

**NOTES: SECONDARY 2 HONORS**  
**QUADRATIC EXPRESSIONS (5.1A, 5.1B, 5.1C)**

**STARTER**

1. What is the standard form of a quadratic expression?	2. Factor $x^2 - 2x - 15$	3. Factor $6x^2 - 11x - 2$
4. Factor $4x^2 - 9$	5. Write the quadratic in vertex form $y = 2x^2 - 8x + 3$	6. Simplify $\sqrt{48x^3}$

Vocabulary

- A quadratic pattern can be found in other types of expressions and equations. If this is the case, we say these expressions, equations, or functions are \_\_\_\_\_.

Example: Determine if the following expressions are quadratic in nature. If it is quadratic in nature, rewrite the expression in quadratic form.

a.  $3x^8 + 4x^4 - 9$

b.  $-5x^{10} - 4x^5 + 2$

c.  $x^{\frac{1}{2}} + 4x^{\frac{1}{4}} - 3$

d.  $x^5 + 4x^2 - 2$

**When factoring expressions that are quadratic in nature, it is sometimes easier to rewrite the quadratic using “u” substitution before you factor.**

**STEP #1: DETERMINE IF THE EXPRESSION IS QUADRATIC IN NATURE.**

Example: Determine if the expression is quadratic in nature.

a.  $10x^4 + 11x^2 - 6$

b.  $3x^{\frac{1}{3}} - 8x^{\frac{1}{6}} + 4$

c.  $(x+1)^4 - 2(x+1)^2 - 15$

STEP #2: IDENTIFY WHAT “u =” THAT WOULD ALLOW YOU TO REWRITE THE EXPRESSION AS A QUADRATIC.

a.  $10x^4 + 11x^2 - 6$

b.  $3x^{\frac{1}{3}} - 8x^{\frac{1}{6}} + 4$

c.  $(x+1)^4 - 2(x+1)^2 - 15$

STEP #3: SUBSTITUTE “u =” INTO THE EXPRESSION.

a.  $10x^4 + 11x^2 - 6$

b.  $3x^{\frac{1}{3}} - 8x^{\frac{1}{6}} + 4$

c.  $(x+1)^4 - 2(x+1)^2 - 15$

STEP #4: FACTOR THE EXPRESSION USING THE DIFFERENT QUADRATIC FACTORING TECHNIQUES (GCF, difference of two squares, perfect square trinomial, “ac method”, guess and check)

a.  $10x^4 + 11x^2 - 6$

b.  $3x^{\frac{1}{3}} - 8x^{\frac{1}{6}} + 4$

c.  $(x+1)^4 - 2(x+1)^2 - 15$

STEP #5: REPLACE THE “u”.

a.  $10x^4 + 11x^2 - 6$

b.  $3x^{\frac{1}{3}} - 8x^{\frac{1}{6}} + 4$

c.  $(x+1)^4 - 2(x+1)^2 - 15$

**Now you try....**

1.  $8x^6 + 2x^3 - 15$

2.  $100x^8 - 121y^6$

3.  $4x^4 - 20x^2 + 25$

4.  $9x^{10} - 6x^5y + y^2$

5.  $12x^{\frac{2}{5}} - 17x^{\frac{1}{5}} + 6$

6.  $3x^{\frac{2}{3}} + 10x^{\frac{1}{3}} + 8$

7.  $81x^6 - 4$

8.  $2x - \sqrt{x} - 1$