Academic Algebra 1

9.7 Notes - Factoring Special Cases

Date_____

Special Case #1: Factor. Can you see a pattern?

1) $x^2 - 10x + 25$

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

OR $(x-5)^2$

2) $9x^2 - 6x + 1$

$(3x-1)(3x-1)$

OR $(3x-1)^2$

3) $9x^2 - 12x + 4$

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

OR $(3x-2)$

4) $4x^2 + 20x + 25$

$(2x+5)(2x+5)$

OR $(2x+5)$

PERFECT SQUARE TRINOMIAL PATTERN

5) What is the Pattern?

* 1ST and Last terms are perfect squares

* Last term (c) is positive

* TAKE SQ ROOT (a) times SQ ROOT (c) AND DOUBLE IT TO MATCH THE MIDDLE TERM.

Special Case #2: Factor. Can you see a pattern?

6) $x^2 - 25$

$(x+5)(x-5)$

OR $(x-5)(x+5)$

7) $9x^2 - 4$

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

DIFFERENCE OF TWO SQUARES

8) What is the Pattern?

* ONLY 2 TERMS

* FIRST AND LAST TERMS ARE PERFECT SQUARES

* MUST BE SEPERATE WITH (-) SIGN.

Solve each equation by factoring. Check ALL SOLUTIONS.

9) $25x^2 + 40x + 16 = 0$

$(5x+4)(5x+4) = 0$

$5x+4 = 0$
$\quad -4 \quad -4$
$\dfrac{5x}{5} = \dfrac{-4}{5}$ $\boxed{x = \dfrac{-4}{5}}$

$C: 25(-4/5)^2 + 40(-4/5) + 16 = 0$

(Use Calc) $0 = 0 \checkmark$

10) $16x^2 - 25 = 0$

$(4x+5)(4x-5) = 0$

$4x+5 = 0 \qquad\qquad 4x-5 = 0$

$\boxed{x = -5/4} \qquad \boxed{x = 5/4}$

$C: 16\left[\dfrac{-5}{4}\right]^2 - 25 = 0 \qquad C: 16\left[5/4\right]^2 - 25 = 0$

$\qquad 0 = 0 \checkmark \qquad\qquad 0 = 0 \checkmark$

11) $4x^2 + 12x + 9 = 0$

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

$2x+3 = 0$
$\quad -3 \quad -3$
$\dfrac{2x}{2} = \dfrac{-3}{2}$ $\boxed{x = \dfrac{-3}{2}}$

$C: 4\left(-3/2\right)^2 + 12\left(-3/2\right) + 9 = 0$

12) $25x^2 - 4 = 0$

$(5x+2)(5x-2) = 0$

$5x+2 = 0 \qquad\qquad 5x-2 = 0$

$\boxed{x = -2/5} \qquad\qquad \boxed{x = 2/5}$

$C: 25\left(-2/5\right)^2 - 4 = 0 \qquad C: 25\left(\dfrac{2}{5}\right)^2 - 4 = 0$

$\qquad 0 = 0 \checkmark \qquad\qquad\qquad 0 = 0 \checkmark$

Solve by completely factoring and check all solutions.
(1st step is to always factor out any GCF- COMMON FACTOR)

13) $6x^3 + 30x^2 - 36x = 0$

$6x(x^2 + 5x - 6) = 0$

$6x(x+6)(x-1) = 0$

$\dfrac{6x}{6} = \dfrac{0}{6}$

$\boxed{x = 0}$

$C: 0 = 0 \checkmark$

$x+6 = 0$
$\boxed{x = -6}$

$C: 6(-6)^3 + 30(-6)^2 - 36(-6) = 0$

$-1296 + 1080 + 216 = 0$

$0 = 0 \checkmark$

$x-1 = 0$
$\boxed{x = 1}$

$C: 6(1)^3 + 30(1)^2 - 36(1) = 0$

$6 + 30 - 6 = 0$

$0 = 0 \checkmark$