

MATH 1100 Semester Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

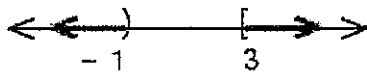
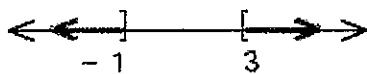
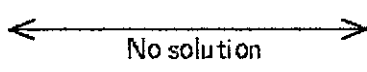

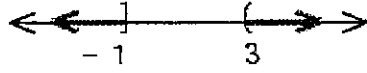
- _____ 1. Simplify the expression completely.

$$11 - 3(4x + 5) - (3x - 4)$$

- a. $-15x + 20$
- b. $-15x - 1$
- c. $-15x - 2$
- d. $-29x + 44$
- e. $-15x$

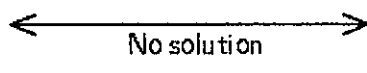
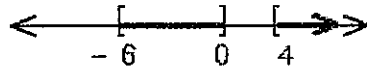
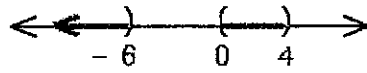
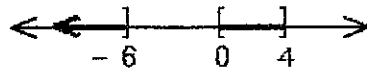
- _____ 2. Graph the following compound inequality.

$$\{x | x \leq -1 \text{ and } x \geq 3\}$$

- a. 
- b. 
- c. 
- d. 
- e. 

- _____ 3. Graph the following.

$$\{x | x < -6 \text{ or } 0 < x < 4\}$$

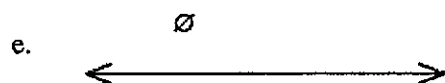
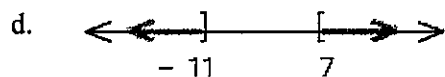
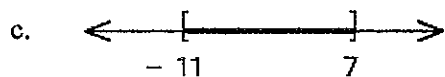
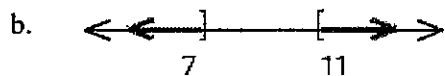
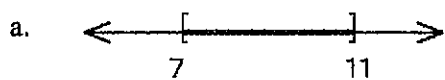
- a. 
- b. 
- c. 
- d. 

Name: _____

ID: A

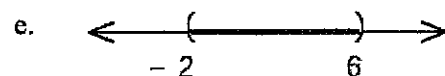
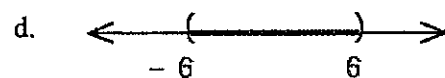
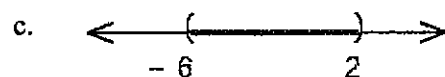
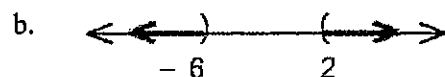
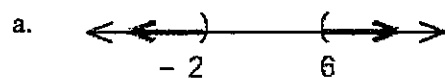
_____ 4. Solve the inequality and graph the solution set.

$$|a - 9| \geq 2$$



_____ 5. Solve the inequality and graph the solution set.

$$|2x - 4| < 8$$

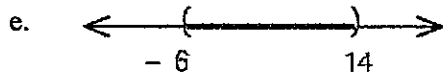
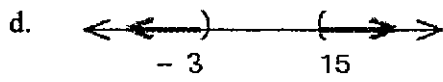
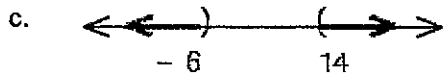
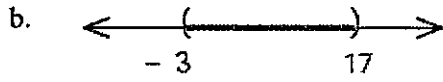
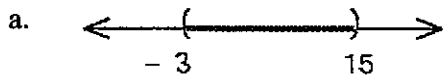


