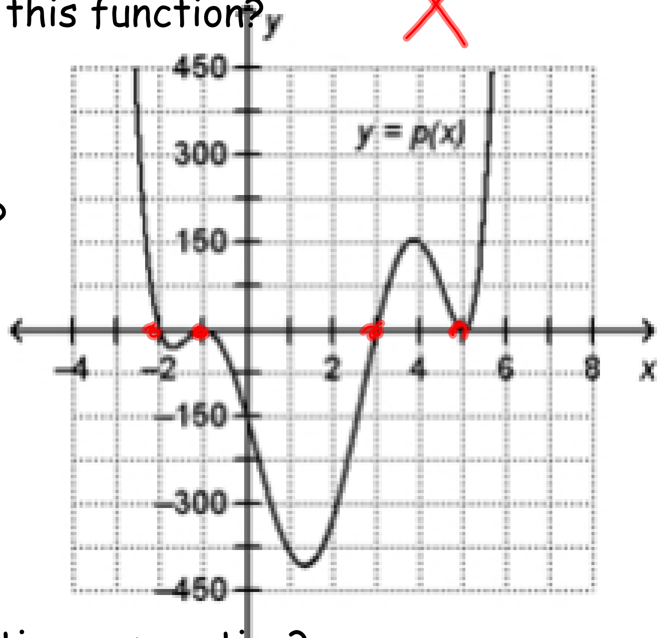
1 2 1 2 ← counting degrees x^6

What are the distinct zeros of this function?

-2, -1, 3, 5



Which zeros have a multiplicity?

-1, 5

$x = -1$
$+1 \quad +1$
$(x+1)^2 = 0$

Is the degree even or odd?

Even

Is the leading coefficient positive or negative?

Positive

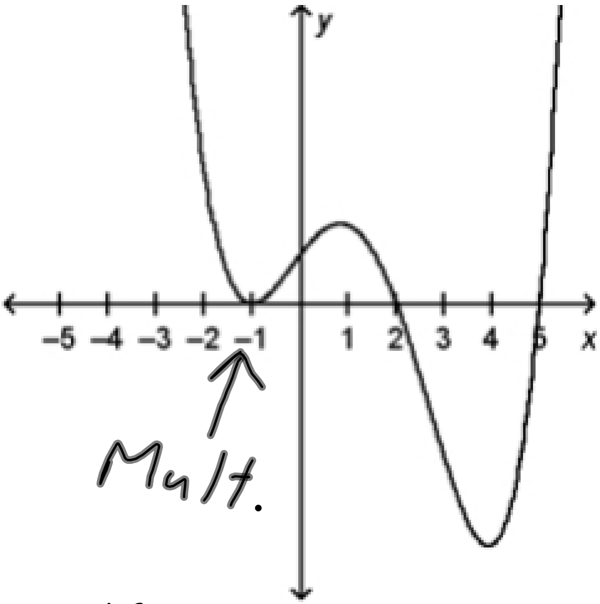
What degree is this polynomial? 6

What are the zeros?

-1 , 2 , 5

Which ones have a multiplicity?

-1



What is a possible polynomial in factored form?

$f(x) = (x+1)^2(x-2)(x-5)$

$f(x) = (x+1)(x+1)(x-2)(x-5)$

Y

On which of the following intervals is the average rate of change of the function $f(x) = x^3 - 4x$ the greatest?

A) $-3 \le x \le -1$ $= 9$

B) $-1 \le x \le 1$ -3

C) $1 \le x \le 3$ $= 9$

D) $3 \le x \le 5$ $= 45$

X_1 X_2

$$\text{Slope} = \text{Avg R.o.c.} = \frac{Y_2 - Y_1}{X_2 - X_1}$$

$f(x) = x^3 - 4x$

$y = x^3 - 4x$

A) $X_1 = -3$ $Y_1 = -15$

$X_2 = -1$ $Y_2 = 3$

$Y_1 = (-3)^3 - 4(-3)$

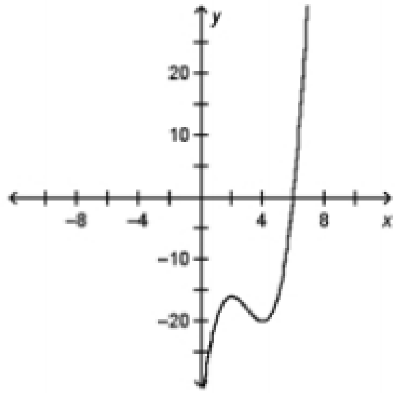
$-27 + 12 = -15$

$$\frac{3-(-15)}{-1-(-3)} = \frac{18}{2} = 9$$

$Y_2 = (-1)^3 - 4(-1)$

$= -1 + 4 = 3$

The graph of $p(x) = x^3 - 9x^2 + 24x - 36$ is shown.



a) Identify a possible zero of the function $p(x)$.

6

b) Prove that it is actually a zero by using the equation of the function $p(x) = x^3 - 9x^2 + 24x - 36$. $= 0$

$$p(6) = 6^3 - 9(6)^2 + 24(6) - 36$$
$$216 - 324 + 144 - 36 = 0$$

c) Write the function as the product of a linear factor and a quadratic factor.

$$p(x) = (x-6)(x^2-3x+6)$$

$$
\begin{array}{r|l}
 & x^2 - 3x + 6 \\
\hline
x-6 & x^3 - 9x^2 + 24x - 36 \\
 & x^3 - 6x^2 \\
\hline
 & -3x^2 + 24x - 36 \\
 & -3x^2 + 18x \\
\hline
 & 6x - 36 \\
 & 6x - 36 \\
\hline
 & 0
\end{array}
$$

d) Algebraically confirm that the zero is not a repeated zero.

