

# Advanced Algebra – Chapters 5 and 6 Review

Name \_\_\_\_\_ Period \_\_\_\_\_

1. Solving the quadratic equation by using any method:  $3x^2 - 15 = 0$ . 1. \_\_\_\_\_
  
2. Solving the quadratic equation by using any method:  $x^2 + 4x = -20$  2. \_\_\_\_\_
  
3. Solving the quadratic equation by using any method:  $3(x + 3)^2 = -12$  3. \_\_\_\_\_
  
4. Solving the quadratic equation by using any method:  $2x^2 - 5x = 12$  4. \_\_\_\_\_
  
5. Solving the quadratic equation by using any method:  $9x^2 - 64 = 0$  5. \_\_\_\_\_

6. Write the following expression as a complex number in standard form:  $(7 - 2i) - (3 - 3i)$  6. \_\_\_\_\_
7. Write the following expression as a complex number in standard form:  $(3 - 2i)(2 + 5i)$  7. \_\_\_\_\_
8. Factor the following expression completely:  $20x^2 - 6x - 2$  8. \_\_\_\_\_
9. Factor the following expression completely:  $16x^2 - 81$  9. \_\_\_\_\_
10. Factor the following expression completely:  $7u^2 - 4u - 3$  10. \_\_\_\_\_
11. A model for Kloefkorn Construction's revenue is  $R = -15p^2 + 300p + 12000$ , where  $p$  is the price in dollars of the company's product. What price will maximize the revenue? What will be the maximum revenue? 11. Price: \_\_\_\_\_  
Maximum revenue: \_\_\_\_\_

12. The equation for the motion of a projectile fired straight up at an initial velocity of 64 ft/sec is  $h = -16t^2 + 64t$ , where  $h$  is the height in feet and  $t$  is the time in seconds. Find the time the projectile needs to reach its highest point. How high will it go?

12. Time: \_\_\_\_\_  
 Height: \_\_\_\_\_

13. From 1990 to 1996, the consumption of poultry per capita is modeled by  $y = -0.2125t^2 + 2.615t + 56.33$ , where  $t = 0$  corresponds to 1990. During what year was the consumption of poultry per capita at about 61 per capita?

13. Year: \_\_\_\_\_

Find the vertex of the quadratic function and explain how you found it. Identify the axis of symmetry. Identify the  $y$ -intercept. Then graph the quadratic function.

14.  $y = 4x^2 + 8x - 45$

Vertex: \_\_\_\_\_

How did you figure out the vertex?

\_\_\_\_\_

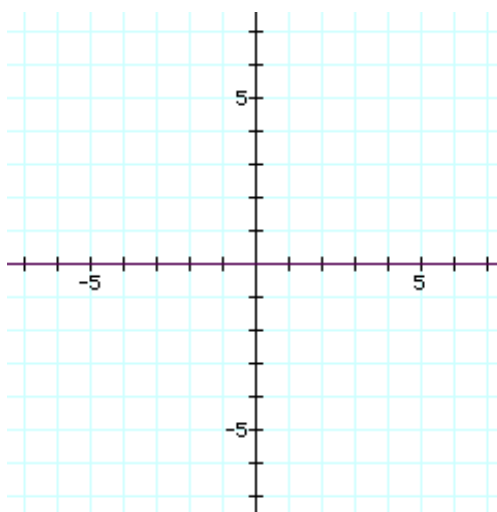
\_\_\_\_\_

\_\_\_\_\_

Axis of symmetry: \_\_\_\_\_

$y$ -intercept: \_\_\_\_\_

Graph:



15. List all possible rational zeros of the function  $f(x) = 5x^3 + 2x^2 + 16x + 9$ . Do not find the zeros.

15. \_\_\_\_\_

16. Solve the following equation, giving exact answers:  $x^3 - 2x^2 - 10x + 20 = 0$ .

16. \_\_\_\_\_

17. Solve the following equation, giving exact answers:  $x^4 + 3x^2 = 10$ .

17. \_\_\_\_\_

18. Write a polynomial function in standard form that has zeros of 4, -2, and 0. Classify the polynomial by number of terms and degree.

18. Standard form: \_\_\_\_\_

Name by degree: \_\_\_\_\_

Name by number of terms: \_\_\_\_\_

19. Describe the end behavior of the function  $f(x) = -2x^3 + 5x^2 + 9x - 10$  by filling in the blanks.

19.  $\lim_{x \rightarrow -\infty} f(x) =$  \_\_\_\_\_

$\lim_{x \rightarrow +\infty} f(x) =$  \_\_\_\_\_

Also, use your graphing calculator to find the relative maximum(s) and minimum(s).

Relative maximum(s) \_\_\_\_\_

Relative minimum(s) \_\_\_\_\_

20. Divide  $(x^4 + 2x^3 - 3x - 1) \div (x + 4)$  by synthetic division.

20. \_\_\_\_\_

21. Divide  $(5x^4 + 14x^3 + 9x) \div (x^2 + 3x + 1)$  by long division.

21. \_\_\_\_\_

22. Three of the roots of a polynomial are  $4$ ,  $-3i$ , and  $2 - \sqrt{7}$ . What are all of the **roots** of this polynomial? Explain.

22. Roots: \_\_\_\_\_

Explanation:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

23. Find the zeros and multiplicity of zeros of the following function:  $f(x) = 2x^5 - 12x^4 + 18x^3$ .

23. Zeros: \_\_\_\_\_

Multiplicities: \_\_\_\_\_

\_\_\_\_\_