Math 3 4.7 Remainder & Factor Theorems Unit 4

*EQ: How can you use the remainder and factor theorems to determine if a factor is a root of a polynomial?*

Remainder Theorem: When we divide a polynomial *f(x)* by a divisor *(x – c)*, the remainder, *r*, equals *f(c).*

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| **Using Synthetic Division:** | **Using the Remainder Theorem:** |
| What is the remainder when 2x2 – 5x – 1 is divided by x – 3? | What is the remainder when 2x2 – 5x – 1 is divided by x – 3? |

**Example 1:** Use the remainder theorem to determine the remainder of the following division problems.

1. 
2. 
3. 
4. 

Factor Theorem: If we calculate *f(c)* and it equals 0, that means the remainder is 0, and *(x – c)* must be a factor of the polynomial

* Knowing that x – c is a factor is the same thing as knowing that *c* is a root (and vice versa).
* The factor “x – c” and the root “c” are the same thing

**Example 2:** Determine whether each binomial is a factor of 

1. 
2. 

**Example 3:** Consider the polynomial $P\left(x\right)= x^{3}+kx^{2}+x+6$. Find the value of k so that x + 2 is a factor of P.

**Example 4:** When you divide $P\left(x\right)=x^{3}+4x^{2}-2x+k$ by$ \left(x-3\right)$, the remainder is -2. What is the remainder of P(x) when you divide by $\left(x+2\right)$?

Homework 4.7: Remainder & Factor Theorems Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Math 3

**Directions:** Use the Remainder Theorem to evaluate each function at the given value.







**Directions:** State if the given binomial is a factor of the given polynomial.









**Directions:** Divide the following.



