MATD 0370 ELEMENTARY ALGEBRA

Review for Test 1

Test 1 covers sections 1.1 - 1.8 and 2.1 - 2.6.
Bring a non-graphing calculator and something to write with and erase with.
Be prepared to show your work on all test problems in order to receive full or partial credit.

*Fill in the appropriate symbol: < . > , or =*

1. \[-\frac{2}{3} \square -0.8\]
2. \[|2 - 5| \square 7\]
3. \[3.008 \square 3.09\]
4. \[-4.102 \square -4.2\]

*Evaluate. Express your answer as a reduced fraction or an integer (no decimals).*

5. \[\frac{2 - \frac{5}{3}}{3}\]
6. \[\frac{15 \cdot \frac{5}{3}}{3}\]
7. \[\frac{\frac{6}{13} + \frac{5}{26}}{9}\]
8. \[\frac{\frac{1}{12} + \frac{5}{9}}{3}\]
9. \[\frac{\frac{1}{6} - \frac{1}{12}}{11}\]
10. \[\left(-\frac{2}{3}\right) \left(\frac{21}{5}\right) \left(-\frac{25}{4}\right)\]
11. \[\left(-\frac{2}{3}\right)^3\]
12. \[\frac{2}{3} - \frac{1}{2} \cdot \frac{1}{3} + 2\]

*Evaluate.*

13. \[-1.68 - (-3.02)\]
14. \[-5^2\]
15. \[(-5)^2\]
16. \[3(1 - 2)^3\]
17. \[-2|5 - 8|\]
18. \[3 \cdot (|7 - 5| - |5 - 7|)\]
19. \[-(3 - 12 \div 4 \cdot 3)^2\]
20. \[3 + (3 - 5)^2 \div 2(-2)\]
21. \[8 - 3 + 4 - (2 - 6) \div 4\]
Simplify.

22. \(3(x-1)+2(-4x+5)\)  
23. \(2(x-5)-3(x+1)\)  
24. \(\frac{1}{3}(2x-9)+\frac{2}{3}x-1\)

25. Evaluate \(-x^2-2x+3\) at \(x=-2\)

26. Evaluate \(\frac{mn^2}{m-n}\) at \(m=2\) and \(n=-5\)

Solve the equations. (Give no decimal answers in fraction problems.)

27. \(-2 = x - 5\)  
28. \(-1.12x = -0.36\)  
29. \(x - \frac{1}{2} = 5\)  
30. \(\frac{2}{3}x = -8\)  
31. \(-5x = 37\)

32. \(5x + 8 = 2(x + 4)\)  
33. \(\frac{1}{3}x - \frac{1}{2} = -1\)  
34. \(-3x + 4 = x - 4\)  
35. \(2(x-3) = 3x - 2(x+1)\)

36. State whether the equation is an identity or a contradiction.
   a. \(3(x-1) = 3(x-2) + 3\)
   b. \(2x - 3 = x + (x + 5)\)

37. Solve for \(y\): \(ax - by = c\)

Solve the inequality. Express your answer in set-builder notation and graph it.

38. \(2 - 5t \geq 7\)  
39. \(\frac{2}{3}x - \frac{1}{2} > 2\)  
40. \(2y - 5 \leq 5y + 12\)

41. The formula for the area of a triangle is \(A = \frac{1}{2}bh\). Solve this formula for \(h\).
42. Rewrite the expression \( ab + (c + d) \) using:
   a. The commutative property of addition
   b. The commutative property of multiplication
   c. The associative property of addition

43. Rewrite the expression \( (rs)w + yz \) using the associative property of multiplication

44. Identify which of the following list of numbers are of each type below.

   \[ 1.1, -5, \frac{1}{4}, \pi, 0, -\frac{5}{3}, \sqrt{2} \]

   a. real numbers
   b. rational numbers
   c. integers
   d. whole numbers
   e. irrational numbers

45. A beam is measured at \( x \) feet and \( y \) inches. Give an expression in terms of \( x \) and \( y \) for the length of the beam in inches.

46. Write an algebraic expression to represent “two less than three times a number”, with \( x \) as the number.

47. Interest earned on a principal of \( P \) dollars is given by the simple interest formula
   \[ I = Prt \], where \( r \) is the interest rate, as a decimal, and \( t \) is time, in years. What is the
   interest earned in 2 years on a principal of $4000 at an interest rate of 6.5%?

48. What number is 30% of 12?

49. 80% of what number is 196?

50. A bookstore has a 15% off sale on every book in the store. Round answers to nearest cent.
    a. What is the sale price of a gardening book originally priced at $19.95?
    b. What was the original price of a cook book on sale for $18.66?

51. Income tax for an income of $15,000 is calculated as follows: no tax is paid on the first
    $6500, and 15% tax is paid on the remaining amount. What is the income tax on $15,000?
52. Sales tax in Austin is 8.25%. [Round answers to the nearest cent.]
   
   a. What is the pre-tax price of a shovel whose price including tax is $22.72?
   
   b. What is the price including tax of a dictionary that costs $23.95 before tax?

