Math 055 Study Guide

Name: *Key*

This study guide represents the type of questions that are on the final but is not meant to be all-inclusive. Students will need to review **ALL** the content presented in the course.

Chapter 9

Solve.

1. $-2 = -8 + 2x$

    1. ___3___

2. $5 - 2x = x + 4$

    2. ___$\frac{1}{3}$___

3. $3 + 4(x - 2) = x + 1$

    3. ___2___

Translate the sentence into an equation, using the variable x. Then solve the resulting equation.

4. Three times a number plus 2 equals the number minus 4.

    4. ___$3x + 2 = x - 4$___
       ___$x = -3$___

5. The sum of three consecutive natural numbers is 75. Find the three numbers.

    5. ___$24, 25, 26$___

Solve the inequality.

6. $-2 - x \geq 8 + 3x$

    6. ___$x \leq -5/2$___

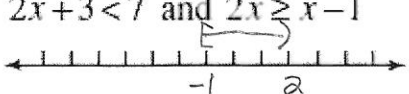7. $3 + 4(x - 2) < x + 1$

    7. ___$x < 2$___

8. Solve the formula $c = ab - 3b$ for a.

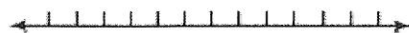   8. ___$a = \frac{c + 3b}{b}$___

Chapter 15

Graph the solution set to the compound inequality on a number line.

9. $2x + 3 < 7$ and $2x \geq x - 1$ $[-1, 2)$

10. $-2x + 3 \leq 5$ or $3x < x + 1$ $(-\infty, \infty)$

Solve the compound inequality and write the solution set in interval notation.

11. $-3 < 2 + \frac{1}{2}x \le 1$

11. $(-10, -2]$

12. $-2 - \frac{1}{3}x \ge -2$ or $-2 - \frac{1}{3}x < -3$

12. $(-\infty, 0] \cup (3, \infty)$

13. Solve the equation $|1 - 2x| = 2$.

13. $-\frac{1}{2}, \frac{3}{2}$

Solve each inequality. Write your answer in interval notation.

14. $|2 + 3x| < -5$

14. No Solutions

15. $|2 + 5x| + 1 \ge 4$

15. $(-\infty, -1] \cup [\frac{1}{5}, \infty)$

16. $|1 - 2x| < 2$

16. $(-\frac{1}{2}, \frac{3}{2})$

Chapter 11

17. Determine which ordered pair is a solution to the system of equations.
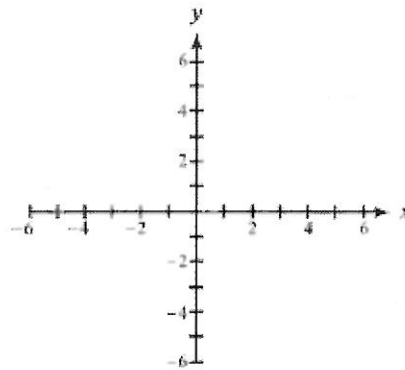
$(3, -4),\ (1, -1)$

