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Graphing Polynomial Functions - Guided Lesson Explanation

Basic strategy to follow for all problems is:

Step 1) Plot the graph by plugging in x values.

Make sure that you use negative and positive numbers for your x values. Since they are polynomial functions they will dance around the y-axis.

Step 2) Determine the Maximum Number of Turns For the Function

n is the degree of the polynomial. Basically that is the highest level exponent. Polynomial functions have the maximum number of turns equal to $n - 1$. You just need to find the degree of each function and subtract it by 1 to find the total number of turns.

Step 3) Use the Rational Zero Theorem to Find all Possible Zeros.

$$\frac{p}{q}$$

p = factors of the constant.

q = the factors of the leading coefficient.

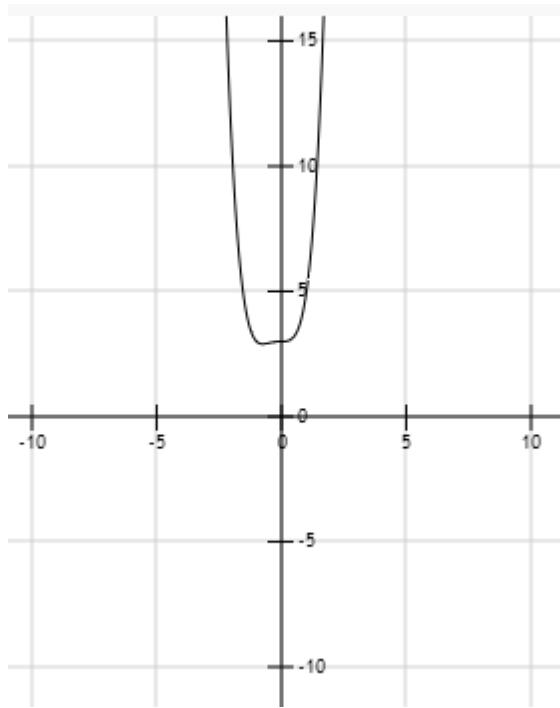
Find all the factors of both the constant of the function and leading coefficient and plug them into the Rational Zero Theorem to find all the possible zero values.



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Explanation#1



a. Graph as plotted to the left.

b. n is each to the degree of the polynomial. Polynomial functions have the maximum number of turns equal to $n - 1$. The degree (exponent value) is 4.

Therefore the maximum number of turns is $4 - 1 = 3$.

c. Use the Rational Zero Theorem to list all the real zeros.

Constant = 3 Leading Coefficient = 1

Constant factors include $(\pm 1, \pm 3)$

Leading coefficient factor (± 1)

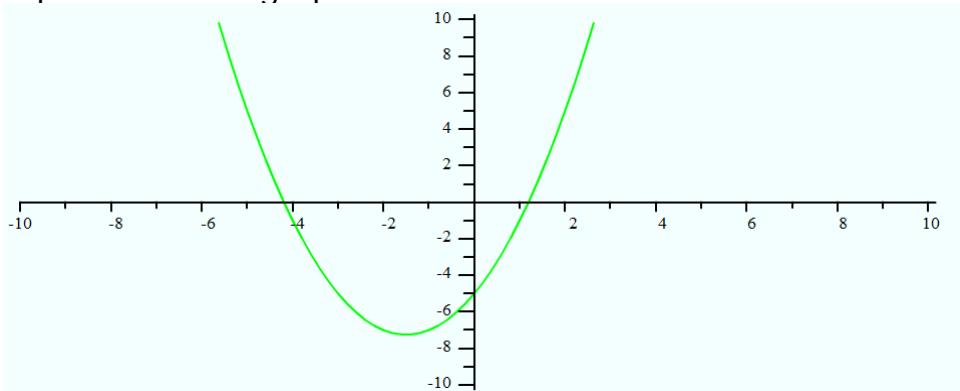
Plug values into

$$\begin{array}{ll} \pm 1 & \pm 3 \\ 1 & 1 \end{array}$$

This means all possible zeros are $\pm 1, \pm 3$.

Explanation#2

a. Plot the points on the graph.



b. n value = 2 (x^2) Therefore the maximum number of turns is $2 - 1 = 1$.



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c. Use the Rational Zero Theorem to list all the real zeros.

Constant = -5 Leading Coefficient = 1

Constant factors include ($\pm 1, \pm 5$)

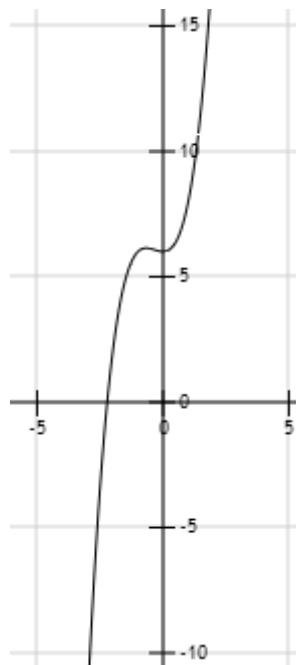
Leading coefficient factor (± 1)

Plug values into

$$\begin{array}{cc} \underline{\pm 1} & \underline{\pm 5} \\ 1 & 1 \end{array}$$

This means all possible zeros are $\pm 1, \pm 5$.

Explanation#3



a. Plot the points on the graph.

b. n value = 3 (x^3) Therefore the maximum number of turns is $3 - 1 = 2$.

c. Use the Rational Zero Theorem to list all the real zeros.

Constant = +6 Leading Coefficient = 1

Constant factors include ($\pm 1, \pm 2, \pm 3, \pm 6$)

Leading coefficient factor (± 1)

Plug values into

$$\begin{array}{cccc} \underline{\pm 1} & \underline{\pm 2} & \underline{\pm 3} & \underline{\pm 6} \\ 1 & 1 & 1 & 1 \end{array}$$

This means all possible zeros are $\pm 1, \pm 2, \pm 3, \pm 6$.

