

Properties of Quadratic Functions: Domain, Range, & Completing the square.

Wednesday, October 26, 2016 5:55 PM

Name: _____

Quadratic Functions: Given the following tables of values for each quadratic function sketch the function and state the domain and range.

a) $y = x^2 - 2x$ D: $x \in \mathbb{R}$ R: $y \geq -1$
 $y = 1^2 - 2(1) = -1$

x	y
-2	8
-1	3
0	0
2	0
3	3
4	8

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

b) $y = x^2 + 2x - 3$ D: $x \in \mathbb{R}$ R: $y \geq -4$
 $= (-1)^2 + 2(-1) - 3 = -4$

x	y
-4	5
-3	0
-2	-3
0	-3
1	0
2	5

$y = (x^2 + 2x + 1) - 3 - 1$
 $y = (x+1)^2 - 4$

c) $y = x^2 - x - 6$ D: $x \in \mathbb{R}$ R: $y \geq -6.25$
 $y = 0.5^2 - 0.5 - 6 = -6.25$

x	y
-2	0
-1	-4
0	-6
1	-6
2	-4
3	0

$y = (x^2 - x + \frac{1}{4}) - 6 - \frac{1}{4}$
 $y = (x - 0.5)^2 - 6.25$

d) $y = -x^2 - x + 2$ D: $x \in \mathbb{R}$ R: $y \leq 2.25$
 $y = -(-0.5)^2 - 0.5 + 2 = 2.25$

x	y
-3	-4
-2	0
-1	2
0	2
1	0
2	-4

$y = -(x^2 + x + \frac{1}{4}) + 2 - \frac{1}{4}$
 $y = -(x + 0.5)^2 + 2.25$

e) $y = 2x^2 - x - 8$ D: $x \in \mathbb{R}$ R: $y \geq 8.125$

x	y
-2	2
-1	-5
0	-8
1	-7
2	-2
3	7

$y = 2(x^2 - \frac{1}{2}x + \frac{1}{16}) - 8 - 2(\frac{1}{16})$
 $= 2(x - \frac{1}{4})^2 - 8.125$

f) $y = 3x^2 + x - 10$ D: $x \in \mathbb{R}$ R: $y \geq \frac{121}{12}$

x	y
-2	1
-1	-8
0	-10
1	-6
2	4

$y = 3(x^2 + \frac{1}{3}x + \frac{1}{36}) - 10 - 3(\frac{1}{36})$
 $= 3(x + \frac{1}{6})^2 - \frac{121}{12}$