Meramec Intermediate Algebra TEST 1 Solution Spring 2008

NAME: _____ Score _____/100
Please print

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Circle T or F, whichever is correct. 2 pts each for 1 – 24.

1. T F The opposite of $-\frac{3}{4}$ is $-\frac{4}{3}$.

2. T F **$\mathbf{N \subset R}$.**

3. T F $\{x \mid x \in R \text{ and } 1 < x < 5\} = \{2, 3, 4\}$

4. T F Every integer is a real number.

5. T F $\{3, b, x, 5\}$ is an example of the roster method for specifying a set.

6. T F $\left\{3, \frac{2}{3}, \sqrt{5}, \pi\right\}$ is a set of real numbers.

7. T F Every real number is a rational number.

8. T F Division by 0 is undefined.

9. T F If x is a real number, then $-x$ is negative.

10. T F If Q is the set of rational numbers and F is the set of irrational numbers, then $Q \subset F$.

Fill in each of the blanks to make the statements true.

11. A set is a collection of objects.

12. The null set is the set with no elements.

13. The set A is a subset of the set B if every element of set A is an element of set B.

14. If A and B are sets such that A is a subset of B and B is a subset of A, then A = B.

15. The product of two real numbers with the same signs is positive.

16. The product of two real numbers with different signs is negative.

17. The transitive property of equality states that if a = b and b = c, then a = c.

18. A real number which is not rational is irrational.

19. A prime number is a natural number greater than 1 which has only 1 and itself as factors.

20. Absolute value is defined by $|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

21. Are there any irrational prime numbers ? No

22. If a and b are real numbers and ab = 0, then a = 0 or b = 0.

23. Use the roster method to describe $\{x \mid x \in Z \text{ and } |x| < 3\}$ {-2, -1, 0, 1, 2}

24. Insert the correct symbol (<, =, or >) in the blank.
If x and y are real numbers and x < y, then –3x > –3y

25. Give two examples of each of the following types of Real numbers. Choose your examples so they are in the set listed but are not in a smaller set. For example, give two examples of integers which are not whole numbers. F designates the irrational numbers (5 pts)

N 1, 2 Z -1, -2 W 0 Q $\frac{1}{2}, \frac{3}{4\frac{1}{2}}$ F $\pi, \sqrt{2}$

Other answers are possible

26. List all of the possible subsets of { 1, 2, 3 }---There are eight subsets including the set { 1, 2, 3 }itself and the empty set. So you need to list six other subsets. Use the roster method of specifying the sets. (5 pts)

a. {1} b. {2} c. {3} d. {1, 2} e. {1,3} f. {2,3}

2 pts each for 27 - 32

27. $\frac{0}{-3} = 0$

28. $(-2)^3 = -8$

29. $-7^2 = -49$

30. $-8 - (-10) = -8 + 10 = 2$

31. $3(5 - 7)^2 = 3(-2)^2 = 3(4) = 12$

32. What property of the real numbers justifies that 3(x + 2y) = 3x + 6y? Give the name of the property.
The Distributive Property

Show your work on exercises 33 – 36 inclusive. (5 pts each for 33 – 38)

33. $25 - [(3 - 5) + (14 - 18)]^2 = 25 - [(-2) + (-4)]^2 = 25 - [-6]^2 = 25 - 36 = -11$

34. Simplify the expression $3x - 2(x - 5) + x$ = **$3x - 2x + 10 + x = 3x - 2x + x + 10 = 2x + 10$**

35. Simplify $-5 + 7 - 3 - (-10)$ = $-5 + 7 - 3 + 10 = 2 + 7 = 9$

36. Simplify $\dfrac{\left(\frac{1}{3}\right)9 - 7}{3 + \left(\frac{1}{2}\right)4} = \dfrac{3 - 7}{3 + 2} = \dfrac{-4}{5}$

37. Law of Trichotomy: If a and b are real numbers, then one and only one of the following is true:

i. $a > b$
ii. $a = b$
iii. $a < b$

38. Complete the following diagram to convert the subtraction problem to an equivalent addition problem.

$$\begin{array}{ccc} -3 & - & (-5) \\ \downarrow & \downarrow & \downarrow \\ -3 & + & 5 \end{array}$$