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Date _____
Algebra 2

Factoring by Grouping

Factor the following polynomials

1. $x^3 - 5x^2 + 2x - 10$

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

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

2. $x^3 + 3x^2 + 4x + 12$

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

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

3. $8x^3 + 2x^2 + 12x + 3$

$2x^2(4x+1) + 3(4x+1)$

$(2x^2+3)(4x+1)$

4. $6x^3 + 9x^2 + 6x + 9$

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

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

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

5. $4x^3 + 12x^2 - 3x - 9$

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

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

6. $x^3 + 12x^2 - 2x - 24$

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

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

7. $x^3 + 6x^2 - 3x - 18$

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

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

8. $x^3y^2 + 4x^2y^2 - 4x - 16$

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

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

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

9. $x^3 + 3x^2 - 9x - 27$

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

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

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

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

10. $8x^3 + 12x^2 - 2x - 3$

$4x^2(2x+3) - 1(2x+3)$

$(4x^2-1)(2x+3)$

$(2x+1)(2x-1)(2x+3)$

Solve the following equations:

11. $x^3 + 10x^2 - 9x - 90 = 0$

$x^2(x+10) - 9(x+10) = 0$

$(x^2-9)(x+10) = 0$

$(x+3)(x-3)(x+10) = 0$

$x+3=0$ $x-3=0$ $x+10=0$

$-3\ -3$ $+3\ +3$ $-10\ -10$

$x=-3$ $x=3$ $x=-10$

12. $27x^3 + 36x^2 - 12x - 16 = 0$

$9x^2(3x+4) - 4(3x+4) = 0$

$(9x^2-4)(3x+4) = 0$

$(3x+2)(3x-2)(3x+4) = 0$

$3x+2=0$ $3x-2=0$ $3x+4=0$

$-2\ -2$ $+2\ +2$ $-4\ -4$

$\frac{3x}{3} = \frac{-2}{3}$ $\frac{3x}{3} = \frac{2}{3}$ $\frac{3x}{3} = \frac{-4}{3}$

$x = \frac{-2}{3}$ $x = \frac{2}{3}$ $x = \frac{-4}{3}$