*Show all steps* solving the word problems below. You must define the unknown value(s) using at least one variable, create an equation, and solve the equation. Express your answer(s) with units, if appropriate.

53. The sum of three consecutive odd integers is –39. What are the integers?

54. A salesperson is paid $60 in wages for one day of work, plus $2.10 for every pair of boots sold. How many pairs of boots must be sold to earn a total of $97.80 in one day?

55. The length of a rectangle is three feet less than twice the width. Find the length and width if the perimeter is 21 feet.

56. Two angles are complementary if the sum of their angles is 90 degrees. One angle is 6 degrees less than three times its complement. Find the two angles.

57. One angle of a triangle is 15 degrees more than the smallest angle. The third angle is 22 degrees more than the sum of the other two angles. Find all three angles.
ANSWERS:

1. \(-\frac{2}{3} > -0.8\)

2. \(|2 - 5| < 7\)

3. \(3.008 < 3.09\)

4. \(-4.102 > -4.2\)

5. \(-1\)

6. \(\frac{25}{3}\)

7. \(\frac{12}{5}\) or \(2\frac{2}{5}\)

8. \(\frac{23}{36}\)

9. \(\frac{1}{12}\)

10. \(\frac{35}{2}\)

11. \(-\frac{8}{27}\)

12. \(\frac{5}{2}\) or \(2\frac{1}{2}\)

13. 1.34

14. -25

15. 25

16. -3

17. -6

18. 0

19. -36

20. -1

21. 10

22. 7\(x - 6\)

23. -\(x - 13\)

24. \(\frac{4}{3}x - 4\)

25. 3

26. \(\frac{50}{7}\)

27. \(x = 3\)

28. \(x = 0.321\)

29. \(x = \frac{11}{2}\) or \(5\frac{1}{2}\)

30. \(x = -12\)

31. \(x = -7.4\) or \(-\frac{37}{5}\)

32. \(x = 0\)

33. \(x = -\frac{3}{2}\)

34. \(x = 2\)

35. \(x = 4\)

36. a. identity

   b. contradiction

37. \(y = \frac{ax - c}{b}\)

38. \(\{t | t \leq -1\}\)

39. \(\left\{x | x > \frac{15}{4} \text{ or } \frac{3}{4}\right\}\)

40. \(\{y | y \geq -\frac{17}{3} \text{ or } -5\frac{2}{3}\}\)

41. \(h = \frac{2A}{b}\)
42.  
   a.  \( ab + (d + c) \) or \( (c + d) + ab \)  
   b.  \( ba + (c + d) \)  
   c.  \( (ab + c) + d \)  

43.  \( r(sw) + yz \)  

44.  
   a.  \( 1.1, -5, 2\frac{1}{4}, \pi, 0, -\frac{5}{3}, \sqrt{2} \)  
   b.  \( 1.1, -5, 2\frac{1}{4}, 0, -\frac{5}{3} \)  
   c.  \(-5, 0 \)  
   d.  \( 0 \)  
   e.  \( \pi, \sqrt{2} \)  

45.  \( 12x + y \) inches  

46.  \( 3x - 2 \)  

47.  $520 in interest  

48.  3.6  

49.  245  

50.  
   a.  Sale price is $16.96  
   b.  Original price was $21.95  
   CAUTION: $21.46 may seem close but it is incorrect!  

51.  $1275  

52.  
   a.  $20.99  
   CAUTION: $20.85 may seem close but it is incorrect!  
   b.  $25.93  

53.  Integers: \( x, x + 2, \) and \( x + 4 \)  
   Equation: \( x + (x + 2) + (x + 4) = -39 \)  
   Answer: \(-15, -13, \) and \(-11 \)  

54. Let \( x \) be the number of pairs of boots.  
   Equation: \( 60 + 2.10x = 97.80 \)  
   Answer: 18 pairs of boots  

55. Let \( w \) be the width. Length is \( 2w - 3 \).  
   Equation: \( 2w + 2(2w - 3) = 21 \) \ OR \( w + w + (2w - 3) + (2w - 3) = 21 \)  
   Answer: width = 4.5 feet, length = 6 ft  

56. Angles (in degrees):  
\[ \rightangle \]  
   \[ 3x - 6 \]  
   \[ x \]  
   Equation: \( x + (3x - 6) = 90 \)  
   Answer: \( 24^\circ \) and \( 66^\circ \)  

57. Angles (in degrees):  
\[ \righttriangle \]  
   \[ x \]  
   \[ x + 15 \]  
   \[ x + (x + 15) + 22 \]  
   Equation: \( 4x + 52 = 180 \) \ OR \( x + (x + 15) + [x + (x + 15) + 22] = 180 \)  
   Answer: \( 32^\circ, 47^\circ, \) and \( 101^\circ \)