Graphing a quadratic. There are many ways to graph a quadratic. This is the way we are teaching and work we want to see on your test at NSHS

Graph $x^{2}-2x-3=y$

This table will guide you through the three steps.

|  |  |  |
| --- | --- | --- |
| X | Y | Specific point |
|  | 0 | 1st x-intercept |
|  | 0 | 2nd x-intercept |
| 0 |  | y-intercept |
|  |  | vertex |

In each step you are starting with the original equation.

Step 1. Finding the x-intercepts

Start with the Original equation. $x^{2}-2x-3=y$

For this step you factor the equation with generic rectangles and diamonds. Here are the results after factoring.

$$x^{2}-2x-3=(x-3)(x+1)$$

Solve for the roots with the zero product property.

$$\left(x-3\right)\left(x+1\right)=0$$

From this we get the two equations x-3=0 and x+1=0, which are easily solved for x+3 and x+-1. These are x-intercepts and will be put in the guiding table and plotted on the graph

Step 2. Finding the y intercept. This is easy. At the y intercept the x value is 0, as already noted in the table. To find the y value you simply plug zero in for x in the original equation.

Start with the original equation. $x^{2}-2x-3=y$.

Enter zero in for all the x. $(0)^{2}-2(0)x-3=y$.

Solve for y. y=-3

So your ordered pair is (0,-3) for the y-intercept

Step 3 finding the vertex. This is similar to finding the y intercept, but the math can be more challenging. Just like the y intercept, you need an x value to plug into the original equation. In this case you use the x value that is in the middle of the 2 x-intercepts.

Start with the original equation. $x^{2}-2x-3=y$

Find the x-value in the middle of the x-intercepts. X=1

Plug this value into the original equation $\left(1\right)^{2}-\left(1\right)x-3=y$

Solve for y y=-4

So your ordered pair for the vertex is (1, -4)

Put these points in your table and then graph

|  |  |  |
| --- | --- | --- |
| X | Y | Specific point |
| 3 | 0 | 1st x-intercept |
| -1 | 0 | 2nd x-intercept |
| 0 | -3 | y-intercept |
| 1 | -4 | vertex |



Graph the following equations

1. $x^{2}-4x-5=y$
2. $x^{2}-8x+12=y$
3. $x^{2}+4x-5=y$
4. $x^{2}-6x+5=y$

Solution to number 1



Solution to problem 2



Solution to problem 3



Solutions to problem 4

