**Using the Remainder Theorem to Evaluate Polynomials:**

What does the polynomial equal when I substitute in a particular x-value?

Steps:

 1.) Use the given x-value and place in your "\_\_\_."

 2.) Then perform \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 3.) The value of the polynomial when evaluated at

 that x-value is the value of your \_\_\_\_\_\_\_\_\_\_.

Example: Use the Remainder Theorem to determine the value of f(-5) for the polynomial \_\_\_\_\_\_\_\_\_\_\_.

The Remainder Theorem can also be used to **determine if a number is a zero**.

Steps:

 1.) Use the given x-value and place in your "box."

 2.) Then perform synthetic division.

 \*If the remainder = \_, the x-value is a \_\_\_\_.

 \*If the remainder ≠ \_, the x-value is \_\_\_ a

 \_\_\_\_.

Example: Use the Remainder Theorem to determine if x = 2 is a zero of the polynomial \_\_\_\_\_\_\_\_\_\_\_.

The Factor Theorem

If a polynomial is divided by a divisor (\_\_\_\_\_) and the resulting remainder = \_, then (x - c) is a factor.

\*By default, we also know that x = c is a zero.

Steps:

1. Set the \_\_\_\_ = 0 and solve. Place the x-

value and place in your "box."

 2.) Then perform synthetic division.

 \*If the remainder = \_, the (x – c) is a \_\_\_\_.

 \*If the remainder ≠ \_, the (x – c) is \_\_\_ a

 \_\_\_\_.

Example: Use the Factor Theorem to determine if x - 1 is a factor of the polynomial \_\_\_\_\_\_\_\_\_\_\_.

We can also use the Factor theorem to help us factor polynomials completely that don't factor from the start.

Steps:

1.) Use the given \_\_\_\_\_\_ to synthetically divide.

2.) Factor the resulting polynomial using the appropriate \_\_\_\_\_\_\_\_\_\_\_.

\*Don't forget to \_\_\_\_\_\_\_ the given factor in your answer since it must be \_\_\_\_\_\_\_\_\_ to the original polynomial.

Example: Factor the polynomial function \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ completely given that x - 2 is a factor.