Bellwork

Factor each of the following expressions completely:

1. $-x^2 + 3x + 70$

2. $15x^2 + 13x + 2$

Review on Factoring Expressions

Equation is given in standard form:

$$y = ax^2 + bx + c$$

Step 1: Multiply a times c.
Step 2: Factor out ac by completing the U.
Step 3: Select the factors that combine by the second sign to get the middle number.
Step 4: Remove the middle term and replace it with the 2 terms found in Step 3.
Step 5: Group first 2 terms, and last 2 terms.
Step 6: Factor out the GCF's
Step 7: Write the factored version and check!

Basic Concepts VS. Specific Concepts

When graphing, if possible, we needed to see:

1. x-intercept(s)
2. y-intercept
3. Vertex

Now algebraically, we need to identify:

1. The zeros of the function
2. The Axis of Symmetry
3. The Extreme Value

Definitions

Zeros:

The zeros of a function are the values of x that form the x-intercepts.

Example: (-5,0) means the zero is -5.

Axis of Symmetry:

Still finding this using x = -b/2a

Extreme Value:

Defining if the vertex is a Maxima or Minima, then identifying its value .

Identifying the Zeros of a Function

IF the expression is UNFACTORABLE:

Plug into the following expression and simplify where possible...

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

IF the expression can be factored:

Step 1: Factor the expression completely.

Step 2: Set each factor = 0.

Step 3: Solve for the variable.

NOTE: These could also be referred to as the **ROOTS** of the function.

Examples

Identify the zeros of the given equations:

1. $f(x) = 2(x+5)(x-6)$ 2. $h(t) = -3t^2 + 5t + 1$

Examples

Find the Axis of Symmetry for each of the given functions:

3. $A(t) = 2t^2 + 8t - 9$

4. $s(t) = 5t^2 - 7t + 51$

Identifying the Extreme Value of a Function

Procedure:

Step 1: Identify if the function has a Maxima or a Minima.

Leading Coefficient is...

+ then we have a Minima

- then we have a Maxima

Step 2: Find the AOS of the function.

Step 3: Plug the AOS into the function.

Examples

Identify the Extreme Value in each of the following functions:

5. $y = x^2 + 6x - 8$

6. $y = -3x^2 + 9x + 7$

Examples

Without graphing the following functions identify each of the following:

A. The zeros of the function.

B. The axis of Symmetry.

C. The extreme value.

7. $A(x) = -x^2 - 6x + 2$

8. $h(t) = -2t^2 + 3t - 1$