Due: Aug. 06, 2024

1. Write the following in set notation:

   a) The set of all real numbers less than 5.

   b) The set of all real numbers greater than 8, but less than 73.

2. Given the sets: $S_1 = \{2, 4, 6\}$, $S_2 = \{7, 2, 6\}$, $S_3 = \{4, 2, 6\}$ and $S_4 = \{2, 4\}$, find

   a) $S_1 \cup S_3$

   b) $S_2 \cap S_4$

   c) $S_3 \cup S_1 \cup S_4$

   d) $S_1 \cap S_3 \cap S_4$

3. Enumerate all of the subsets of the set $\{1, 7, 13\}$.

4. If the *domain* for the function $y = 10 - 4x$ is the set $\{x \mid -2 \leq x \leq 3\}$ find the *range* of the function and express it as a set.

5. If the *domain* for the function $y = 3x$ is the set $\{x \mid x \geq 3\}$ find the *range* of the function and express it as a set.

6. For the function $y = -x^2$, if the domain is the set of all nonnegative real numbers, what will its range be?

7. Graph the following functions:

   a) $y = 8 + 3x$

   b) $y = 8 - 3x$

   c) $y = 3x + 12$

   d) $y = 4$

   e) $y = x$

   f) $y = x^2$

8. Identify the vertical intercept and the slope for the following functions:

   a) $y = 14 + 6x$

   b) $y = -2 - 6x$

   c) $y = x$

   d) $y = 2$

9. Simplify the following expressions:

a) $x^2 \times x^8$

b) $x^2 \times x^3 \times x^4$

c) $x^3 \times y^3 \times z^3$

d) $(x^4)^5$

e) $(x^a)^3$

f) x^{-2}

g) $\dfrac{x^3}{x^{-3}}$

h) $\dfrac{x^{1/2} \times x^{1/3}}{x^{2/3}}$

i) $\dfrac{x^4}{x^3}$

j) $\dfrac{(x^{1/3})^3}{x^{1/3}}$