Name: _____

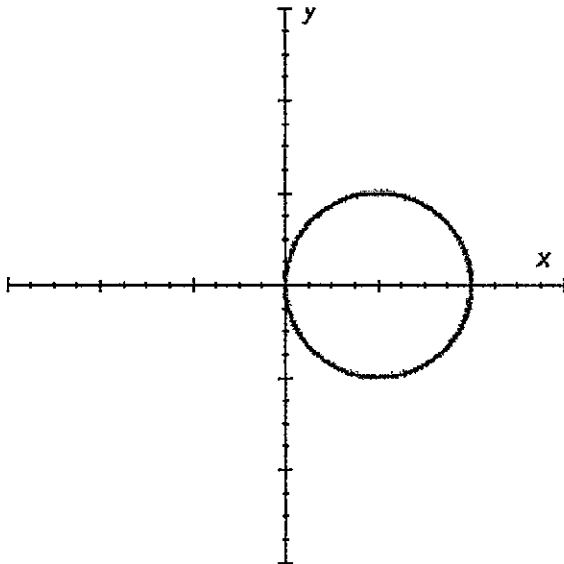
ID: A

_____ 6. Solve the inequality and graph the solution set.

$$|x - 6| + 1 < 10$$



_____ 7. Does the graph represent a function?



- a. no
- b. yes

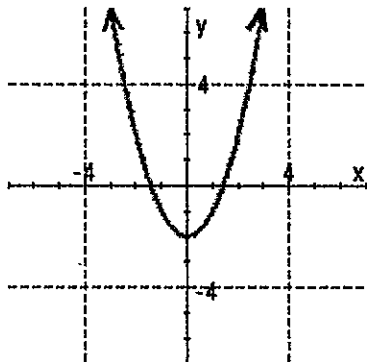
8. Graph the following relation. Use the graph to find the domain and range, and indicate whether the graph is the graph of a function.

