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Date _____
Algebra II

Factoring Trinomials with Substitution

Factor the following expressions completely

1. $(x^2 + 5x)^2 - 2(x^2 + 5x) - 24$ $y = x^2 + 5x$

$$y^2 - 2y - 24$$
$$(y - 6)(y + 4)$$
$$(x^2 + 5x - 6)(x^2 + 5x + 4)$$
$$(x + 6)(x - 1)(x + 4)(x + 1)$$

2. $(x^2 - 2x)^2 - 11(x^2 - 2x) + 24$ $y = x^2 - 2x$

$$y^2 - 11y + 24$$
$$(y - 8)(y - 3)$$
$$(x^2 - 2x - 8)(x^2 - 2x - 3)$$
$$(x - 4)(x + 2)(x - 3)(x + 1)$$

3. $(x^2 - 3x)^2 - 14(x^2 - 3x) + 40$ $y = x^2 - 3x$

$$y^2 - 14y + 40$$
$$(y - 10)(y - 4)$$
$$(x^2 - 3x - 10)(x^2 - 3x - 4)$$
$$(x - 5)(x + 2)(x - 4)(x + 1)$$

$$4. (x^2 + 3x)^2 - 8(x^2 + 3x) - 20 \quad y = x^2 + 3x$$

$$y^2 - 8y - 20$$

$$(y - 10)(y + 2)$$

$$(x^2 + 3x - 10)(x^2 + 3x + 2)$$

$$(x + 5)(x - 2)(x + 2)(x + 1)$$

$$5. (x^2 - 7x)^2 - 2(x^2 - 7x) - 48 \quad y = x^2 - 7x$$

$$y^2 - 2y - 48$$

$$(y - 8)(y + 6)$$

$$(x^2 - 7x - 8)(x^2 - 7x + 6)$$

$$(x - 8)(x + 1)(x - 6)(x - 1)$$

$$6. (4x^2 + 5x)^2 - 5(4x^2 + 5x) - 6 \quad y = 4x^2 + 5x$$

$$y^2 - 5y - 6$$

$$(y - 6)(y + 1)$$

$$(4x^2 + 5x - 6)(4x^2 + 5x + 1)$$

$$x^2 + 5x - 24 \quad x^2 + 5x + 4$$

$$(x + 8)(x - 3) \quad (x + 4)(x + 1)$$

$$\frac{4}{4} \quad \frac{4}{4}$$

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