NAME_____ Date _____ Pd ____

ALGEBRA 2A 1st SEMESTER EXAM REVIEW

Final Exam all multiple choice questions. From chapters 1 – 4, including Matrices.

1. Solve $|y+2|=6$.

2. If $f(x)=\dfrac{x^2-4x+5}{x+7}$, find $f(-3)$.

3. Solve the following system: $\begin{matrix}2x+3y=8\\3x-8y=-13\end{matrix}$

4. Solve the system: $\begin{matrix}x+2y-3z=50\\2x+y+2z=3\\2x-5y+4z=-79\end{matrix}$

5 – 6: Simplify the following:

5. $(8-3i)(6+5i)$

6. $\dfrac{6+i}{3-i}$

7. Divide: $(4x^3-2x^2+8x-8)/(2x+1)$

8. Solve the following system: $\begin{matrix}2x-3y=5\\5y+x=12\end{matrix}$.

9. Graph $\dfrac{1}{2}|x|-3=y$.

10. Factor completely: y^3-y^2-4y+4.

11. Factor completely: $4x^2-4x-15$.

12. Simplify: $\dfrac{4\sqrt{24}}{2\sqrt{8}}$.

13 – 17: Solve and Graph the following quadratics: (intercepts, vertex, max/min, domain/range, Axis of Symmetry)

13. $2x^2 + 32 = 0$

14. $2x^2 - 5x - 3 = 0$

15. $(x+1)^2 - 2 = 0$

16. $x^2 - 6x = 1$

17. $-4x = 2 - 7x^2$

18. Describe the roots of the equation based on the discriminant $2x^2 - 7x = -9$.

19. Find a quadratic equation with roots 4 and −5.

20. Write the polynomial function whose zeros include –2 and $4 - 3i$.

21. Simplify $(3 - 4\sqrt{5})(4 - \sqrt{2})$.

22. Simplify $-\sqrt{8} + 2\sqrt{96 + 5\sqrt{4}}$

23. Solve and graph (on a number line): $|x + 1| \geq 4$

24. State the possible number of positive real zeros for $f(x) = 3x^4 - 2x^3 - 5x^2 + 6x - 2$.

25. State the possible number of negative real zeros for $f(x) = 2x^4 - 5x^3 - 3x^2 + x + 6$.

26. Find $2f(x) - f(x-1)$ for $f(x) = 3x^2 + 5$.

27. Find $p(-2)$ for $p(x) = x^2 + 3x - 1$.

28. Find the remainder for $(x^3 + 2x^2 - 4x - 5) \div (x - 2)$.

29. Factor $x^3 + 2x^2 - 5x - 6$ by using synthetic division.

30. State all the possible rational zeros for $f(x) = 2x^3 - 2x^2 + 5x - 8$.

31. Solve the equation over the set of complex numbers. $x^4 - 12x^2 - 45 = 0$

32. Graph a function with an odd degree and positive leading coefficient.

33. Graph a function with an even degree and negative leading coefficient.

34. Find all of the zeros of $h(x) = x^3 - 3x^2 + 9x - 7$ if one of the zeros is 1. State any multiplicities, if any.

35. Graph the solution to $\left|\frac{1}{4}x + 1\right| \geq 3$.

36. If $-3x + y = 15$ and $-2x + y = 8$, then what does xy equal?

37. Simplify $(7x - 3x^2 + 5x^3) - (3x^3 - 4x^2 + 13x)$.

38. Graph: $y = \frac{1}{2}|x - 3| + 2$.

39. Graph the solution set of the system: $\begin{cases} x + 4y > 8 \\ x - y \leq 2 \end{cases}$.

40. Solve by completing the square: $4x^2 + 2x - 1 = 0$.

41. Find $f(-2)$, given $f(x) = -x^3 + 4x^2 + 6x - 20$.

42. Multiply: $(-1 + 8i)(-4 - 2i)$.

43. Simplify: $(6x - 2)^2$.

44. Divide using 2 methods: $(3x^3 - 2x^2 - 10x - 2) \div (x - 2)$.

45. If $(x + 2)$ is a factor, find the remaining factors for $3x^3 + 22x^2 + 37x + 10$.

46. Factor using SOAP: $x^3 - 27$ and $8x^3 + 125$.

47. Identify the domain and range of the **quadratic** parent function.

48. Factor completely: $12a^2 + 5ab - 2b^2$.

49. Linear Regression:

Studying Time (hrs)	Grade earned on Test (%)
1	70
1.5	73
2	81
2.7	89
3	92
3.25	90
4	100

What grade might I expect to make on the next test if I study for 2.5 hours?
If I earned a 95 on the test, approximately how many hours would I have studied? Why is this data linear?

50. $\begin{aligned} 6a - 2b &= 18 \\ 3b + 5c &= -34 \\ a + 6c &= -28 \end{aligned}$ Find a, b and c using substitution or elimination.

51. The height, h, in feet of an object above the ground is given by $h = -16t^2 + 64t + 190$, $t \geq 0$ where t is the time in seconds. Find the time it takes the object to strike the ground and find the maximum height of the object.

52. Simplify: $(2a - b)^4$.

53. Factor: $32a^6 - 4b^3$.

54 – 57: Use matrices A – E below.

