./Min. Value: $(0,0)$

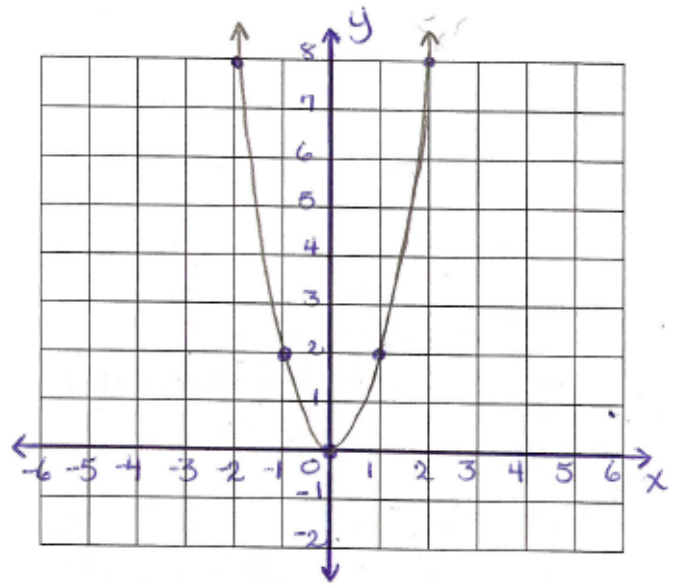
Axis of Symm: $x=0$

Domain: $\{x | x \in \mathbb{R}\}$

Range: $\{y | y \geq 0, y \in \mathbb{R}\}$

$$y = 2x^2$$

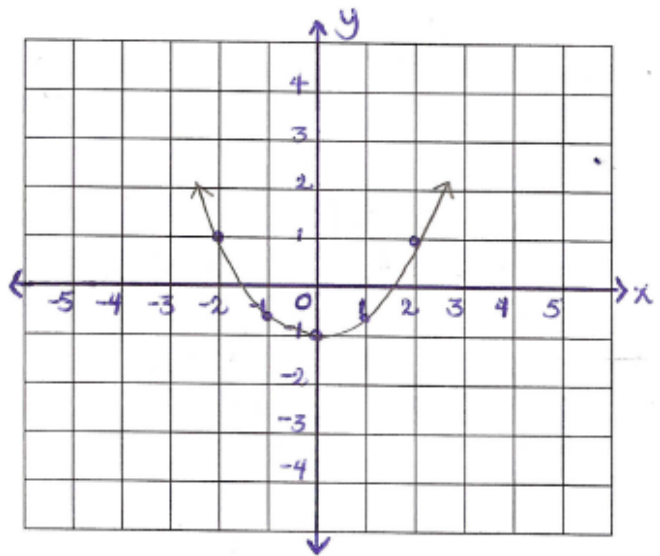
x	y
-2	8
-1	2
0	0
1	2
2	8



6.

$$y = \frac{1}{2}x^2 - 1$$

Vertex:	<u>(0, -1)</u>	<u>x</u>	<u>y</u>
Approx. x-intercept(s):	<u>(1.5, 0) (-1.5, 0)</u>	<u>-2</u>	<u>1</u>
Max./Min. Value:	<u>(0, -1)</u>	<u>-1</u>	<u>-1/2</u>
Axis of Symm:	<u>x = 0</u>	<u>0</u>	<u>-1</u>
Domain:	<u>{x x ∈ ℝ}</u>	<u>1</u>	<u>-1/2</u>
Range:	<u>{y y ≥ -1, y ∈ ℝ}</u>	<u>2</u>	<u>1</u>



7.

