Write the ONLY equation of this parabola if it also passes through the point (-1, 37).

$$y = a(x - h)^2 + k$$

(4,0)

$$y = a(x-4)^2$$
$$37 = a(-1-4)^2$$
$$37 = a \cdot 25$$
$$\frac{37}{25} = a$$
$$y = \frac{37}{25}(x-4)^2$$
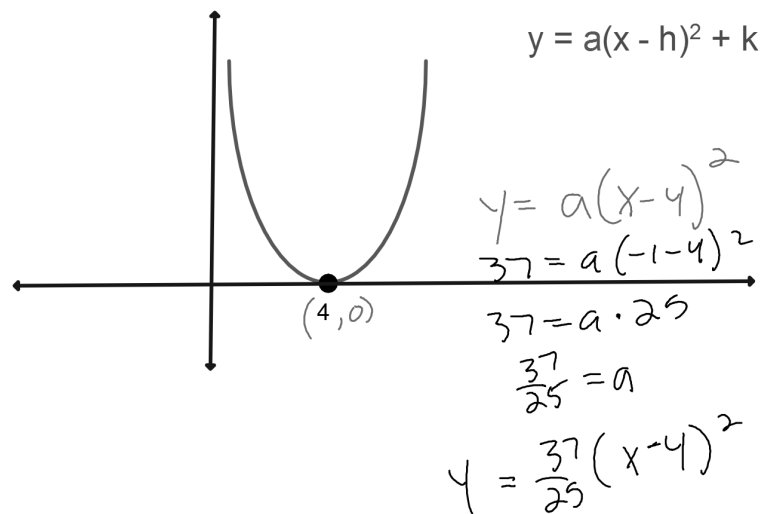
Just like Vertex Form of a Quadratic is $y = a(x - h)^2 + k$

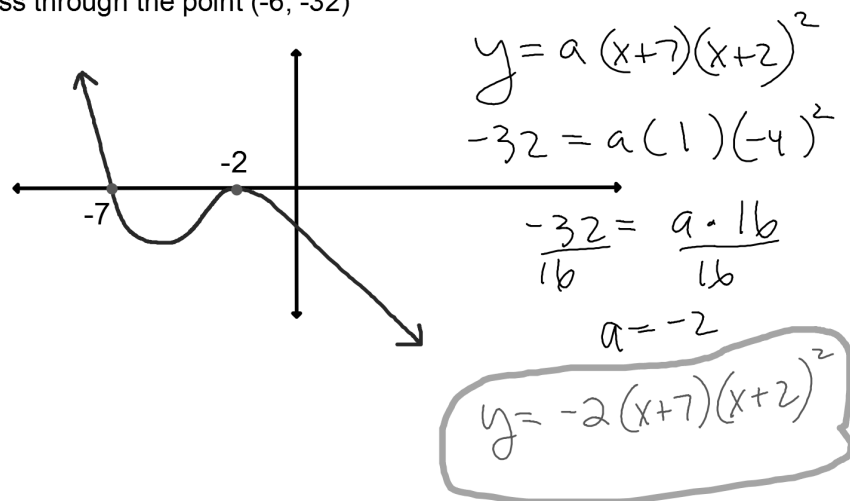All Polynomial equations also have an a.

EQ of a polynomial in factored form:

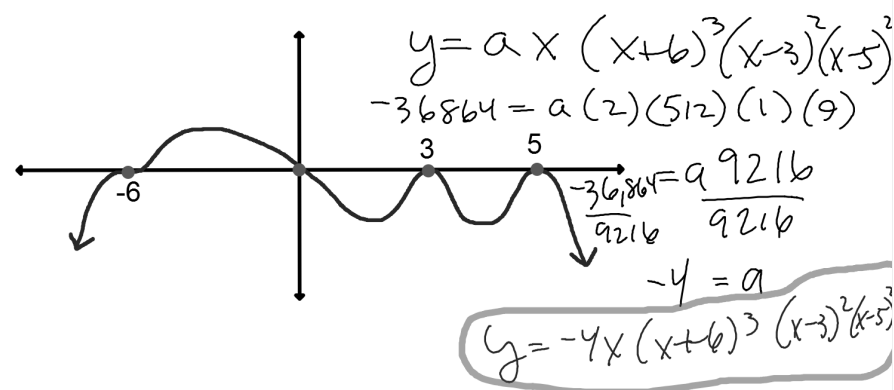$$f(x) = a(x - h)^n(x - j)^m(x - k)^p........$$

How do you find a? You need one more piece of information

Any point on the graph except an x-intercept.

