Lesson 54. Warm Up (Clickers)

1. Factor: x³ + 125

2. Solve for x: $-3x^2 + 4x - 9 = 2$

Lesson 5.4 Dividing Polynomials

<u>Essential Understanding</u>: You can divide polynomials using steps that are similar to the long-division steps that you use to divide whole numbers.

Numerical lang division and	nahmamial lang division are similar
Numerical long division and	polynomial long division are similar.

Numeric	al Long Division	Polynomial L	ong Division
$ \begin{array}{r} 32\\ 21)\overline{672}\\ \underline{63}\\ 42\\ \underline{42}\\ 0 \end{array} $	21 divides into 67 3 times 21 divides into 42 2 times		(2x + 1) divides into $(6x^2 + 7x) 3x$ times (2x + 1) divides into (4x + 2) 2 times

The remainder from each division above is 0, so 21 is a factor of 672 and 2x + 1 is a factor of $6x^2 + 7x + 2$.

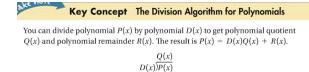
Ex. Use polynomial long division to divide $4x^2 + 23x - 16$ by x + 5. What is the quotient and remainder?

Ex. Use polynomial long division to divide $3x^2 - 29x + 56$ by x - 7. What is the quotient and remainder?

Ex. Use polynomial long division to divide $5x^2 + 2x + 3$ by x + 1. What are the quotient and remainder?

1 Use polynomial long division to divide the following polynomial by x + 5. $x^2 - 3x - 40$

2 Divide the following polynomial by x - 4: $x^3 - 13x - 12$



 $\frac{1}{R(x)}$

If R(x) = 0, then P(x) = D(x)Q(x) and D(x) and Q(x) are factors of P(x).

To use long division, P(x) and D(x) should be in standard form with zero coefficients where appropriate. The process stops when the degree of the remainder, R(x), is less than the degree of the divisor, D(x).

Ex. Is $x^2 + 1$ a factor of $3x^4 - 4x^3 + 12x^2 + 5$? If it is, write P(x) as a product of two factors.

Ex. Is x - 2 a factor of P(x) = $x^5 - 32$? If it is, write P(x) as a product of two factors.

Ex. Is $x^4 - 1$ a factor of P(x) = $x^5 + 5x^4 - x - 5$? If it is, write P(x) as a product of two factors.

Ex. The polynomial $x^3 + 7x^2 - 38x - 240$ expresses the volume in cubic inches, of the shadow box shown. What are the dimensions of the box?