$$x = y^2 - 2$$

a. Domain = All real numbers

$$\text{Range} = \{y \mid y \geq -2\}$$

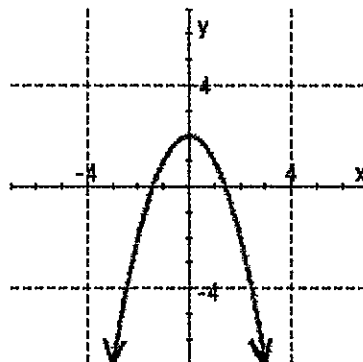
This relation is a function



c. Domain = All real numbers

$$\text{Range} = \{y \mid y \leq 2\}$$

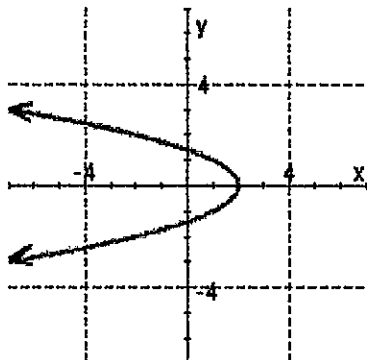
This relation is a function



b. Domain = $\{x \mid x \leq 2\}$

Range = All real numbers

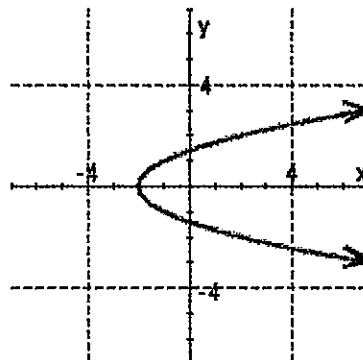
This relation is not a function



d. Domain = $\{x \mid x \geq -2\}$

Range = All real numbers

This relation is not a function



_____ 9. Simplify as much as possible.

$$\frac{6 + \frac{5}{6}}{1 - \frac{2}{3}}$$

a. $-\frac{1}{2}$

b. $\frac{2}{41}$

c. 41

d. $\frac{41}{4}$

e. $\frac{41}{2}$

_____ 10. Simplify the expression. Remember, negative exponents give reciprocals.

$$\left(\frac{9}{121}\right)^{-\frac{1}{2}}$$

a. $\frac{4}{3}$

b. $\frac{3}{4}$

c. $\frac{11}{3}$

d. $\frac{121}{9}$

e. $\frac{3}{11}$

Numeric Response

11. Let $g(x) = x^2 + 2x + 5$. Evaluate $g(-4)$.

$$g(-4) = \underline{\hspace{2cm}}$$

12. Find the value of the 2×2 determinant.

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

13. Solve for
- x
- .

$$\begin{vmatrix} 3x & 2 \\ x & 4 \end{vmatrix} = 10$$

$$x = \underline{\hspace{2cm}}$$

14. Solve the equation.

$$\frac{7}{2x} = \frac{2}{x} - \frac{1}{4}$$

$$x = \underline{\hspace{2cm}}$$

15. Solve the equation.

$$\frac{3}{y-6} - \frac{2}{y+1} = \frac{7}{y^2 - 5y - 6}$$

$$y = \underline{\hspace{2cm}}$$

16. Use the definition of rational exponents to write the following with the appropriate root. Then simplify.

$$144^{\frac{1}{2}}$$

17. Use the definition of rational exponents to write the following with the appropriate root. Then simplify.

$$(-27)^{\frac{1}{3}}$$

18. Multiply.

$$(\sqrt{14} - \sqrt{7})(\sqrt{14} + \sqrt{7})$$

19. Solve the equation.

$$\sqrt{7x+8} - 2 = 4$$

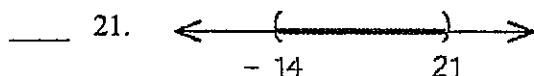
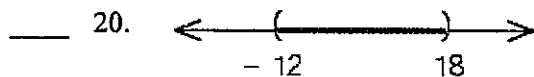
$$x = \underline{\hspace{2cm}}$$

Matching

Solve the inequality and graph the solution. Match each inequality with its graphical representation.

a. $5 < 15 + \frac{5}{6}x < 30$

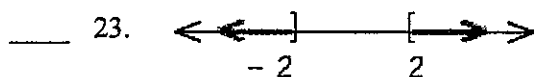
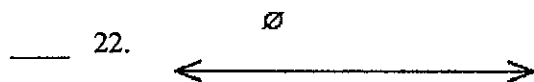
b. $3 < 15 + \frac{6}{7}x < 33$



Solve the inequality and graph the solution set. Match each inequality with its graphical representation.

a. $|y| < -2$

b. $|y| \geq 2$

**Short Answer**

24. For the set $\{-8, -7.5, -\sqrt{7}, -\pi, 0, 1, 2, 2.3, \frac{7}{2}, \sqrt{17}\}$, list all the elements that are Irrational Numbers.

25. Solve the equation.

$$\frac{3}{5}(10x - 5) = \frac{2}{3}(6x - 9)$$

26. The taximeter was invented in 1891 by Wilhelm Bruhn. The city of Chicago charges \$1.80 plus \$0.40 per mile for a taxi ride. A woman paid a fare of \$9.00. Write an equation that connects the fare the woman paid, the miles she traveled, n , and the charges the taximeter computes.

27. Solve the formula for the indicated variable.

$$h = vt - 16t^2 \text{ for } v$$

28. Solve the formula for the indicated variable.

$$5x - 10y + 50 = 0 \text{ for } y$$

29. The biggest video download of all time was a *Star Wars* movie trailer. The video was compressed so it would be small enough for people to download over the Internet. A formula for estimating the size, in kilobytes, of a compressed video is

$$S = \frac{\text{height} \cdot \text{width} \cdot \text{fps} \cdot \text{time}}{35,000}$$

where *height* and *width* are in pixels, *fps* is the number of frames per second the video is to play (television plays at 30 fps), and *time* is given in seconds.

Estimate the size in kilobytes of the *Star Wars* trailer that has a height of 640 pixels, has a width of 216 pixels, plays at 15 fps, and runs for 200 seconds. Round to the nearest kilobyte.