Write the only equation of this polynomial if it must pass through the point (-6, -32)

-7   -2

$$y = a(x+7)(x+2)^2$$
$$-32 = a(1)(-4)^2$$
$$\frac{-32}{16} = \frac{a \cdot 16}{16}$$
$$a = -2$$
$$y = -2(x+7)(x+2)^2$$

Write the only equation of this polynomial if it must pass through the point (2, -36864)

-6   3   5

$$y = ax(x+6)^3(x-3)^2(x-5)^2$$
$$-36864 = a(2)(512)(1)(9)$$
$$\frac{-36864}{9216} = a\frac{9216}{9216}$$
$$-4 = a$$
$$y = -4x(x+6)^3(x-3)^2(x-5)^2$$

Write a possible equation of a polynomial with the given zeros. Give your answer in Standard Form.
Single Zeros at -6 and 7

$y = (x+6)(x-7)$
$y = x^2 - x - 42$

$$\begin{array}{c|c|c}
 & x & +6 \\
\hline
x & x^2 & 6x \\
\hline
-7 & -7x & -42 \\
\end{array}$$

Write a possible equation of a polynomial with the given zeros. Give your answer in Standard Form.
Zeros are 5(single zero) and -2(double zero)

$y = (x-5)(x+2)^2$
$(x-5)(x^2+4x+4)$

$$\begin{array}{c|c|c|c}
 & x^2 & +4x & +4 \\
\hline
x & x^3 & +4x^2 & +4x \\
\hline
-5 & -5x^2 & -20x & -20 \\
\end{array}$$

$y = x^3 - x^2 - 16x - 20$

Write the ONLY equation of a polynomial with the given zeros. Give your answer in Standard Form with the proper value of a.
Zeros are 1, -4, 2   The point (-3, 200) is on the graph.

these are all single zeros.

$y = a (x-1)(x+4)(x-2)$

$200 = a(-4)(1)(-5)$

$\dfrac{200}{20} = \dfrac{20a}{20}$

$a = 10$

$y = 10(x-1)(x+4)(x-2)$
$y = 10(x^3 + x^2 - 10x + 8)$
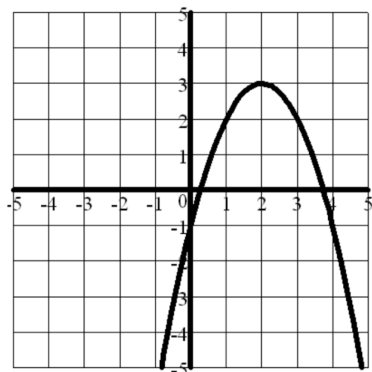$y = 10x^3 + 10x^2 - 10x + 80$

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

$(x^2 + 3x - 4)(x-2)$

$$\begin{array}{c|c|c|c}
 & x^2 & +3x & -4 \\
\hline
x & x^3 & +3x^2 & -4x \\
\hline
-2 & -2x^2 & -6x & +8 \\
\end{array}$$

You can now finish Hwk #25

Practice Sheet Graphs of Polynomials

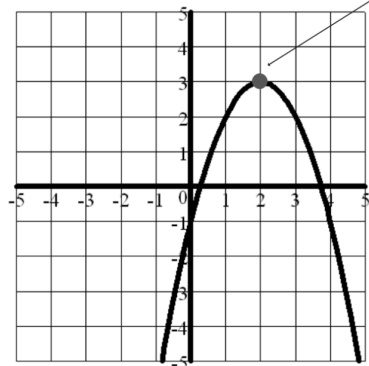What is the maximum of this function?

3

When does this maximum occur?

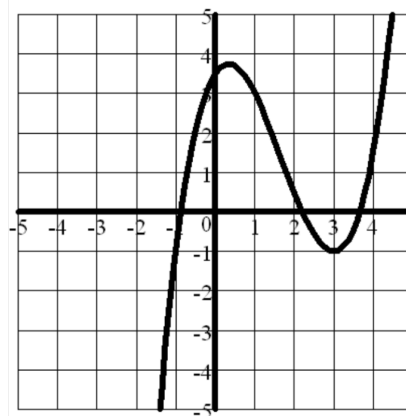when x = 2

What is the minimum of this function?

It has none

When asked for the value of a function, or what a function equals, you are being asked for **the y-coordinate**

The **x-coordinate** of a point tells us when a certain y-value occurs.

This point is called the Absolute Maximum of the function.

It is the highest point anywhere on the entire graph.

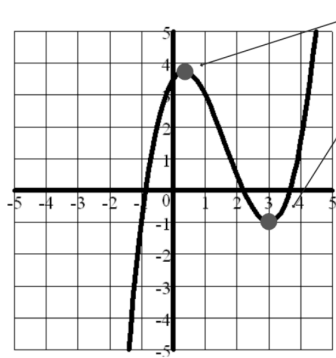
What is the Absolute Maximum of this function?

It has none

(this graph doesn't have a highest point, it goes up forever)

What is the Absolute Minimum of this function?

It has none

(this graph doesn't have a lowest point, it goes up forever)

What would you call these two points?

Relative Maximum and Relative Minimum

Other books/authors use this terminology:
Local Max/Min

Together, Maximums and Minimums are called EXTREMA