

The TEST will be on: _____

Skills you should have mastered:

- Identify if an expression is quadratic in nature. Explain your reasoning in a complete sentence.
- Factor an expression that is quadratic in nature using “u” substitution.
- Simplify complex expressions. (Addition, subtraction, multiplying, and dividing)
- Find the conjugate of a complex number
- Graph a complex number on the complex plane and find the modulus.
- Find the discriminant and use the discriminant to determine the nature of the zeros.
- Find the zeros of a quadratic by the quadratic formula.
- Solve a quadratic equation using one of the five methods. (Choose the method that best fits the problem.)
- Concepts from Units 1-4. (These are fair game!!)

Determine if the quadratic expression is “quadratic in nature”. Explain your reasoning in a complete sentence.

1. $-5x^{10} - 4x^5 + 2$

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

3. $x^3 - 4x + 4$

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

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

6. $9x^{\frac{2}{3}} - 12x^{\frac{1}{3}} + 4$

Factor the following polynomials using “u” substitution.

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

6. $2(2x - 3)^2 + (2x - 3) - 1$

Simplify the following expressions. Remember that i should never be raised to a power or appear in the denominator of a fraction.

1. $-\sqrt{-50}$

2. $\sqrt{-28}$

3. $(4-5i)-(8-3i)$

4. $(4-5i)+(3-6i)$

5. $(3-5i)(2+3i)$

6. $(11+2i)(3-7i)$

7. i^{19}

8. i^{297}

9. i^{32767}

10. What is the conjugate of $6+6i$?

11. What is the conjugate of $-2+3i$?

12. $\frac{-8-3i}{-2i}$

13. $\frac{8-3i}{4+2i}$

14. $\frac{6i}{-3+i}$

Draw the complex number on the complex plane and then find the modulus.

1. $-6+2i$

2. $3+4i$

3. $8-4i$

Derive the quadratic formula from the standard form of a quadratic equation.

Calculate the discriminant for each quadratic and describe the nature of the roots. Then, find the zeros.

1. $2x^2 + 4x = 2$ 2. $-x^2 + 2x - 5 = 0$ 3. $4x^2 + 12x + 9 = 0$ 4. $x^2 + 8x + 12 = 0$

There are five different methods used to solve quadratic equations:

1. Square Root Method
2. Factoring Method
3. Completing the Square Method
4. Quadratic Formula Method
5. Graphing Method (from Unit 2)

1. $4x^2 + 81 = 0$ 2. $(x - 1)^2 - 5 = 44$ 3. $x^2 + 4x + 6 = 0$ 4. $4x^2 + 4x = 3$

5. $x^2 + 4 = 0$ 6. $2x^2 - 5x - 4 = 0$ 7. $x^2 + x - 30 = 0$ 8. $2(x + 3)^2 + 5 = 23$