# Algebra 2 & Trigonometry Unit 3 Test Review Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Polynomial Functions and Equations Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_**

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| *1-8: Operations with Polynomials – Simplify each expression completely. Leave no negative exponents in final solutions.* | | | | | | | | |
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| 1. (4x – 3)2 | | | | | 1. (3x + 5)(9x2 – 15x + 25) | | | |
| *9-10: Dividing Polynomials - Use long division in #9 and synthetic division in #10.* | | | | | | | | |
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| *11-13: Polynomial Functions – Find each indicated value for p(x) = -4x2 + 1 and m(x) = x3 + 2x2 – 3.* | | | | | | | | |
| 1. p(-5) | | 1. m(3a3) | | | | | 1. p(a + 2) | |
| *14-15: Analyzing Graphs of Polynomial Functions* | | | | | | | | |
| 1. f(x) = x2(x **–** 6)(x2 – 5x – 6)(x + 5)(x2 **–** 36)    1. What is the degree of this function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    2. Is the degree even or odd? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    3. What is the maximum number of turns? \_\_\_\_\_\_\_\_\_\_\_\_\_    4. How many zeros will this function have? \_\_\_\_\_\_\_\_\_\_\_\_\_    5. List the zeros of this function. \_\_\_\_\_\_\_\_\_\_\_\_\_­\_\_\_\_\_\_\_\_\_\_    6. Are there any points of tangency to the x-axis? \_\_\_\_\_\_\_\_\_    7. Are there any terrace points at the x-axis? \_\_\_\_\_\_\_\_\_\_\_    8. As x 🡪 -∞, f(x) 🡪 \_\_\_\_\_\_\_ and as x 🡪 +∞, f(x) 🡪 \_\_\_\_\_\_\_    9. Estimate the x coordinates for the local maximum(s).   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * 1. Estimate the x coordinates for the local minimum(s).   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | **k.** Complete the sign change chart for the function. | | |
| **l.** Sketch the graph of the function below.  *Be sure to label the units on the x-axis!* | | |
| 1. **Use the graph to complete a – f below.** | | | | | | | | |
| Is the function even or odd? How do you know?  * 1. Is the leading coefficient positive or negative? How do you know?   2. What is the minimum degree of the function? How do you know?   3. Estimate the real zeros of the function.   4. Are there any zeros of even multiplicity? How do you know?   5. Are there any zeros of odd multiplicity? How do you know? | | | | | | | | |
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| *16-21: Solving Polynomial Equations – Solve each polynomial equation over the set of complex numbers by FACTORING.*  *Provide exact solutions only. Therefore, all irrational solutions must be in simplified radical form (no decimal answers).* | | | | | | | | |
| **16.** f(x) = 9x4 – 100  **factored form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**    **zeros:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | **17.** 18x3 + 84x2 + 98x = 0  **factored form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**    **zeros:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | | | |
| **18.** x3 – 25x = 7x2 - 175  **factored form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **zeros:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | **19.** x5 + 30x = 11x3  **factored form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **zeros:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | | | |
| **20.** y = 3x3 + 81  **factored form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**    **zeros:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | **21.** 48x4 – 27x2 = 0  **factored form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **zeros:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | | | |
| *22-23: The Remainder and Factor Theorems – Given a polynomial and one if its factors, find the remaining factors of the polynomial.* | | | | | | | | |
| 22. | | | | | 23. | | | |
| *24-27: Roots and Zeros – Write a polynomial function of least degree that has the given features. Write the function in its factored form ONLY!* | | | | | | | | |
| 24. fifth degree; zeros: x = 4, x = -5, terrace at -1;  y-intercept: (0, -20) | | | | | 25. zeros: x = 3, x = , x = ; y-intercept: 12 | | | |
| 26. zeros: x = 5*i*, x = -7; y-intercept: (0, 175) | | | | | 27. | | | |
| *28: Behavior of Functions – Determine the intervals on which the function is increasing or decreasing as indicated.* | | | | | | | | |
| 28.  a. What is the behavior of the function appear to be on the interval (-4, 0)?    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  b. On which interval does this graph appear to be increasing?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  c. On which interval does this graph appear to be decreasing?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | | | |
| *29-30: Find all of the roots of the function by depressing the polynomial.*  *Provide exact solutions only. Therefore, all irrational solutions must be in simplified radical form (no decimal answers).* | | | | | | | | |
| 29. f(x) = x3 – 7x2 + 16x – 10 | | | 30. f(x) = x4 + x3 + 2x2 + 4x – 8 | | | | | |