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Math 108 Final Review

Name_____

1. **Simplify:** $-8 - 2(1-6)^2 \div (-5)$

2. **Solve:** $x - 5 < -2$ or $2x - 1 > 8$
   Write in set builder and interval notatation.

3. **Graph the solution set of:**

   $\{x|x>-4\} \cap \{x|x<2\}$

4. **Simplify:** $\frac{3}{8} - \left(\frac{5}{6} \div \frac{5}{8}\right) + \frac{3}{4}$

5. **Evaluate ab – (a -2c) when a = 4, b = -3, and c = -2.**

6. **Given; A = {0, 1, 2, 3} and B = {-2, 0,2,4}**
   a) Find A ∪ B

   b) Find A ∩ B

7. **Simplify:** $3x - 2(2x - 3y) + 2(2y - x)$

8. **Solve:** $\frac{3}{2}x - 5 = 7$

9. **Solve:** $10 - 2(3 - x) \leq 4(2x - 5)$

10. A child's piggy bank contains nickels, dimes and quarters. There are twice as many nickels as dimes and five more dimes than quarters. The total value of all the coins is $5.95. How many quarters are in the bank?

11. An investment of $4800 is made at an annual simple interest rate of 8.5%. How much additional money must be invested at an interest rate of 13% so that the total interest earned is $720 ?

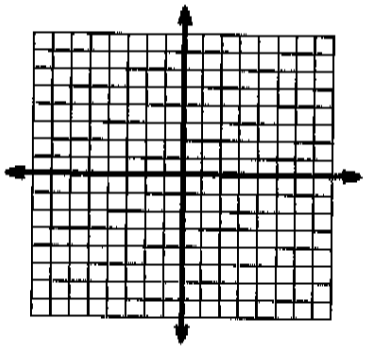
12. Two planes start from the same point and fly in opposite directions. The first plane is flying 30 mph faster than the second plane. In 3.5 hours the planes are 875 miles apart. Find the rate of the faster plane.

13. A bicyclist traveling at 18mph overtakes an in-line skater who is traveling at 10mph and has a 0.5-hour head start. **How far from the starting point** did the bicyclist overtake the skater?

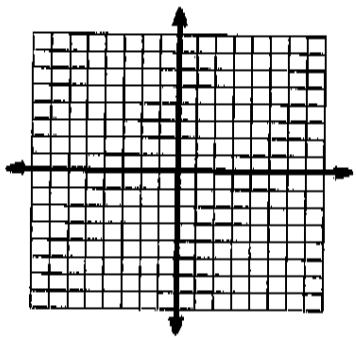
14. The sum of two integers is sixteen. Five times the smaller integer is eight more that three times the larger integer. Find the two integers.

15. Find the **midpoint** and the **distance** of the line segment with endpoints (5, -1) and (8, -3).
a) midpoint b) distance

16. Graph: $y = -x + 2$



17. Graph: $3x - 2y = -8$



18. Find the **slope** of the line containing the points (-3, 4) and (1, -6).

19. Find the **x and y intercepts** of $3x + 2y = 1$.

20. Find the **equation of the line** that contains the point (-4, 0) and has a slope of $\frac{-3}{2}$

21. Find the **equation of the line** containing the points (3, -4) and (-2, 1).

22. Find the **equation of the line** that contains the point (2, -3) and is **parallel** to the line $y = \frac{5}{2}x - 4$.