$3x + 2y = 1$

$2x - 3y = 5$

17. $(1, -1)$ is a solution

18. Solve the system of equations graphically.

$2x + y = 15$

$x - y = 0$

$(5, 5)$

19. Use the method of substitution to solve the system of linear equations.

$3x + y = 4$

$-4x - y = -3$

19. $(-1, 7)$

20. Use the elimination method to solve the system of equations.

$2x + 5y = 4$

$x - 2y = -1$

20. $\left(\frac{1}{3}, \frac{2}{3}\right)$

21. Use the elimination method to solve the system of equations.

$x + 4y = 2$

$2x + 3y = 9$

21. $(6, -1)$

22. Determine whether the test point $(2, -2)$ is a solution to the system of linear inequalities.
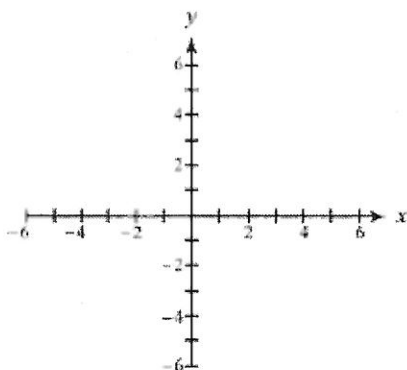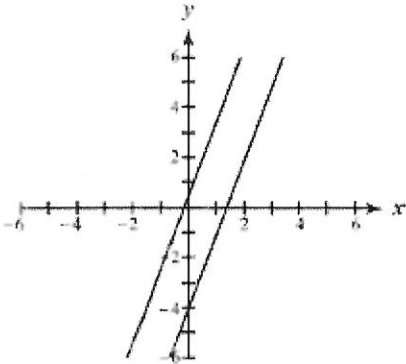
$x + 2y < 2$

$2x + y \geq -4$

22. No

23. Shade the solution set for the system of inequalities.

$2x - y > 0$

$x - 2y \leq 2$

24. The graphs of two equations are shown.
   (a) State the number of solutions to the system of equations.
   (b) Is the system consistent or inconsistent? If the system is consistent, state whether the equations are dependent or independent.

24. (a) _____None_____

   (b) _____Inconsistent_____

Chapter 12

Divide.

25. $\dfrac{12a^3 - 6a^2}{6a^2}$

25. ___$2a - 1$___

26. $\dfrac{3x^3 + 8x^2 + 1}{x + 2}$

26. ___$3x^2 + 2x - 4 + \dfrac{9}{x+2}$___

Chapter 13

Factor completely.

27. $2x^3 - 5x^2 - 3x$

27. ___$x(2x+1)(x-3)$___

28. $3x^4 - 3x^2 - 36$

28. ___$3(x-2)(x+2)(x^2+3)$___

29. $27x^4 - 64x$

29. ___$x(3x-4)(9x^2+12x+16)$___

30. $8x^4 + 125x$

30. ___$x(2x+5)(4x^2-10x+25)$___

31. $3b^4 + 48$

31. ___$3(b^4+16)$___

Solve by factoring completely.

32. $x^2 - 9 = 0$

32. $x = \pm 3$

33. $2x^2 = 5x - 3$

33. $x = 1, \frac{3}{2}$

34. $4x^2 + 49 = -28x$

34. $x = -\frac{7}{2}$

35. $x(x+2) = 15$

35. $x = -5, 3$

36. $6x^5 = 6x^3$

36. $x = -1, 0, 1$

37. $x^4 - 10x^2 + 9 = 0$

37. $x = -3, -1, 1, 3$

Chapter 14

38. Evaluate the expression $\dfrac{2x}{x-4}$ for $x = -1$.

38. $\frac{2}{5}$

39. Find any x-value that makes $\dfrac{x+2}{x-3}$ undefined.

39. $x \neq 3$

Simplify the expression.

40. $\dfrac{x^2 - 16}{x+4}$

40. $x - 4$

41. $\dfrac{12a^2 - 6a}{6a}$

41. $2a - 1$

42. $\dfrac{x+3}{x^2-9} \cdot \dfrac{x-3}{x+3}$

42. $\frac{1}{x+3}$

43. $\dfrac{x+1}{2x^2} \div \dfrac{2x+2}{6x^2}$

43. $\frac{3}{2}$

44. $\dfrac{2a}{3a+2} - \dfrac{a+4}{3a+2}$

44. $\underline{\quad \dfrac{9-4}{3a+2} \quad}$

45. $\dfrac{2}{x-3} - \dfrac{5}{(x-3)^2}$

45. $\underline{\quad \dfrac{2x-11}{(x-3)^2} \quad}$

46. $\dfrac{9}{4x} - \dfrac{3}{2x}$

46. $\underline{\quad \dfrac{3}{4x} \quad}$

47. $\dfrac{1}{x} + \dfrac{4}{x-1}$

47. $\underline{\quad \dfrac{5x-1}{x(x-1)} \quad}$

Simplify the complex fraction.