$$y = -(x+1)^2 + 3$$

Vertex: $(-1, 3)$

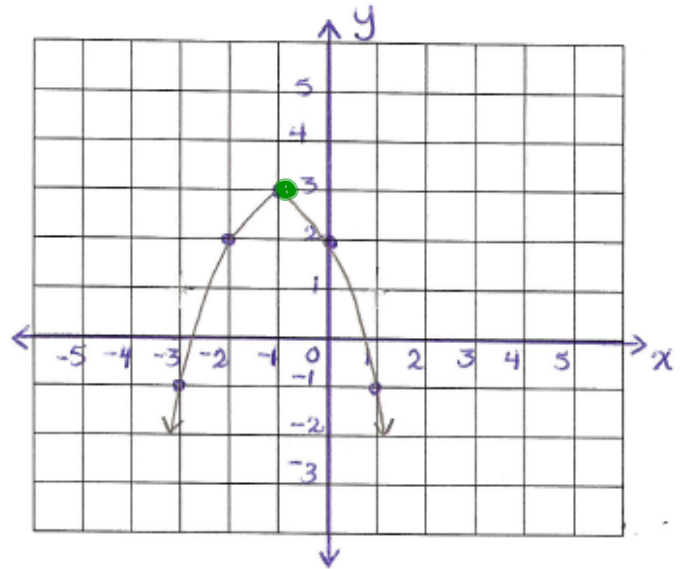
Max./Min. Value: $(-1, 3)$

Axis of Symm: $x = -1$

Domain: $\{x | x \in \mathbb{R}\}$

Range: $\{y | y \leq 3, y \in \mathbb{R}\}$

x	y
-3	-1
-2	2
-1	3
0	2
1	-1
2	-6
3	-13



8.

$$y = x^2 - 5x + 4$$

Vertex: $(2.5, -2.25)$

x-intercept(s): $(1, 0)$ $(4, 0)$

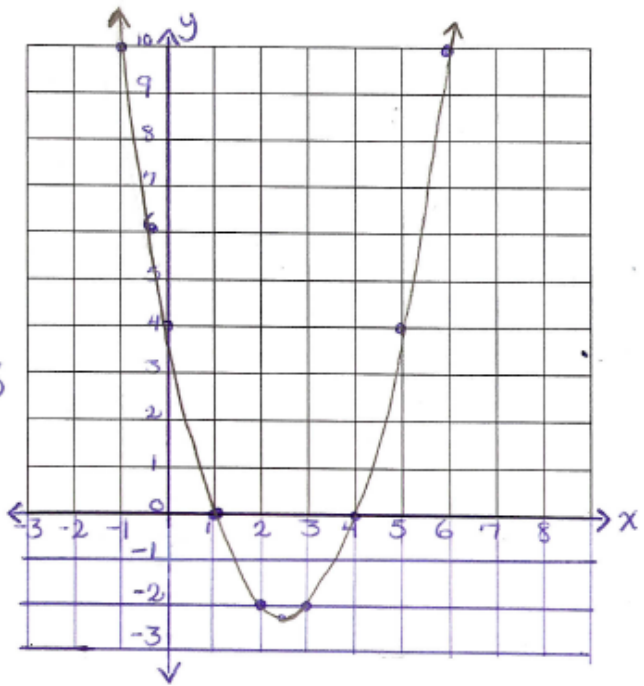
Max./Min. Value: $(2.5, -2.25)$

Axis of Symm: $x = 2.5$

Domain: $\{x | x \in \mathbb{R}\}$

Range: $\{y | y \geq -2.25, y \in \mathbb{R}\}$

x	y
-1	10
0	4
1	0
2	-2
2.5	-2.25
3	-2
4	0
5	4
6	10



9.

$$y = -x^2 + 6x - 5, -1 \leq x \leq 7$$

Vertex: (3, 4)

x-intercept(s): (1, 0) (5, 0)

Max./Min. Value: (3, 4)

Axis of Symm: $x = 3$

Domain: $\{x \mid -1 \leq x \leq 7, x \in \mathbb{R}\}$

Range: $\{y \mid -12 \leq y \leq 4, y \in \mathbb{R}\}$

x	y
-1	-12
0	-5
1	0
2	3
3	4
4	3
5	0
6	-5
7	-12