$A = \begin{bmatrix} 3 & 1 \\ -5 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$ $C = \begin{bmatrix} -6 & 0 \\ 4 & 3 \end{bmatrix}$ $D = \begin{bmatrix} 7 & -2 & 9 \\ -4 & 1 & -8 \end{bmatrix}$ $E = \begin{bmatrix} 7 & 2 & 9 \\ 4 & 1 & 8 \end{bmatrix}$

54. Find $2C - B$

55. Find $A \cdot E$

56. Find B^2

57. Find K so that $D - 2K = \begin{bmatrix} 2 & 0 & 3 \\ 0 & 1 & -4 \end{bmatrix}$

58. Solve for x, y and z given: $\begin{bmatrix} x^2 & y+z \\ -2 & 1 \end{bmatrix} = \begin{bmatrix} 9 & -7 \\ 2z-y & 1 \end{bmatrix}$

59. Find $\begin{vmatrix} 2 & -1 & -3 \\ 4 & 0 & 1 \\ -2 & -3 & 5 \end{vmatrix}$

60. Solve for x: $\begin{vmatrix} 8 & 3 & -1 \\ 2 & 1 & -2 \\ 4 & 1 & x \end{vmatrix} = 14$

61 – 62: Solve for X when: $A = \begin{bmatrix} -2 & -1 \\ 1 & 0 \\ 3 & -4 \end{bmatrix}$ $B = \begin{bmatrix} 0 & 3 \\ 2 & 0 \\ -4 & -1 \end{bmatrix}$

61. $X = 3A - 2B$

62. $2X + 3A = B$

63 – 64: Solve the following equations using inverse matrices:

63. $\begin{bmatrix} 5 & 6 \\ 4 & 5 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ -5 \end{bmatrix}$

64. $\begin{bmatrix} 0 & 1 \\ 2 & 4 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} - \begin{bmatrix} 10 \\ -3 \end{bmatrix} = \begin{bmatrix} -8 \\ 5 \end{bmatrix}$

65 – 68: Find the inverse of the given matrix:

65. $\begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$

66. $\begin{bmatrix} 2 & 3 \\ 7 & 11 \end{bmatrix}$

67. $\begin{bmatrix} 8 & -3 \\ 4 & -2 \end{bmatrix}$

68. Decide whether the matrices are inverses of each other: $\begin{bmatrix} 1 & -1 & -3 \\ 5 & 2 & 1 \\ -3 & -1 & 0 \end{bmatrix}$, $\begin{bmatrix} 1 & 3 & 5 \\ -3 & -9 & -16 \\ 1 & 4 & 7 \end{bmatrix}$

69 – 71: Write the product as a single matrix:

69. $\begin{bmatrix} 1 & 0 \\ 4 & 9 \end{bmatrix}\begin{bmatrix} -1 & 1 \\ 3 & 2 \end{bmatrix}$

70. $\begin{bmatrix} 6 & 6 & 0 \\ 1 & -1 & 5 \end{bmatrix}\begin{bmatrix} -6 & 1 & 4 \\ 5 & -2 & 1 \\ 3 & -8 & 0 \end{bmatrix}$

71. $\begin{bmatrix} 10 & 2 & 1 & 5 \end{bmatrix}\begin{bmatrix} 1 \\ 0 \\ -2 \\ 3 \end{bmatrix}$

72 – 76: Perform the matrix operation(s):

72. $\begin{bmatrix} 0 & 1 & -5 \\ 4 & 1 & 6 \end{bmatrix} + \begin{bmatrix} 10 & 3 & 11 \\ -2 & 8 & 3 \end{bmatrix}$

73. $\begin{bmatrix} 5 & 1 & 10 \\ -1 & 0 & 0 \\ 2 & 3 & 4 \end{bmatrix} - \begin{bmatrix} 6 & 7 & 3 \\ 0 & 14 & 6 \\ 1 & -1 & 2 \end{bmatrix}$

74. $\begin{bmatrix} 6 & 10 \\ 9 & 6 \\ 4 & -1 \end{bmatrix} + \begin{bmatrix} 2 & 1 \\ 0 & 7 \\ 4 & 7 \end{bmatrix}$

75. $3\begin{bmatrix} 4 & 6 & -1 \\ 10 & -5 & 2 \\ 2 & 11 & 1 \end{bmatrix}$

76. $-2\left(\begin{bmatrix} 6 & 4 \\ 0 & 3 \end{bmatrix} - \begin{bmatrix} 5 & 10 \\ 1 & 3 \end{bmatrix}\right)$

77. If ΔABC is defined by the matrix $P = \begin{bmatrix} 4 & 3 & 1 \\ 1 & 5 & 2 \end{bmatrix}$, what are the coordinates of the triangle after it has been rotated ?

a. 90 degrees counter-clockwise?

b. 90 degrees clockwise?

c. Reflected over the x-axis?

d. Reflected over the y-axis?

e. Rotated 180 degrees?

f. Dilated by a factor of 3?

g. Translated 2 units to the left and 5 units up?

h. Reflected over the x-axis & dilated by a factor of ½?

78-85: Graph the following functions, state the domain and range and all transformations from the function's parent function:

78. $f(x) = |x - 2| + 3$

79. $g(x) = -2|x| - 7$

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

81. $g(x) = -(2x)^2$

82. $g(x) = -2x^3 + 5$

83. $h(x) = \frac{1}{3}x^3 - 2$

84. $h(x) = -\frac{5}{2}(x + 2)^2 - 4$

85. $g(x) = \left(\frac{3}{4}x - 4\right)^3$