Write a polynomial in standard form given the following zeros:

1. $\{-4, 2i\}$

2. $\{0, -\sqrt{3}\}$

3. {-3 with a multiplicity of 4}

Dividing Polynomials

1st Method: Long Division

1. Divide $\left(x^2+3x+1\right)\div\left(x-4\right)$

2. $(r-3)\overline{)r^3-9r^2+27r-28}$

3. $\left(x^2+3x+8\right)\div\left(x+4\right)$

4. $\left(3x-2\right)\overline{)3x^4-5x^3+2x^2+3x-2}$

When you have no remainder, we say

_____ and _____ are FACTORS of

_____

Unit 4 Day 8 – Dividing Polynomials

Warm Up

Divide using long division.

1. $(x^3 + 7x^2 + 14x + 3) \div (x + 2)$

2. $(42x^2 - 33) \div (7x + 7)$

1. Go to YouTube
2. In search box type **"Synthetic Division & Remainder Theorem"**
3. Choose the 2nd video & watch the first **10 minutes** only

2nd Method: Synthetic Division

1. Divide $3x^3 - 4x^2 + 2x - 1$ by $x + 1$

Setup:

NOTE: Synthetic Division only works when _____

2. $\dfrac{x^5 - 3x^2 - 20}{x - 2}$

3. Divide $\left(r^3 - 9r^2 + 27r - 28\right)$ by $(r - 3)$

4. $\left(2m^4 - 5m^3 - 10m + 8\right)(m - 3)^{-1}$

Remainder Theorem: If a polynomial is divided by (x - a), then the remainder is f(a).

Use division to find f(- 4) if $f(x) = x^4 - 5x^2 + 4x + 12$.

Use division to find f(- 1) if $f(x) = 2x^4 + 6x^3 - 5x^2 - 60$.

Factor Theorem: If a polynomial is divided by (x - a) and the remainder is 0, then (x - a) is a factor of the polynomial.

Use division to determine if (x - 1) is a factor of $x^3 - x^2 + 2x - 2$.

Use division to determine if (x + 3) is a factor of $2x^3 - 4x + 5$.