23. Given $P(x) = x^2 - 7$

a) Evaluate: $P(-2)$

b) Evaluate: $P(t)$

24. Solve by Substitution:

$3x - 2y = 13$

$-2x + y = 1$

25. Solve by addition method:

$2x + 3y = 7$

$4x - y = 1$

26. Solve ~~by Cramer's Rule~~:

$x + 3y = -1$

$2x + 2y = 1$

27. Solve by any method:

$5x - y - 2z = 4$

$x + 2y - 4z = -13$

$2x - 2y + 3z = 14$

28. Evaluate the determinants:

$$\begin{vmatrix} 5 & 6 \\ -1 & 3 \end{vmatrix}$$

$$\begin{vmatrix} 1 & -1 & 2 \\ 0 & 1 & 3 \\ -1 & 2 & 1 \end{vmatrix}$$

29. Simplify:

$$\left(x^{\frac{3}{4}} \bullet x^{\frac{1}{2}}\right)^2$$

30. Simplify: $\dfrac{\left(6x^2y\right)^2}{\left(-2xy^2\right)^3}$

31. Simplify: $\left(\dfrac{4a^4}{b^2}\right)^{\frac{-3}{2}}$

32. Multiply: $(2a - 5)(a^2 - 3a - 9)$

33. Multiply: $(3a - 4b)(2a + 5b)$

34. Factor: $x^2y^2 - 49$

35. Factor: $x^3 + 125$

36. Factor: $6x^6 + 14x^4 - 40x^2$

37. Factor: $ay - 3ax - 2by + 6bx$

38. Divide: $\frac{x^3+4x^2-x-2}{x+1}$ (long or synthetic)

39. Simplify: $(3x-4)^2$

40. Write $\left(a^3b^4\right)^{\frac{2}{3}}$ **as a radical expression.**

41. Simplify: a) $\sqrt{28a^4b^9}$

b) $\sqrt[5]{729x^{11}y^7}$

42. Subtract:

a) $\sqrt{32} - \sqrt{8}$

b) $\sqrt{64a^5b^3} - 3a\sqrt{9a^3b^3}$

43. Multiply and simplify:

$(\sqrt{2} - 3)(\sqrt{2} + 4)$

44. Simplify: $\frac{\sqrt{40a^2b}}{\sqrt{32a^3b^3}}$

45. Simplify: $\frac{4}{2+\sqrt{5}}$

46. Simplify: $\frac{4}{\sqrt[5]{16a^2}}$

47. Simplify: $\sqrt{32} - \sqrt{-8}$

48. Simplify: $\frac{2i}{2+3i}$

49. $(4-9i)(1+3i)$

50. Solve: $\sqrt[3]{5-x} - 8 = -5$

51. Solve: $\sqrt{3x+10} = x + 4$

52. Solve: $\sqrt{2x+4} = 3 - \sqrt{2x}$

53. Simplify: $\dfrac{5x^4 - 10x^3}{5x^3 - 20x^2 + 20x}$

54. Simplify: $\dfrac{16x^2 - 9}{4x^2 + 5x - 6} \bullet \dfrac{2x^2 + x - 6}{4x^2 - 9x - 9}$

55. Subtract: $\dfrac{x+2}{x^2 - 3x + 2} - \dfrac{1-x}{x^2 - 4}$

56. Simplify: $\dfrac{3 - \dfrac{6}{x+4}}{x + \dfrac{4}{x+4}}$

57. Simplify: $\dfrac{1 + \dfrac{2}{x} - \dfrac{3}{x^2}}{1 + \dfrac{6}{x} + \dfrac{9}{x^2}}$

58. Solve: $\dfrac{6}{y} = \dfrac{-2}{3 - y}$

59. Solve: $\dfrac{x}{x-3} - \dfrac{2}{x+4} = 2$

60. Solve: $I = \dfrac{E}{R+r}$ *for* **R**

61. Solve: $\dfrac{A + B}{n} = T$ *for* **A**

62. Write a quadratic **equation** that has **integer coefficients** and has **solutions ½ and -4.**

63. Solve by taking square roots:
$(x - 3)^2 - 18 = 0$

64. Solve by completing the square:
$x^2 - 10x - 7 = 0$

65. Solve by using the quadratic formula:
$x^2 - 6x = -1$

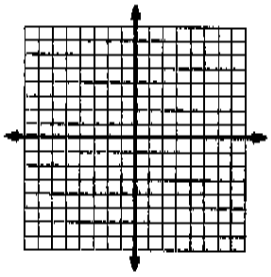
66. Solve: $x^4 - x^2 - 6 = 0$

67. Solve: $x - 8x^{\frac{1}{2}} + 15 = 0$

68. Solve: $x^2 - 5x - 14 > 0$ (Use a number line!)

69. Solve: $\frac{2x-3}{(x+5)(x+2)} \leq 0$

70. Graph: $y = x^2 + 6x + 2$



Name the

vertex:

axis of sym:

Domain:

Range:

x-intercepts:

71. Given: $f(x) = x^2 - 5$ **and** $h(x) = 2x + 4$

a) find $(f - h)(-2)$

b) find $h[f(2)]$

c) find $h^{-1}(x)$

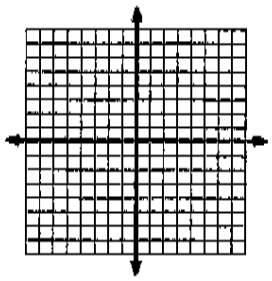
72. Find the inverse of $f(x) = \frac{1}{2}x + 13$

73. Find the x-intercepts for
$F(x) = x^2 - 4x - 12$

74. $f(x) = 3^{x-3}$ **; evaluate** $f(2)$

75. Solve: $4^{2x-1}=8^{x}$

76. Graph: $f(x)=2^{x-2}$



77. Solve: $\log_5\left(\frac{1}{25}\right)=x$

78. Solve: $\log_3(5x-3)=3$

79. Write $\log_5 \frac{x^3}{yz^4}$ **in expanded form.**

80. Write $\frac{1}{3}(\log_5 x-2\log_5 y)$ **as a single logarithm with a coefficient of 1.**

81. Solve: $5^x = 36$

82. Evaluate:

a) $\log_{10} 20$

b) $\log_5 25$

c) $\log_2 8$

83. Solve:

$\log_5 (3x) - \log_5 (x^2 - 1) = \log_5 2$

84. The intensity (I) of a light source is inversely proportional to the square of the distance (d) from the source. If the intensity is 20 lumens at a distance of 5 ft, what is the intensity when the distance is 10 ft?

85. The profit (P) realized by a company varies directly as the number of items it sells (s). If the company makes a profit of $6000 on the sale of 150 items, what is the profit if the company sells 2000 items?