$\cancel{(x-6)^2}$

$$6^2 - 3(6) + 6$$
$$36 - 18 + 6 = 24$$

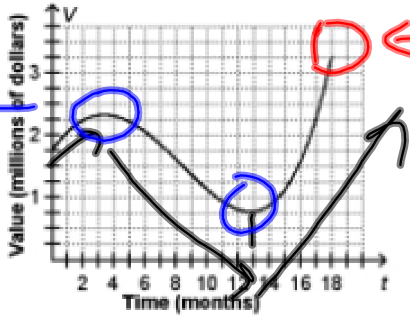
e) Explain why the function cannot be factored further over the set of real numbers.

Because it doesn't cross the x-axis at more than one point

there is only one real zero.

The graph shows a function that models the value V, in millions of dollars, of a stock portfolio as a function of time t, in months, over an 18-month period.

2.5



Not Local Maximum

Local

a. For what values of t is the function increasing? For what values of t is the function decreasing? Approximate the endpoints of the intervals to the nearest 0.5 month.

Increasing: $0 \to 3.5$, $13 \to 18$

Decreasing: $3.5 \to 13$

b. Interpret the intervals found in part a, as they relate to the situation.

between 0 and 3.5 months the value of the stock increases from 1.75 to 2.25 million $

c. Identify the coordinates of any local maximums and local minimums. Approximate the t-values to the nearest 0.5 month and the V-values to the nearest 0.25 million dollars.

Local Maximum: (3.5, 2.25)

Local Minimum: (13, 0.75

d. Explain the significance of any local maximums and minimums in part c.

Max it is the point where the value stops increasing and starts decreasing.

e. What does the fact that the function is always positive indicate about the appropriateness of this model?

Because the value of a stock could never be negative.

$f(x) = (x-2)(x-3)(x+1)$

$x-2=0$ $\quad$ $x+1=0$

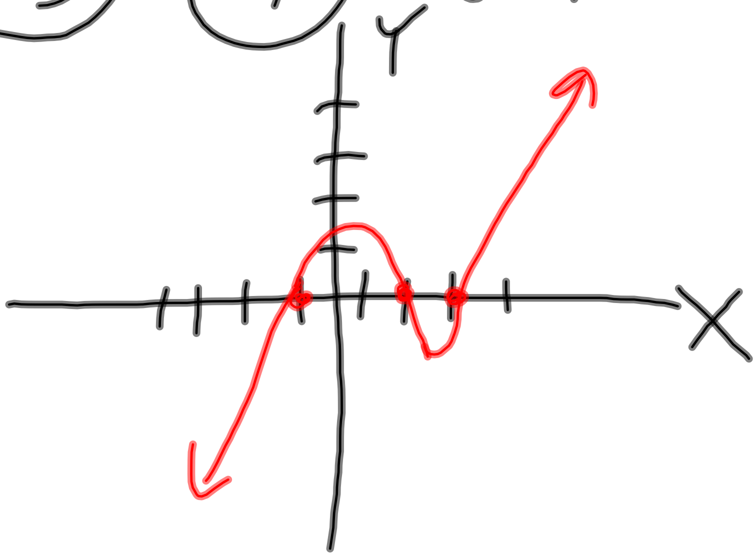
$+2 \quad +2$

Draw a Graph

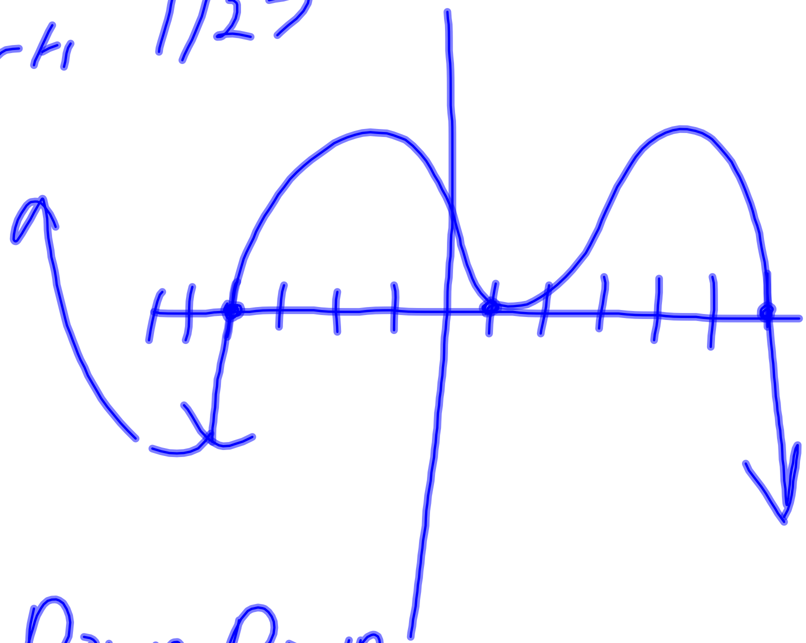
$2 \qquad 3 \qquad -1$

$X \cdot X \cdot X = X^3$

First Term



Bell Work 1/27



1) Zeros
-4, 1, 6

2) Multiplicity
1

End Behavior Down, Down

a) $x \to \infty$ $f(x) \to -\infty$ Down

b) $x \to -\infty$ $f(x) \to -\infty$ Down

c) $x \to -\infty$ $f(x) \to \infty$ Up

Example for Up!