_____ kilobytes

Estimate the size in kilobytes of the *Star Wars* trailer that has a height of 160 pixels, has a width of 132 pixels, plays at 15 fps, and runs for 200 seconds. Round to the nearest kilobyte.

_____ kilobytes

30. A woman has a total of \$8,000 to invest. She invests part of the money in an account that pays 8% per year and the rest in an account that pays 9% per year. If the interest earned in the first year is \$672, how much did she invest in each account?

_____ at 8%

_____ at 9%

31. A Girl Scout troop sells 83 tickets to their mother-and-daughter dinner, for a total of \$618. If the tickets cost \$8.00 for mothers and \$7.00 for daughters, how many of each ticket did they sell?

_____ mothers

_____ daughters

32. Write $-3 \leq x - 5 \leq 3$ as a single inequality involving absolute value.

33. Solve the equation.

$$|a - 3| = \frac{7}{5}$$

34. Solve the equation.

$$|2x - 3| = -2$$

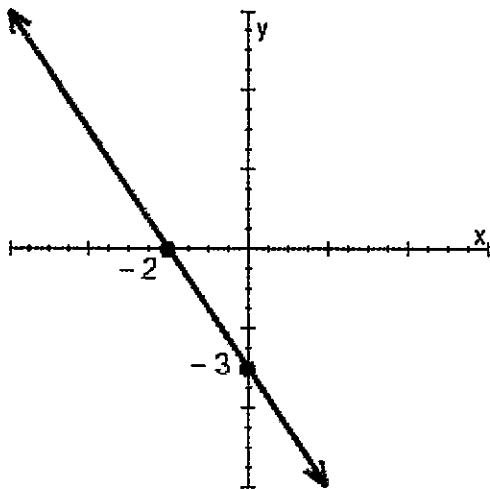
35. Solve the equation.

$$2 + |3t - 2| = 7$$

36. Solve the equation. Simplify your answers.

$$|7a + 11| = |3a + 19|$$

37. Find the slope of the line from the graph.



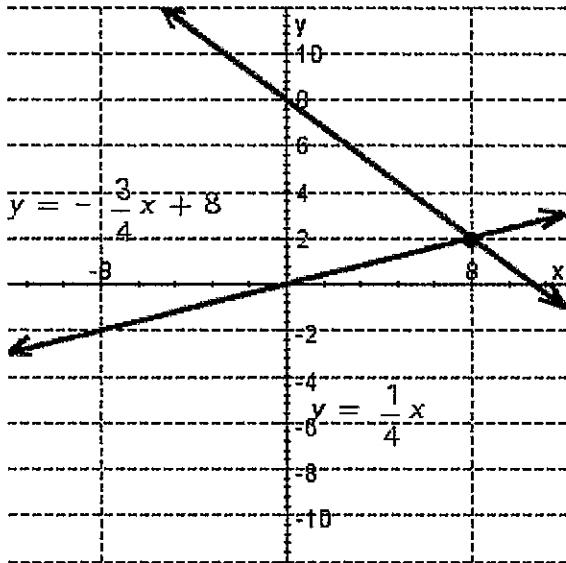
38. Write the equation of the line with the slope $m = -4$ and y -intercept $b = -2$.
39. The slope of the line is $m = -\frac{1}{5}$ and one point on a line is $(-5, 1)$. Find the equation of the line and write the answer in slope-intercept form.
40. Find the equation of the line that passes through the pair of points $(3, 7)$ and $(-6, -2)$. Write your answer in standard form.
41. Find the equation of the line parallel to the graph of $4x - y = 5$ that contains the point $(-2, 1)$.
42. Find the equation of the line with x -intercept 7 and y -intercept 2.
43. Let $f(x) = 5x^2 - 2x + 1$. Evaluate $f(-3)$.
44. Let $f(x) = 3x^2 - 12$. Evaluate $f(a)$.

45. Given the graph of the following equations. Find the solution of the system of these equations.

$$y = \frac{1}{4}x$$

$$y = -\frac{3}{4}x + 8$$

If the system is dependent or inconsistent, indicate this.



