Name:_____ Date:_____

Notes
Algebra Section 9.8
Pages 606-613

Goal: "You will factor polynomials completely"

Ex: $2x(x + 4) - 3(x + 4)$

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

Ex: $4x(x - 3) + 5(x - 3)$

$(x - 3)(4x + 5)$

Ex: $3y^2(y - 2) + 5(2 - y)$

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

Ex: $2y^2(y - 5) - 3(5 - y)$

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

Ex: $x(x - 2) + (x - 2)$

$(x + 1)(x - 2)$

Factor by grouping:

Ex: $x^3 + 3x^2 + 5x + 15$

$(x + 3)(x^2 + 5)$

Ex: $y^2 + y + yx + x$

$(y + 1)(y + x)$

Ex: $a^3 + 3a^2 + a + 3$

$(a + 3)(a^2 + 1)$

Ex: $x^3 + 2x^2 + 8x + 16$

$(x - 3)(4x + 5)$

Ex: $r^2 + 4r + rs + 4s$

$(r + 4)(r + s)$

Factoring by grouping (rearrange first):

Ex: $x^3 - 6 + 2x - 3x^2$

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

Ex: $y^2 + 2x + yx + 2y$

$(y+2)(y+x)$

Ex: $x^3 - 10 - 5x + 2x^2$

$(x^2-5)(x+2)$

Factor completely:

Ex: $n^2 + 2n - 3$

$\boldsymbol{(n+3)(n-1)}$

Ex: $4x^3 - 44x^2 + 96x$

$\boldsymbol{4x(x-8)(x-3)}$

Ex: $50h^4 - 2h^2$

$\boldsymbol{2h^2(5h+1)(5h-1)}$

Ex: $3x^3 - 12x$

$\boldsymbol{3x(x+2)(x-2)}$

Ex: $2y^3 - 12y^2 + 18y$

$\boldsymbol{2y(y-3)^2}$

Ex: $m^3 - 2m^2 - 8m$

$\boldsymbol{m(m+2)(m-4)}$

Ex: $x^2 - 4x + 3$

$\boldsymbol{(x-3)(x-1)}$

Ex: $3x^3 - 21x^2 - 54x$

$\boldsymbol{3x(x-9)(x+2)}$

Ex: $x^4 - x^2 + 3x^2 - 3$

$\boldsymbol{(x^2+3)(x-1)(x+1)}$

Ex: $8d^3 + 24d$

$\boldsymbol{8d(d^2+3)}$

Solve:

Ex: $3x^3 + 18x^2 = -24x$

$\mathbf{3x(x+4)(x+2)}$
$\mathbf{x = 0 \;\; x = -4 \;\; x = -2}$

Ex: $w^3 - 8w^2 + 16w = 0$

$\mathbf{w(w-4)(w-4)}$
$\mathbf{w = 0 \;\; w = 4}$

Ex: $c^3 - 7c^2 + 12c = 0$

$\mathbf{c(c-3)(c-4)}$
$\mathbf{c = 0 \;\; c = 3 \;\; c = 4}$

Ex: $2x^3 - 18x^2 = -36x$

$\mathbf{2x(x-6)(x-3)}$
$\mathbf{x = 0 \;\; x = 6 \;\; x = 3}$

Terrarium A terrarium in the shape of a rectangular prism has a volume of 4608 cubic inches. Its length is more than 10 inches. The dimensions of the terrarium are shown. Find the length, width and the height of the terrarium.

$w(w+4)(36-w) = 4608$
$(w^2+4w)(36-w) = 4608$
$36w^2 - w^3 + 144w - 4w^2 = 4608$
$-w^3 + 32w^2 + 144w - 4608 = 0$
$-1(w^3 - 32w^2 - 144w + 4608) = 0$
$-1(w^2 - 144)(w - 32) = 0$
$-1(w+12)(w-12)(w-32) = 0$
$w = -12 \;\; w = 12 \;\; w = 32$

Length has to be more than ten inches so w cannot = 32
w must be 12. 12 in by 16 in by 24 in