

NAME: _____ Score _____/100
Please print

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Circle T or F, whichever is correct.

1. T F The opposite of $-\frac{3}{4}$ is $-\frac{4}{3}$.
2. T F $\mathbf{N} \subset \mathbf{R}$.
3. T F $\{x | x \in \mathbf{R} \text{ and } 1 < x < 5\} = \{2, 3, 4\}$
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 _____ is a collection of objects.
12. The _____ is the set with no elements.
13. The set A is a subset of the set B if every element of set _____ is an element of set _____.
14. If A and B are sets such that A is a subset of B and B is a subset of A , then _____.
15. The product of two real numbers with the same signs is _____.
16. The product of two real numbers with different signs is _____.
17. The transitive property of equality states that if $a = b$ and $b = c$, then _____.
18. A real number which is not rational is _____.
19. A prime number is a natural number greater than _____ which has only _____ and _____ as factors.

20. Absolute value is defined by _____ = $\left\{ \begin{array}{l} \text{_____} \\ \text{_____} \end{array} \right.$

21. Are there any irrational prime numbers ? _____

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

23. Use the roster method to describe $\{x \mid x \in \mathbb{Z} \text{ and } |x| < 3\}$

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
N _____ Z _____ W _____ Q _____ F _____

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.
a. _____ b. _____ c. _____ d. _____ e. _____ f. _____

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

28. $(-2)^3 =$

29. $-7^2 =$

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

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

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

Show your work on exercises 33 – 36 inclusive.

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

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

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

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

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

- i. _____
- ii. _____
- iii. _____

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

