

Name: _____ Hour: _____ Date: _____

Factoring Polynomials *Completely* Notes

Recall from Monday – Factor out the GCF of the following polynomials.

1) $15y^3 - 18y^2 + 3y - 6$

GCF = 3

$$3(5y^3 - 6y^2 + y - 2)$$

2) $32x^4 - 8x^3 + 16x^2$

GCF: $8x^2$

$$8x^2(4x^2 - x + 2)$$

Sometimes after we factor the GCF out of the polynomial, the part that is leftover in the parentheses is quadratic and can be factored !

Let's refresh our memory on how to factor a quadratic.

Standard Form of a Quadratic:

$$ax^2 + bx + c$$

Method for Factoring:

$$(2x - 3)(x + 2)$$

Factor the following quadratics:

1) $x^2 - 8x + 15$

$$(x - 3)(x - 5)$$

2) $2x^2 + x - 6$

First step factor out GCF

Now, let's finally **FACTOR COMPLETELY**.

1) $3x^4 - 18x^3 + 24x^2$

$$3x^2(\underline{x^2 - 6x + 8})$$

$$\begin{array}{r} 8 \\ -4 \quad -2 \\ \hline -6 \end{array}$$

$$3x^2(x-4)(x-2)$$

While we're at it, let's find the zeros after factoring the next couple completely.

2) $12r^3 - 64r^2 + 80r$

$$4r(\underline{3r^2 - 16r + 20})$$

$$\begin{array}{r} 60 \\ 3r \quad 10 \\ -10 \quad 6-2 \\ \hline -16 \end{array}$$

$$4r(3r-10)(r-2)$$

3) $x^3 - 9x$

$$x(x^2 - 9)$$

$$\begin{aligned} a &= 1 \\ b &= 0 \\ c &= -9 \end{aligned}$$

$$\begin{array}{r} -9 \\ -3 \quad 3 \\ \hline 0 \end{array}$$

$$x(\underline{x-3})(\underline{x+3})$$

Find the zeros:

$$x=0$$

$$x-3=0$$

$$x+3=0$$

$$x=3$$

$$x=-3$$