Algebra II Review
Chap. 4-6.6

_____
Name

1. Identify a_{23} in this matrix $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \\ 10 & 11 & 12 \end{bmatrix}$

2. The above matrix has _____ rows.

3. $\begin{bmatrix} 1 & 0 & 2 \\ 4 & 5 & 3 \end{bmatrix} + \begin{bmatrix} 4 & -2 & -3 \\ 3 & -2 & 1 \end{bmatrix} =$

4. $5\begin{bmatrix} 4 & 1 & 7 \\ -2 & 0 & 3 \end{bmatrix} =$

5. $\begin{bmatrix} 5 & 0 & 1 \\ -1 & 2 & 1 \end{bmatrix}\begin{bmatrix} 3 & -2 \\ 0 & 1 \\ 4 & -1 \end{bmatrix} =$

6. $\begin{vmatrix} 4 & 2 \\ -3 & 5 \end{vmatrix} =$

7. Find the inverse of $\begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$

8. Solve by matrix inverses
$4x + 3y = 2$
$-2x + y = -6$

9. Solve by Cramer's Rule (determinants)
$7x - 8y = 2$
$14x + 8y = 13$

10. Given $y = x^2 + 4x + 1$
    a. graph
    b. State the vertex _____
    c. State the axis of symmetry _____
    d. Is there a maximum or minimum? _____. What is the value? _____

11. Which way does the parabola $y = -\frac{1}{2}x^2 - 4x + 12$ open? _____

12. If the equation $y = x^2$ is translated (moved) 3 units to the left and 5 units up, what will be the new equation? _____

13. State the vertex of the parabola $y = -3(x-2)^2 - 4$.

14. Put this equation into vertex form: $y = x^2 + 6x - 2$

Factor the following:

15. $6x^2 + 13x + 6$

16. $x^2 + 25$

17. $a^2 - 5a + 6$

18. $x^2 + 3x - 10$

19. $3x^3 - 3x$

20. $x^3 - 8$

21. $x^4 - 2x^2 - 8$

22. Solve by factoring: $2x^2 - 11x = -15$

23. Solve by Completing the Square: $x^2 - 3x = 28$

24. Solve by the Quadratic Formula: $2x^2 + 8x + 12 = 0$

Solve by any method BUT you must show your work!

25. $x^2 + 12 = 0$

26. $-x^2 - 2x = 5$

27. $x^2 + 6x - 5 = 0$

28. $9x^2 + 12x = 5$

29. $x^3 + 64 = 0$

Simplify the following:

30. $(2 + 3i) + (5 - 2i)$

31. $-2i(4 - i)$

32. $(3 + i)(2 + 3i)$

33. $(4 - 3i)(4 + 3i)$

34. $|2 + 5i| =$

35. State the type and number of solutions to: $x^2 + 4x + 5 = 0$

36. What is the degree of the polynomial $x^4 + 5x^3 - 2x + 7 = 0$? _____

Simplify the following:

37. $(3x^2 + 2x - 4) + (x^3 - x^2 - 2x - 5) =$

38. $(3x^2 + 2x - 4) - (x^3 - x^2 - 2x - 5) =$

39. Multiply: $5x^2(x - 4) =$

40. Multiply: $(x^3 + 2)^2 =$

41. Find the zeros of $y = (x - 2)(x + 3)(x + 1)$

42. Write in factored form: $y = x^4 + 3x^3 + 2x^2$

43. $(x^3 + 3x^2 - 6x - 7) / (x + 4) =$

44. In the above problem, is $(x + 4)$ a factor of $x^3 + 3x^2 - 6x - 7$?

45. If $P(x) = x^4 - 3x^3 + 2x^2 + x - 4$, Find $P(2)$.

46. Solve: $x^4 - 2x^2 - 8 = 0$

47. How many solutions are there to the polynomial $x^5 - 12x^4 - 3x^3 + 2x^2 + 5x + 6 + 0$?

48. If P(x) is a polynomial with rational coefficients and 2i and $3 - \sqrt{5}$ are roots, what are two additional roots?

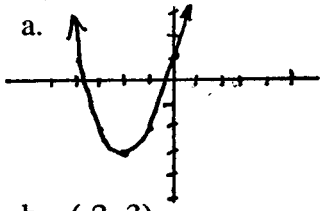
49. List all of the possible rational roots of $3x^4 - 7x^3 + 2x^2 + x - 4 = 0$.

50. Find all of the zeros of $y = x^3 - 3x^2 - x + 3$.

51. If $(x + 1)$ is a factor of $x^3 - 3x^2 - x + 3$, what are the other factors?

52. Write an equation with real coefficients that has roots of 4 and $2 + i$.

Algebra II Fall Review
Answers

1. 6
2. 4
3. $\begin{bmatrix} 5 & -2 & -1 \\ 7 & 3 & 4 \end{bmatrix}$
4. $\begin{bmatrix} 20 & 5 & 35 \\ -10 & 0 & 15 \end{bmatrix}$
5. $\begin{bmatrix} 19 & -11 \\ 1 & 3 \end{bmatrix}$
6. 20-(-6) = 26
7. $\begin{bmatrix} .1 & -.3 \\ .2 & .4 \end{bmatrix}$
8. (2,-2)
9. $(\frac{5}{7}, \frac{3}{8})$
10. a. 
    b. (-2,-3)
    c. x = -2
    d. Minimum value of –3
11. down
12. $y = (x+3)^2 + 5$
13. (2,-4)
14. $y = (x + 3)^2 - 11$
15. $(2x + 3)(3x + 2)$
16. does not factor
17. $(a - 3)(a - 2)$
18. $(x - 2)(x + 5)$
19. $3x(x - 1)(x + 1)$
20. $(x - 2)(x^2 + 2x + 4)$
21. $(x^2 - 4)(x^2 + 2) = (x - 2)(x + 2)(x^2 + 2)$
22. x = 3, 5/2
23. x = -4,7
24. $x = -2 \pm i\sqrt{2}$
25. $x = \pm 2i\sqrt{3}$
26. $x = -1 \pm 2i$
27. $x = -3 \pm \sqrt{14}$
28. x = -5/3,1/3
29. $x = -4, 2 \pm 2i\sqrt{3}$
30. 7 + i
31. –2 – 8i
32. 3 + 11i
33. 16 + 9 = 25
34. $\sqrt{4+25} = \sqrt{29}$
35. D = -4 therefore 2 imaginary
36. 4
37. $x^3 + 2x^2 - 9$
38. $-x^3 + 4x^2 + 4x + 1$
39. $5x^3 - 20x^2$
40. $x^6 + 4x^3 + 4$
41. x = 2, -1, -3
42. $x^2(x + 2)(x + 1)$
43. $x^2 - x - 2 + \frac{1}{x+1}$
44. No
45. -2
46. $x = 2, -2, \pm i\sqrt{2}$
47. 5
48. -2i and $3 + \sqrt{5}$
49. $\pm 1, \pm 2, \pm 4, \pm 1/3, \pm 2/3, \pm 4/3$
50. $\pm 1, 3$
51. $(x - 3)(x - 1)$
52. $x^3 - 8x^2 + 21x - 20 = 0$