

Name: _____ Hour: _____ Date: _____

HONORS - Factoring Using the Quadratic Pattern Notes

What is the quadratic pattern?

Factoring a polynomial that is not quadratic like it was a quadratic

When do I use the quadratic pattern?

$$aX^{\text{even}} + bX^{\text{even}/2} + c$$

Ex:

$$X^4 + 2X^2 + 1$$
$$X^8 + 4X^4 + 3$$

Factor the following polynomials using the quadratic pattern:

1) $x^4 + 7x^2 + 6$

$$(x^2 + 6)(x^2 + 1)$$

$\frac{1}{2}$ the degree of the polynomial

Always make sure that you have factored completely!

3) $x^4 - 2x^2 - 8$

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

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

2) $x^4 - 3x^2 - 10$

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

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

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

Things to look for to make sure you are factoring completely:

- Is there a GCF?
- Is there a difference of squares?
- Is there a sum/diff of cubes?

$$\begin{array}{l} x^2 - 1 \\ x^2 - 4 \\ x^2 - 9 \end{array}$$

$$\begin{array}{l} x^2 - 16 \\ x^2 - 25 \\ x^2 - 36 \end{array}$$

Further examples:

5) $4x^4 + 32x^2 + 60$

$$4(x^4 + 8x^2 + 15)$$
$$4(x^2 + 5)(x^2 + 3)$$

6) $x^4 - 13x^2 + 36$

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

7) $x^6 + 6x^3 + 5$

$$(x^3 + 5)(x^3 + 1)$$
$$(x^3 + 5)(x + 1)(x^2 - x + 1)$$