48. $\dfrac{\dfrac{3x}{4y}}{\dfrac{x}{2y^2}}$

48. $\underline{\quad \dfrac{3y}{2} \quad}$

49. $\dfrac{\dfrac{1}{x} - \dfrac{1}{x-2}}{\dfrac{2}{x} + \dfrac{5}{x-2}}$

49. $\underline{\quad \dfrac{-2}{7x-4} \quad}$

Solve the equation and check your answer.

50. $\dfrac{9}{6} = \dfrac{12}{y}$

50. $y = 8$ $\underline{\qquad}$

51. $\dfrac{18}{3x-4} = 3$

51. $x = \dfrac{10}{3}$ $\underline{\qquad}$

52. $\dfrac{7}{3x} + \dfrac{2}{2x} = \dfrac{5}{6}$

52. $x = 4$ $\underline{\qquad}$

53. $\dfrac{6}{a} + \dfrac{6}{a+1} = 5$

53. $a = \dfrac{-3}{5}, 2$ $\underline{\qquad}$

54. $\dfrac{5}{x-2} - \dfrac{2}{x+2} = \dfrac{3}{x^2-4}$

54. $x = \dfrac{-11}{3}$ $\underline{\qquad}$

55. Solve $y = \dfrac{3}{2x-3}$ for x.

55. $\underline{\quad x = \dfrac{3y+3}{2y} \quad}$

56. Suppose y is directly proportional to x.
   (a) If $y = 9$ when $x = 14$, find k so that $y = kx$.
   (b) Then use $y = kx$ to find y when $x = 10$.

56. (a) $\underline{\quad k = \dfrac{9}{14} \quad}$

   (b) $\underline{\quad y = \dfrac{45}{7} \quad}$

Chapter 17

Write the expression in radical notation.

57. $7^{\frac{2}{3}}$

57. $\underline{\quad \sqrt[3]{7^2} \ \text{or} \ \sqrt[3]{49} \quad}$

Simplify the expression. Assume that all variables are positive.

58. $\sqrt[3]{125y^3}$

58. $\underline{\quad 5y \quad}$

59. $\left(\sqrt{3} - \sqrt{5}\right)\left(\sqrt{3} + \sqrt{5}\right)$

59. $\underline{\quad 3 - 5 = -2 \quad}$

60. $\left(3x^2 y^3\right)^3$

60. $\underline{\quad 27x^6 y^9 \quad}$

61. $\left(\dfrac{x^2}{y^3}\right)^{-\frac{1}{2}}$

61. $\underline{\quad \dfrac{y^{3/2}}{x} \quad}$

62. $\sqrt{x^3} \cdot \sqrt{x^5}$

62. $\underline{\quad x^4 \quad}$

63. $\dfrac{\sqrt{8}}{\sqrt{2}}$

63. $\underline{\quad 2 \quad}$

64. $5\sqrt{2} + 3\sqrt{3} - 4\sqrt{2}$

64. $\underline{\quad \sqrt{2} + 3\sqrt{3} \quad}$

65. $5\sqrt[3]{16} - 3\sqrt[3]{2}$

65. $\underline{\quad 7\sqrt[3]{2} \quad}$

66. Solve $\sqrt{20 - 2x} = x + 2$.

66. $\underline{\quad x = 2 \quad}$

67. Rationalize the denominator of $\dfrac{1}{\sqrt{7} - \sqrt{5}}$.

67. $\underline{\quad \dfrac{\sqrt{7} + \sqrt{5}}{2} \quad}$

Write the complex expression in standard form.

