

MAT1033 – Intermediate Algebra – Final Exam Review
Textbook: Beginning & Intermediate Algebra, 5th Ed., by Martin-Gay

Section 2.3

Solve the equation.

1) $9x - (3x - 1) = 2$

2) $\frac{1}{3}x + 2 = \frac{1}{6}x + \frac{4}{3}$

3) $-0.07y + 0.12(6000 - y) = 0.06y$

Section 2.4

Solve.

4) Four times the sum of some number plus 2 is equal to 8 times the number minus 20. Find the number.

5) The length of a rectangular room is 9 feet longer than twice the width. If the room's perimeter is 210 feet, what are the room's dimensions?

Section 2.5

Solve the formula for the specified variable.

6) $P = 2L + 2W$ for L

7) $V = \frac{1}{3}Ah$ for A

Section 2.6

Solve. If needed, round to two decimal places.

8) Robin got a 4% raise in her salary from last year. This year she is earning \$37,440. How much did she make last year?

9) How much pure acid should be mixed with 6 gallons of a 50% acid solution in order to get an 80% acid solution?

Section 2.7

Solve.

10) If \$2000 is invested at 10% simple annual interest, how much should be invested at 12% annual simple interest so that the total yearly income from both investments is \$5000?

Section 2.8

Solve the inequality. Graph the solution set and write it in interval notation.

11) $-21x - 9 \leq -3(6x - 5)$

12) $3 \leq 3x - 3 \leq 18$

Section 3.1

Complete the ordered pair so that it is a solution of the given linear equation.

13) $6x + y = -22$; $(-5, \quad)$, $(0, \quad)$, $(1, \quad)$

Section 3.2

Find three ordered pair solutions by completing the table. Then use the ordered pairs to graph the equation.

14) $y = -3x + 2$

x	y
0	
1	
-1	

Section 3.3

Graph the linear equation by finding and plotting its intercepts.

15) $-6x - 12y = 12$

Graph the linear equation.

16) $x = -2$

17) $y = -2$

Section 3.4

Find the slope of the line that passes through the given points.

18) $(9, 0)$ and $(0, -1)$

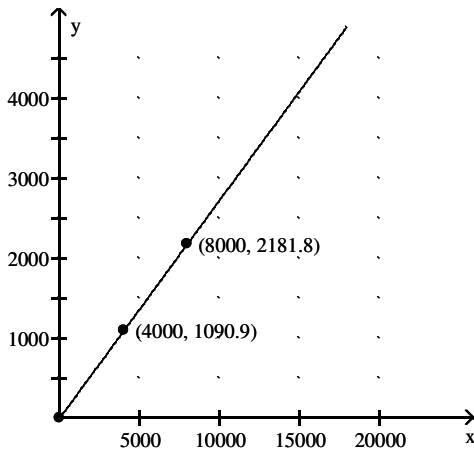
19) $(-8, 10)$ and $(-8, 4)$

Determine whether the pair of lines is parallel, perpendicular, or neither.

20) $3x - 4y = 16$
 $8x + 6y = 1$

Find the slope of the line and write the slope as a rate of change with proper units.

21) The graph shows the total cost y (in dollars) of owning and operating a mini-van where x is the number of miles driven.



Section 3.5

Use the slope-intercept form to graph the equation.

22) $y = \frac{1}{2}x + 5$

Find an equation of the line with the given slope that passes through the given point. Write the equation in the form $Ax + By = C$.

23) $m = 4$; $(9, 7)$

24) $m = -\frac{2}{3}$; $(5, 2)$

Find an equation of the line described. Write the equation in slope-intercept form if possible.

25) Slope 2, through $(-6, -3)$

26) Through $(2, -26)$ and $(-7, 46)$

Find an equation of the line.

27) Perpendicular to $y = 10$, through $(-3, -1)$

Section 3.6

Find the domain and the range of the relation.

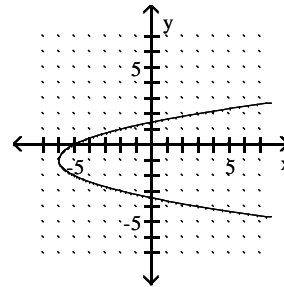
28) $\{(9, 2), (-7, 2), (-5, 2)\}$

Determine whether the relation is also a function.

29) $\{(-2, 2), (2, -2), (4, -9), (8, -5), (10, -2)\}$

Determine whether the graph is the graph of a function.

30)



Evaluate the function.

31) Find $f(-2)$ when $f(x) = 3x^2 + 2x + 2$.

Section 4.1

Solve the system of equations by graphing.

32) $\begin{cases} y = -x + 2 \\ y = 2x + 8 \end{cases}$

33) $\begin{cases} x + y = -6 \\ x + y = -4 \end{cases}$

Sections 4.2-4.3

Solve the system of equations by the substitution or addition method.

