Semester 1 Final Exam Review Algebra II Name_____

Terms to know: x-intercepts, y-intercept, conjunction, disjunction, roots, zero's, extraneous roots.

Graph the following.

1. $3x + y = 2$

2. $2x - y < 3$

3. $y - 3x < 3$
$3y - x > 3$

4. $f(x) = \begin{cases} 2x - 1, & if\ x \leq 2 \\ x + 2, & if\ x > 2 \end{cases}$

5. $f(x) = \begin{cases} 1, & if\ -2 \leq x < 0 \\ 3, & if\ 0 \leq x < 2 \\ 5, & if\ 2 \leq x < 4 \end{cases}$

6. $y = 3|x + 1| - 2$

Solve.

7. An old combine can pick a certain field in 15 hours. ~~An old~~ A new combine can pick the same field in 12 hours. If both combines are used, how long does it take them to pick the field together?

8. Stan invested part of his $1000 at an annual rate of 6% and part of it at an annual rate of 9%. If his return on his two investments was $66, how much did he invest at each rate?

Simplify.

9. $\frac{x^2-5x+6}{x^2-7x+12} \cdot \frac{x-4}{x+3}$

10. $\frac{3x-6}{x^2-6x+9} \cdot \frac{x^2-3x}{x^2-4}$

11. $\frac{t-4}{2t} - \frac{t-6}{3t}$

12. $\frac{2x+5}{4x^2} + \frac{2x-5}{10x}$

13. $\frac{1}{z-4} - \frac{1}{z+4}$

14. $\frac{4}{2-y} + \frac{7}{y-2}$

15. $\frac{m-\frac{1}{m}}{1-\frac{1}{m}}$

16. $\frac{1+\frac{1}{y-1}}{1-\frac{1}{y+1}}$

17. $2x^2(3x^3)^2$

18. $\frac{2x^2}{y^3}\left(\frac{-y^3}{2x^2}\right)^2$

Solve.

19. $3(x-4) > 5x-4$

20. $2(x-4)+x \leq 3\,(x+4)$

21. $2x+4 < 8 \quad or \quad 3x+2 \geq 14$

22. $3x-1 > 8 \quad and \quad 2x+3 < 15$

23. $|2x+1| = 3$

24. $3|x-2|-1 = 8$

25. $|3x+2| < 4$

26. $\left|2x-\frac{1}{5}\right| > \frac{7}{5}$

Graph the equation or inequality.

27. $y = -\frac{2}{3}x+1$

28. $x-2y = 6$

29. $2x-3y < 6$

30. $x+2y \geq 2$

Solve the system of equations.

31. $x-3y = 2$
$2x-5y = 2$

32. $5x-6y = 9$
$2x-3y = 3$

33. $x+3y+2z = -1$
$-3x-2y+z = 3$
$2x-y+3z = -8$

Find the indicated values if: $f(x) = 2x+3,\ g(x) = x^2-2$

34. $f(3)$

35. $g(4)$

36. $g(f(-1))$

37. $f(g(3))$

If $f(x) = \begin{cases} -x-3, & if\ x < 1 \\ 2x-6, & if\ x \geq 1 \end{cases}$ then find:

38. $f(-2)$

39. $f(1)$

Express as a simplified polynomial.

40. $2x(x-2y)^2$

41. $a^2(4a+b)^2$

Find the value of 'k' so that the ordered pair satisfies the equation.

42. $3x-ky = 4;\ (2,-1)$

43. $kx+3y = 7;\ (-1,3)$

Find the slope of the equation.

44. $2x + 5y = 7$

45. $4x - \frac{1}{2}y = 6$

Find the equation in standard form containing the following info:

46. $m = 1,\ b = -3$

47. $m = \frac{2}{3},\ pt\ (2,1)$

48. $(4,-5),\ (1,-4)$

49. Find the equation in standard form through the given point and a) parallel to the given equation and b) perpendicular to the given equation: point (-1, 2), equation: $x - 3y = -2$.

Find the GCF for the following:

50. $24xy^2z,\ 36x^3y^2z^2,\ 21x^2y^4z^3$

51. $12a^2b^2c^2,\ 16a^3b^2c^4,\ 28a^4b^4c^3$

Factor the following.