46. Solve the system by the substitution method.

$$x + y = 850$$

$$1.5x + y = 1,100$$

(_____, _____)

47. Solve the following system by the addition method.

$$5x - 3y = -11$$

$$7x + 6y = -12$$

If the system is dependent or inconsistent, indicate this.

48. Solve the system using Cramer's rule.

$$6x - 5y = 8$$

$$9x - 9y = 9$$

If the system is dependent or inconsistent, so indicate this.

49. How many gallons of 10% alcohol solution and 25% alcohol solution must be mixed to get 9 gallons of 15% alcohol solution?

_____ gallons of 10%, _____ gallons of 25%

50. Use the properties of exponents to simplify the expression. Write your answer with positive exponents only. (Assume all variables are nonzero.)

$$\left(\frac{x^{-9}y^3}{x^{-7}y^9}\right)^{-2}$$

51. Use the properties of exponents to simplify the following expression. Write your answer in scientific notation.

$$\frac{(9 \times 10^4)(3 \times 10^{-7})}{6 \times 10^3}$$

52. Find the sum of $12a^2 + 9ab + 7b^2$, $6a^2 - 8ab + b^2$, and $-8a^2 - 9ab + 9b^2$.
53. Multiply using the FOIL method.

$$(4x - 5y)(5x + 4y)$$

54. Find the product.

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

55. Factor the greatest common factor from the expression. Write the greatest common factor with a positive coefficient.

$$8x^4y^2 + 40x^3y^3 - 48x^2y^4$$

56. Factor completely. Be sure to factor out the greatest common factor first.

$$90r^3 - 120r^2 + 40r$$

57. Factor completely. Be sure to factor out the greatest common factor first.

$$7x^2 - 8x - 12$$

58. Factor completely.

$$25a^2 + 2a + \frac{1}{25}$$

59. Factor the difference of two squares. Be sure to factor completely.

$$16a^2 - \frac{1}{16}$$

60. Factor completely.

$$r^2 - \frac{4}{25}$$

61. Factor the difference of two squares. Be sure to factor completely.

$$\frac{1}{81} - \frac{y^4}{16}$$

62. Factor completely.

$$(x+2)^2 - 9$$

63. Factor the expression as the sum or difference of two cubes.

$$3r^3 + 375$$

64. Factor the difference of cubes.

$$x^3 - 216$$

65. Factor completely.

$$64 - r^3$$

66. Solve the equation by factoring.

$$2x^2 + 4x = 0$$

67. Solve the equation by factoring.

$$x^3 + 5x^2 + 6x = 0$$

$$x = \underline{\hspace{2cm}}$$

68. The relationship between the number of pencil sharpeners x a company can sell each week and the price of each sharpener p is given by the equation $x = 1,700 - 100p$. At what price should the sharpeners be sold if the weekly revenue is to be \$5,200? [Hint: Remember revenue equals the number of items multiplied by the price of each item. That is, $R = xp$. For this problem, in $R = xp$, substitute $1700 - 100p$ for x .]