34) $\begin{cases} -2x + y = -1 \\ -3x - 2y = -19 \end{cases}$

35) $\begin{cases} 2x + y = 10 \\ 8x + 4y = 40 \end{cases}$

36) $\begin{cases} 8x + 5y = 60 \\ -2x - 5y = -90 \end{cases}$

37) $\begin{cases} -3x + 5y = -7 \\ -5x + 3y = -1 \end{cases}$

Section 4.5**Solve.**

38) One number is 10 less than a second number. Twice the second number is 59 more than 5 times the first. Find the two numbers.

39) Devon purchased tickets to an air show for 8 adults and 2 children. The total cost was \$140. The cost of a child's ticket was \$5 less than the cost of an adult's ticket. Find the price of an adult's ticket and a child's ticket.

Section 9.4**Graph the inequality.**

40) $5x + y > -10$

41) $-3x - 5y \leq 15$

Graph the solution of the system of linear inequalities.

42)
$$\begin{cases} y \geq x + 3 \\ y \geq 5 - x \end{cases}$$

43)
$$\begin{cases} y + 2x \geq -7 \\ 3x - 4y \leq 8 \end{cases}$$

Section 5.1**Simplify the expression.**

44)
$$\left(\frac{3x^2y^2}{z^3} \right)^2$$

45)
$$\frac{15m^{13}n^{13}}{3m^{12}n^{10}}$$

46) $-4y^0$

Section 5.2**Perform the indicated operation.**

47) $(-6y + 9) + (-4y^2 + 3y - 4)$

48) $(5n^6 - 19n^5 + 13) - (2n^6 - 7n^5 + 9)$

Section 5.3**Multiply.**

49) $(3x - 12)(x + 6)$

50) $(a - 6)(a^2 + 6a - 9)$

Section 5.4**Multiply.**

51) $(9a - 7)^2$

52) $(5p + 12)(5p - 12)$

Section 5.5**Simplify the expression. Write the result using positive exponents only.**

53) 4^{-3}

54) $(x^{-5}y^6)^{-3}$

55)
$$\frac{2^{-9}x^{-5}y^4}{2^{-6}x^{-8}y^8}$$

Evaluate the expression using exponential rules. Write the result in standard notation.

56)
$$\frac{5.6 \times 10^2}{0.8 \times 10^{-4}}$$

Section 5.6**Perform the division.**

57)
$$\frac{-40x^4 + 56x^3 - 40x^2}{-8x^3}$$

Find the quotient using long division.

58)
$$\frac{x^2 + 12x + 23}{x + 9}$$

Section 6.1**Factor completely. If the polynomial cannot be factored, write "prime."**

59) $32x^9y^8 - 16x^7y^5 - 24x^4y^3$

60) $s(t^2 + 6) - 7(t^2 + 6)$

61) $xy - 2yz + 9x - 18z$

Section 6.2

Factor completely. If the polynomial cannot be factored, write "prime."

62) $x^2 - x - 20$

63) $3x^2 - 9xy - 12y^2$

64) $x^2 - x - 45$

Sections 6.3-6.4

Factor completely. If the polynomial cannot be factored, write "prime."

65) $6y^2 - 17y + 12$

66) $12y^2 + 54y - 30$

67) $64x^2 + 80x + 25$

68) $3x^2 + 2x - 8$

Section 6.5

Factor completely. If the polynomial cannot be factored, write "prime."

69) $25x^2 - 49$

70) $x^4 - 81$

71) $x^3 - 8$

72) $54x^3 + 250$

Section 6.6

Solve the equation.

73) $x^2 - 5x + 6 = 0$

74) $x(3x + 16) = 12$

75) $81x^3 - x = 0$

Section 7.1

Find the domain of the rational expression.

76) $f(x) = \frac{4x - 7}{x^2 - 4}$

Simplify the expression.

77) $\frac{2x - 14}{35 - 5x}$

78) $\frac{2x + 2}{10x^2 + 18x + 8}$

Section 7.2

Multiply or divide as indicated.

79) $\frac{x^2 + 9x + 20}{x^2 + 12x + 32} \cdot \frac{x^2 + 8x}{x^2 - 3x - 40}$

80) $\frac{(x + 5)(x - 6)}{4x} \div \frac{5x + 25}{20x^5}$

81) $\frac{(x + 6)^2}{x - 6} \div \frac{x^2 - 36}{6x - 36}$

Section 7.3

Find the least common denominator (LCD).

82) $\frac{1}{x^2 + 14x + 49} , \frac{1}{x^2 + 7x}$

83) $\frac{7}{x^2 - 6x + 5} , \frac{7}{x^2 + 3x - 4}$

Perform the indicated operation. Simplify if possible.