52. $4x^2 + 12xy + 9y^2$

53. $16x^4 - 40x^2y^3 + 25y^6$

54. $x^6 - y^3$

55. $27m^3 + 8$

Solve.

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

57. $\frac{t}{t-1} = \frac{t+2}{t}$

Find the real roots of each equation. If there are no real roots, say so.

58. $9x^2 - 144 = 0$

59. $10y^2 = -160$

Simplify.

60. $\frac{9\sqrt{2}}{\sqrt{18}}$

61. $20\sqrt{\frac{27}{16}}$

62. $\sqrt[3]{25} \cdot \sqrt[3]{10}$

63. $\sqrt[3]{54} + \sqrt[3]{40} + \sqrt[3]{16}$

64. $\sqrt{40x^7y^5} + \sqrt{90x^3y}$

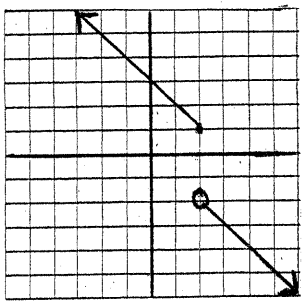
65. $\sqrt{144x^5y} - \sqrt{25xy^3}$

Match the function with the appropriate graph below.

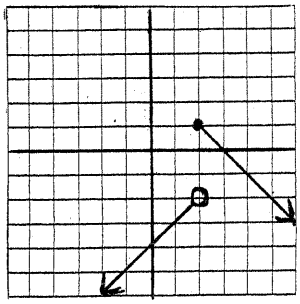
66. $f(x) = \begin{cases} x-4, & if\ x < 2 \\ -x+3, & if\ x \geq 2 \end{cases}$

67. $f(x) = \begin{cases} x+1, & if\ x < 2 \\ -x-2, & if\ x \geq 2 \end{cases}$

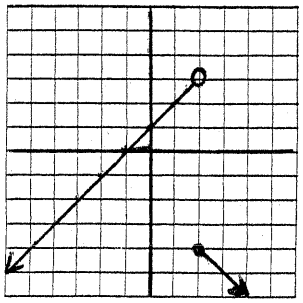
a.



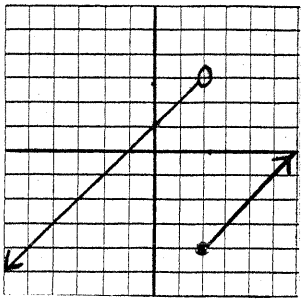
b.



c.



d.



Factor completely.

68. $3m^2 + 6m - 8mn - 16n$

69. $8x^2 - 2xy + 20x - 5y$

70. $c^4 + 14c^3 + 40c^2$

71. $w^4 - 11w^3 + 30w^2$

Solve.

72. $a^2 + 5 = 6a$

73. $r^2 - 21 = 4r$

74. $t^2 - 9t \geq 0$

75. $z^2 - 5z < 0$

76. The length of a rectangle is 3cm greater than its width, and a diagonal of the rectangle is 3cm greater than its length. Find the width of the rectangle.

77. The length of a rectangle is 7 inches greater than its width, and a diagonal of the rectangle is 1 inch greater than its length. Find the width of the rectangle.

Simplify.

78. $\dfrac{(5m^3n^4)^2}{mn^3}$

79. $\dfrac{(4x^2y^4)^3}{x^3y^5}$

80. $\dfrac{c^4}{d^{-2}}\left(\dfrac{c^{-3}}{d^{-5}}\right)^{-1}$

81. $\dfrac{p^6}{q^{-1}}\left(\dfrac{p^2}{q^{-3}}\right)^{-1}$

82. $\dfrac{m^3n^{-1}}{10} \div \dfrac{m^{-2}n^3}{8}$

83. $\dfrac{a^3b}{12} \div \dfrac{a^5b^{-1}}{9}$

Find the (i) domain and (ii) the zeros of the function.

84. $f(x) = \dfrac{x^2-5x+4}{x^2-25}$

85. $f(x) = \dfrac{x^3+8}{x^2-9x+8}$