Relations and Functions

#28: y=-2x2+3

|  |  |  |
| --- | --- | --- |
| x | y=-2x2+3 | y |
| 0 | y=-2(0)2+3 | 3 |
| 1 | y=-2(1)2+3 | 1 |
| 2 | y=-2(2)2+3 | -5 |
| -1 | y=-2(-1)2+3 | 1 |
| -2 | y=-2(-2)2+3 | -5 |

* The graph of the **relation** is ƒ (x)=-2x2+3.
* My 5 points for this equation is as follows:

(0,3)

(1,1)

(2,-5)

(-1,1)

(-2,-5)

* The key points and general shape of this graph is upward and the vertex is 3 located on the y-intercept. This is a parabola.
* The domain is (-∞,∞).
* The range is (-∞, 3].
* This graph is a **function** because each y value equals one x value. “If the value of the variable y is determined by the value of the variable x, then y is a function of x. So is a function of means is uniquely determined by” (Dugopolski, 2012, p. 690).
* The **vertical line test** passes through any x value and it only crosses that line once.

#36: y=2√(x)+1

|  |  |  |
| --- | --- | --- |
| x | y=2√(x)+1 | y |
| 0 | y=2√(0)+1 | 1 |
| 1 | y=2√(1)+1 | 3 |
| 2 | y=2√(2)+1 | 3.82 |
| 4 | y=2√(4)+1 | 5 |
| 6 | y=2√(6)+1 | 5.89 |

* The graph of the **relation** is ƒ (x)=2√(x)+1.
* My 5 points for this equation is as follows:

(0,1)

(1,3)

(2,3.82)

(4,5)

(6,5.89)

* This graph is a **function** because each y value equals one x value.
* The general shape of this graph is a curve that plateau. There is no vertex.
* I selected problem 36 to be shifted 3 units upward and 4 units to the left.

y=2√(x)+1

y=2√(x+4)+1+3

y=2√(x+4)+4

* This is the **transformation** of the function. I added 3 outside the radical and added 4 inside the radical.

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This problem is an example of a quadratic function. We know this because it is in the form f(x)=ax2+bx+c where a, b, and c are real numbers and a is not equal to 0. In this case, we will graph the given function by plotting enouh points to figure out the shape of the graph.

Y = -2x2+3 original equation.  
X Y In this portion, I just plugged in the values under the x column   
-2 -5 into the equation above and found the corresponding solutions   
-1 1 for y. These are the ordered pairs that will appear on the   
0 3 graph.  
1 1  
2 -5  
This is a function because each value for y only has one x value and passes a vertical line test. The vertex for this parabola is [0,3], the domain is {[-∞, ∞]}, and the range is {[-∞,3]}.

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This problem is a square root function because it comes in the form f(x)= √x.

Y = 2√(x)+1 original equation.  
X Y In this portion, I just plugged in the values under the x column   
0 1 into the equation above and found the corresponding solutions  
1 3 for y. These are the ordered pairs that will appear on the graph.  
4 5  
9 7  
This is a function because each value for y only has one x value and passes a vertical line test. The domain for this graph is {[0, ∞]} and the range is [{1, ∞}].  
Had this line been shifted up three and left four a transformation in the graph and equation would occur. (x)+ c represents a line shifting up c units and (x+c) represents a line shifting left c units. The change to the equation is shown below.  
Y= 2√(x )+1  
Y= 2√(x+4) +1+3  
Y= 2√(x+4) +4