84) $\frac{7x + 4}{x^2 - 2x - 63} - \frac{6x - 3}{x^2 - 2x - 63}$

Section 7.4

Perform the indicated operation. Simplify if possible.

85) $\frac{x}{2x - 3} - \frac{3}{8x - 12}$

86) $\frac{4}{x - 6} + \frac{13}{6 - x}$

87) $\frac{x}{x^2 - 16} - \frac{6}{x^2 + 5x + 4}$

Section 7.5

Solve the equation.

88) $1 + \frac{1}{x} = \frac{12}{x^2}$

89) $\frac{3}{y+2} - \frac{7}{y-2} = \frac{8}{y^2-4}$

90) $\frac{1}{x+7} + \frac{2}{x+3} = \frac{-4}{x^2+10x+21}$

Section 7.6

Solve.

91) If three times a number added to 4 is divided by the number plus 11, the result is four thirds. Find the number.

92) Mark can finish a landscaping job in 2 hours, while it takes Rachel 3 hours to finish the same job. If Mark and Rachel will work together on the job, and the cost of labor is \$60 per hour, what should the labor estimate be? (Round to the nearest cent, if necessary.)

93) A car travels 400 miles on level terrain in the same amount of time it travels 160 miles on mountainous terrain. If the rate of the car is 30 miles per hour less in the mountains than on level ground, find its rate in the mountains.

Section 7.7

Simplify.

94) $\frac{\frac{x+1}{6}}{\frac{3x-1}{30}}$

95) $\frac{\frac{10}{a} + 10}{\frac{10}{a} - 10}$

96) $\frac{1 - \frac{3}{x}}{x - \frac{9}{x}}$

Section 10.1

Find the root. Assume that all variables represent nonnegative real numbers.

97) $\sqrt{\frac{49}{100}}$

98) $-\sqrt{100}$

99) $\sqrt[3]{-8x^6}$

100) $\sqrt[4]{81x^8y^{16}}$

Section 10.2

Use radical notation to write the expression. Simplify if possible.

101) $16^{1/2}$

Write with positive exponents. Simplify if possible.

102) $25^{-3/2}$

Use the properties of exponents to simplify the expression. Write with positive exponents.

103) $(b^5)^{2/5}$

104) $z^{-2/7} \cdot z^{3/7}$

Section 10.3

Simplify the radical expression. Assume that all variables represent positive real numbers.

105) $\sqrt{\frac{80x^2y}{49}}$

106) $\sqrt{75k^7q^8}$

107) $\sqrt[3]{40}$

108) $\sqrt[3]{64x^4y^5}$

Section 10.4

Add or subtract. Assume all variables represent positive real numbers.

$$109) -2\sqrt{48} + 10\sqrt{192} - 6\sqrt{108}$$

$$110) 4\sqrt[3]{a} + \sqrt[3]{64a}$$

Multiply, and then simplify if possible.

$$111) 6\sqrt{5}(\sqrt{11} + \sqrt{5})$$

$$112) (\sqrt{7} + \sqrt{13})(\sqrt{7} - \sqrt{13})$$

Section 10.5

Rationalize the denominator and simplify.

$$113) \frac{2\sqrt{7}}{\sqrt{3}}$$

Write the conjugate of the expression.

$$114) -8\sqrt{5} - 11\sqrt{y}$$

Rationalize the denominator and simplify.

$$115) \frac{\sqrt{5} - \sqrt{6}}{\sqrt{5} + \sqrt{6}}$$

Section 10.6

Solve.

$$116) \sqrt{4x + 6} - 7 = 0$$

$$117) \sqrt{5x - 11} = 5 - x$$

- 118) Scott set up a volleyball net in his backyard. One of the poles, which forms a right angle with the ground, is 7 feet high. To secure the pole, he attached a rope from the top of the pole to a stake 3 feet from the bottom of the pole. To the nearest tenth of a foot, find the length of the rope.

Section 10.7

Write in terms of i.

$$119) \sqrt{-16}$$

Perform the indicated operation. Write the result in the form $a + bi$.

$$120) (3 + 7i) - (-8 + i)$$

$$121) (7 + 2i)^2$$

$$122) \frac{8 - 3i}{4 + 2i}$$

Section 11.2

Use the quadratic formula to solve the equation.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$123) x^2 + 14x + 34 = 0$$

$$124) x^2 - 6x + 25 = 0$$

Solve.

- 125) A ball is thrown downward with an initial velocity of 28 meters per second from a cliff that is 40 meters high. The height of the ball is given by the quadratic equation $h = -4.9t^2 - 28t + 40$ where h is in meters and t is the time in seconds since the ball was thrown. Find the time it takes the ball to hit the ground. Round your answer to the nearest tenth of a second.