

FOLLOW THESE INSTRUCTIONS:

- Do all of your work on a SEPARATE sheet of paper, using GRAPH PAPER whenever you are required to graph.
- Do your work in PENCIL only.
- In ALL cases, show your work. Only use the graphing calculator to verify your answers.
- These problems are due on the FIRST day of classes.
- This assignment is the first grade for the marking period and will be graded on following directions, correctness of answers, and turning the work in on time. Late work will be marked down SIGNIFICANTLY.

I. Polynomials and operations on real and imaginary numbers.

A. Simplify these expressions

1. $\sqrt{-100}$

2. $\sqrt{-4 \cdot -9}$

3. $(i\sqrt{7})^2$

4. $\sqrt[3]{2x} \cdot \sqrt[3]{4x^2y^2} \cdot \sqrt[3]{2y^4}$

5. $(3 + 2i) + (5 + 7i)$

6. $2i(3 - i)$

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

8. $\sqrt{\frac{-r}{5}} \cdot \sqrt{\frac{-20}{r}}$

9. $\frac{8}{-2i}$

10. $(3 + i\sqrt{5})^2$

11. $-\sqrt{-9}$

12. $\frac{5i}{6-2i}$ (Hint: Use the conjugate of denominator)

B. Factor Completely

1. $t^2 - 4t - 21$

2. $x^3 - 8$

3. $27x^3 + 125$

4. $x^3 - 2x^2 - 4x + 8$

C. Simplify the following expressions.

1. $5x^2 \cdot 2x^5$

2. $(-2c^3)^2$

3. $\frac{4^{h-k}}{4^{h+k}}$

4. $\frac{10 \cdot 2^6}{8 \cdot 2^{-2}}$

5. $t^3 \cdot t^{n-3}$

6. $(x^m)^n \cdot (x^n)^{n-m}$

D. Divide and simplify these expressions.

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

* 2. $\frac{3x^4 - 2x^3 + 16x - 192}{x^2 - 8}$

E. Solve each quadratic equation for x

1. $(x - 1)(5x + 3) = 13$

2. $2x(x - 4) = 3(1 - x)$

3. $2x^2 + 4x = -3$

4. $2x^2 - 32x = 0$

F. Graph the functions using a table of values, symmetry, rational zero theorem, or other properties of polynomials to plot points. Verify the graph with the calculator. Describe the following characteristics for each function:

- a. domain and range b. zeros c. y-intercept d. end behavior

1. $f(x) = x^3 - 3x^2 + x + 1$

2. $f(x) = x^2 + 2x + 1$

3. $f(x) = 3x^2 + 2x + 1$

4. $f(x) = \sqrt{x-5}$

5. $f(x) = -\sqrt{x-5}$

6. $f(x) = \sqrt{x} + 5$

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