$$p = \underline{\hspace{2cm}}$$

69. State the domain for the rational function.

$$h(t) = \frac{t-3}{t^2-9}$$

70. Reduce the rational expression to lowest terms.

$$\frac{a^4-81}{a-3}$$

71. Reduce to lowest terms.

$$\frac{12-3t}{t-4}$$

72. Divide by factoring the numerator and then dividing out common factors.

$$\frac{x^3+125}{x+5}$$

73. Perform the indicated operations. Reduce your answer to lowest terms.

$$\frac{x^2+8x+7}{3x-3} \cdot \frac{x-1}{x^2+8x+7}$$

74. Perform the indicated operations. Reduce your answer to lowest terms.

$$\frac{a^2-6a+8}{a^2-3a-4} \div \frac{a-6}{a^2+3a+2}$$

75. Combine the rational expressions. Reduce your answer to lowest terms.

$$\frac{3x+1}{2x-18} - \frac{x+5}{x-9}$$

76. Combine the rational expressions. Reduce your answer to lowest terms.

$$\frac{x+3}{2x+4} + \frac{2}{x^2-4}$$

77. Combine the rational expressions. Reduce your answer to lowest terms.

$$x - \frac{6}{8x+5}$$

78. Simplify as much as possible.

$$\frac{1 - \frac{1}{t}}{1 - \frac{7}{t}}$$

79. Simplify as much as possible.

$$\frac{\frac{1}{y} + \frac{8}{x}}{\frac{8}{y} + \frac{1}{x}}$$

80. Solve the equation.

$$1 - \frac{3}{x} = \frac{18}{x^2}$$

$$x = \underline{\hspace{2cm}}$$

81. Solve the equation
- $\frac{1}{x} = \frac{1}{b} - \frac{1}{a}$
- for
- x
- .

82. Simplify the expression. Assume all variables represent nonnegative numbers.

$$\sqrt{25a^{10}}$$

83. Use Property 1 for Radicals to write the expression in simplified form. (Assume the variables are nonnegative numbers.)

$$\sqrt{48x^3}$$

84. Rationalize the denominator in the following expression.

$$\frac{3}{\sqrt{5}}$$

85. Multiply. (Assume the variable represents a nonnegative real number.)

$$\left(x^{\frac{2}{9}} - 7\right)\left(x^{\frac{2}{9}} + 4\right)$$

86. Multiply. (Assume the variable represents a nonnegative real number.)

$$\left(t^{\frac{1}{2}} + 2\right)^2$$

87. Combine the expressions. (Assume the variables are nonnegative numbers.)

$$2\sqrt{50x^2} - 8x\sqrt{18} - 3\sqrt{8x^2}$$

88. Combine the expressions. (Assume the variables are nonnegative numbers.)

$$9a\sqrt{20a^3b^2} + 6b\sqrt{45a^5}$$

89. Multiply.

$$(\sqrt{7} - 5\sqrt{5})(6\sqrt{7} - 8\sqrt{5})$$

90. Solve the equation.

$$\sqrt{7x+8} = -9$$

91. Solve the equation.

$$\sqrt{y-2} = y-2$$

$$y = \underline{\hspace{2cm}}$$

92. Write the number in terms of i , and simplify as much as possible.

$$-\sqrt{-48}$$

93. Combine the complex numbers.

$$(7-9i) + [(3-5i) - (7+9i)]$$

94. Solve the equation by using the square root property of equality.

$$(2y-9)^2 = 9$$

$$y = \underline{\hspace{2cm}}$$

95. Solve the equation by using the square root property of equality.

$$y^2 = \frac{2}{9}$$

96. Solve the equation by using the square root property of equality.

$$x^2 + 112 = 0$$

97. Fill in the blanks so that the left side is a perfect square trinomial; that is, complete the square.

$$x^2 + 10x + \underline{\hspace{2cm}} = (x + \underline{\hspace{2cm}})^2$$

98. Solve the following quadratic equation by completing the square.

$$x^2 - 2x = 15$$

$$x = \underline{\hspace{2cm}}$$

99. Solve the following quadratic equation by completing the square.

$$a^2 - 10a + 29 = 0$$

100. Solve the equation using the quadratic formula.

$$2x^2 - 12x + 26 = 0$$

101. Solve the equation. Use factoring or the quadratic formula, whichever is appropriate. (Try factoring first. If you have any difficulty factoring, then go right to the quadratic formula.)

$$\frac{1}{2}r^2 = \frac{3}{4}r + \frac{1}{8}$$

102. The following equation has three solutions. Look for the greatest common factor, then use the quadratic formula to find all solutions.

$$8t^5 + 2t^4 = -10t^3$$

103. If the length of the shorter sides of a $45^\circ - 45^\circ - 90^\circ$ triangle is p , find the length of the hypotenuse, in terms of p .

