Name: ___________________

HW After Test Unit 2

Algebra Review: Factoring & Evaluating Functions

Part A) Factoring Quadratics

Read the following example problem to review Solving by Factoring then complete the examples below.

Example $2x^2 + 5x - 12 = 0$

1) There is no GCF in this example.
2) a*c = 1st # * Last #
   a*c = **2 * -12 = -24**
3) ___ * ___ = a*c **8 * -3 = -24**
   ___ + ___ = b **8 + -3 = 5**
4) So then **$2x^2 + 5x - 12$**
   becomes **$2x^2 + 8x + -3x - 12$**
5) The GCF of $2x^2 + 8x$ is **2x**
   The GCF of $-3x - 12$ is **-3**
   So now our polynomial is
   $2x(x + 4) - 3(x + 4)$
   $(2x - 3)(x + 4)$
6) **$2x - 3 = 0$** **$x + 4 = 0$**
   $x = 3/2$ **$x = -4$**

Steps explained here:

1) Look for a GCF. If there is one, factor it out to the front.
2) Multiply a*c. Remember "a" is the 1st coefficient (the one in front of x^2) and "c" is the constant (the plain number).
3) Find two other numbers that multiply to equal a*c AND that also add up to equal b (the "b" term is the one with x).
4) Use those numbers to "bust the "b" (break up the "b" term) from our **original problem** into two pieces.
5) Factor by grouping.
   To do this, remember you factor out a GCF from the first two terms, then you factor out a GCF from the last two terms. Then, finish by creating a binomial from the two GCFs pulled together * the repeated binomial.
6) To solve, set each factor equal to zero and solve for x.

Solve by factoring. Show your Work! Use separate paper, if needed.
(Hint: Remember to ALWAYS look for a GCF first!!)

1. $0 = y^2 - 18y + 45$ ______________
2. $a^2 + 14a + 24 = 0$ ______________
3. $c^2 + 7c = 30$ ______________
4. $0 = 3y^2 + 24y + 45$ ______________
5. $3x^2 + 11x + 6 = 0$ ______________
6. $4x^2 - 11x - 3 = 0$ ______________
7. $2x^2 + x = 6$ ______________
8. $8x^3 + 3x = -10x^2$ ______________

Part B) Factoring Polynomials with Perfect Squares and Perfect Cubes

Difference of Squares

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

Difference of Cubes and Sum of Cubes

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

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

Examples: Identify the special factoring pattern shown. Then factor completely

Ex D: $2x^2 - 8$

GCF 1st $2(x^2 - 4)$

Diff. of Squares $2(x - 2)(x + 2)$

Ex F: $3x^3 - 81$

GCF 1st $3(x^3 - 27)$

Diff. of Cubes $3(x - 3)(x^2 + 3x + 9)$

Identify the special factoring pattern shown. Then, factor each <u>completely</u>. (Hint: Remember to ALWAYS look for a GCF first – and be sure you can't factor any further!)

9. $x^2 - 16$ = _______________

10. $4x^2 - 16$ = _______________

11. $x^3 + 27$ = _______________

12. $x^3 - 64$ = _______________

13. $3x^3 - 24$ = _______________

14. $x^4 - 81$ = _______________

15. $16x^2 + 9$ = _______________

16. $8x^3 + 125$ = _______________

17. $32x^2 - 18$ = _______________

18. $16 - 2x^3$ = _______________

Part C) Evaluating Functions

Example: Find f(4) given $f(x) = 2x^2 - 7x + 5$.

$f(x) = 2x^2 - 7x + 5$ → $f(4) = 2(4)^2 - 7(4) + 5$ → $f(4) = 32 - 28 + 5$ → **$f(4) = 9$**

Substitute in x = 4 | Simplify the values | Combine Like Terms

Simplify the following completely given $f(x) = 2x^2 - 7x + 5$. Show your work!

19. $f(3)$ = ________

20. $f(-3)$ = ________

21. $f(3x)$ = ________________

22. $f(x + 3)$ = ________________

23. $f(-x)$ = ________________

24. $f(3 - 4x)$ = ________________