MATH 0270/1314 COLLEGE ALGEBRA Week 8 Monday 3/18/1

(1) $4a^4 - 12a^3 + 10a^2$

$= 2a^2(2a^2 - 6a + 5)$

☆ each term has at least $2a^2$

☆ first thing to try in factoring is common factor.

☆ always check your work by multiplying out your answer and see if you get what you started with.

(2) $3a(2a+3) - 5(2a+3)$

$= (3a-5)(2a+3)$

☆ factoring by grouping also has this step.

(3) $15x^2 - 3x$

$= 3x(5x-1)$

(4) $35x^3 + 14x^2 - 49x$

$= 7x(5x^2 + 2x - 7)$

$= 7x(5x+7)(x-1)$

$5x^2 - 5x + 7x - 7$

(5) $x^2 - 49$

$= (x+7)(x-7)$

(6) $4x^2-25$

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

(7) $9x^2-100$

$=(3x+10)(3x-10)$

(8) $16x^2+49$

☆ the sum of two squares is prime

(cannot be factored anymore)

(9) x^3-2x^2+3x-6

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

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

☆ four terms = factoring by grouping

☆ always end up with a binomial multiplied by a binomial as the result of factoring by grouping

(10) $6x^3+10x^2-21x-35$

$=2x^2(3x+5)-7(3x+5)$

$=(2x^2-7)(3x+5)$

(11) $10x^3 + 12x^2 - 15x - 18$

$= 2x^2(5x+6) - 3(5x+6)$

$= (2x^2-3)(5x+6)$

(12) $x^3 - 27$

$= (x-3)(x^2+3x+9)$

$\boxed{\text{S}}$ame $\quad$ Opposite $\quad$ always $\boxed{\text{P}}$ositive ← memory device for the sign.

☆ the difference & sum of cubes both can be factored into a binomial multiplied by a trinomial

(13) $8x^3 + 125$

$= (2x+5)((2x)^2 - (2x)\cdot 5 + 5^2)$

$= (2x+5)(4x^2 - 10x + 25)$

$$a^3 - b^3 = (a-b)(a^2+ab+b^2)$$
$$a^3 + b^3 = (a+b)(a^2-ab+b^2)$$

(14) $x^2 + 12x + 35$

$= (x+5)(x+7)$

☆ the sign in the last term is positive means you have the same signs in the binomials, if it's negative, signs in the binomials are different.

(15) $x^2 - 2x - 35$

$= (x-7)(x+5)$

1, -35

-1, 35

5, -7

-5, 7

☆ what two number multiply to get the last number and add to get the second number.

(16) $x^2 - 12x + 35$

$= (x-5)(x-7)$

(17) $x^2 - 5x - 24$

$= (x-8)(x+3)$

(18) $x^2 + 10x - 24$

$\cancel{= (x-4)(x-6)}$

$= (x+12)(x-2)$