68. $(3-5i)-(8-2i)$

68. $\underline{\quad -5-3i \quad}$

69. $\dfrac{3+5i}{3+i}$

69. $\underline{\quad \frac{7}{5}+\frac{6}{5}i \quad}$

70. $(-2.3-4.1i)-(6.2-8.7i)$

70. $\underline{\quad -8.5-4.6i \quad}$

71. $\dfrac{-1.7+5.2i}{0.6-1.1i}$ *Clear decimals in fractions*

71. $\underline{\quad \frac{-674}{157}+\frac{125}{157}i \quad}$

Chapter 18

72. Find the vertex and axis of symmetry for the graph of $f(x)=-\frac{1}{2}x^2+2x-5$.
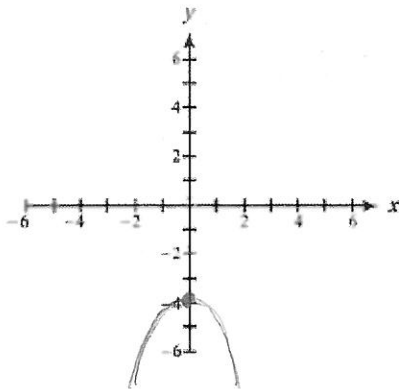
Evaluate $f(-2)$.

72. $\underline{\quad (2,-3);\ X=2 \quad}$

$\underline{\quad f(-2)=-11 \quad}$

73. Graph $f(x)=-x^2-4$.

$-x^2+0x-4$ vertex $(0,-4)$
opens down

74. Solve the quadratic equation $3x^2-5x-12=0$.

74. $\underline{\quad X=-\frac{4}{3},\ 3 \quad}$

75. Solve the quadratic equation $2x^2=12-x^2$.

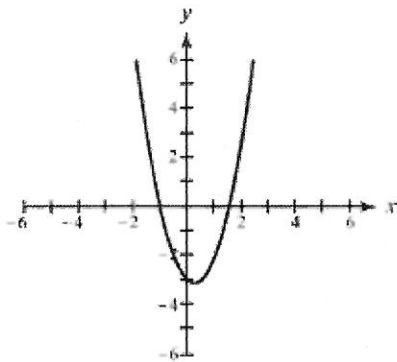75. $\underline{\quad X=-2,\ 2 \quad}$

76. Solve $x^2+3x=2$ by completing the square.

76. $\underline{\quad \dfrac{-3\pm\sqrt{17}}{2} \quad}$

77. Solve $x(-3x+4)=2$ by using the quadratic formula.

77. $\underline{\quad \frac{2}{3}+\frac{\sqrt{2}}{3}i \quad}$

78. A graph of $y = ax^2 + bx + c$ is shown.

(a) State whether $a > 0$ or $a < 0$.

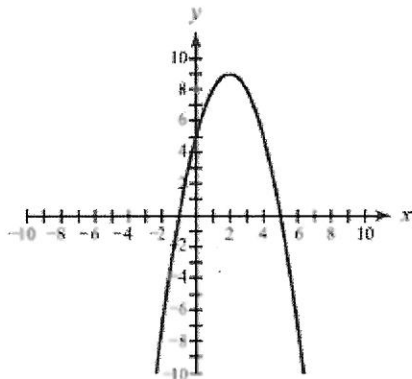(a) _____ $a > 0$ _____

(b) Solve $ax^2 + bx + c = 0$.

(b) _____ $x = -1, \frac{3}{2}$ or $x = -1, 1\frac{1}{2}$ _____

(c) Determine whether the discriminant is positive, negative, or zero.

(c) _____ Positive _____

79. The graph of $y = ax^2 + bx + c$ is shown.
Solve each equation or inequality. *Write the answer in interval notation.*

(a) $ax^2 + bx + c = 0$

79. (a) _____ $x = -1, 5$ _____

(b) $ax^2 + bx + c < 0$

(b) _____ $(-\infty, -1] \cup [5, \infty)$ _____

(c) $ax^2 + bx + c \geq 0$

(c) _____ $[-1, 5]$ _____

80. Solve $2x^2 - 9x < 0$. Write your answer in interval notation.

80. _____ $\left(0, \frac{9}{2}\right)$ _____

81. Solve $x^4 + x^2 - 20 = 0$.

81. _____ $x = -2, 2$ _____

82. Solve $2x^2 + x + 4 = 0$.

82. _____ $x = \frac{-1 \pm \sqrt{31}}{4}i$ _____