

Working with Wets Assignment

Write each set in roster form.

1. $A = \{x \mid x \text{ is a positive multiple of } 2 \text{ and } x < 18\}$
2. $B = \{x \mid x \text{ is an integer and } x \geq 12\}$

Write each set in set-builder notation.

3. $L = \{11, 12, 13, 14, \dots\}$
4. $M = \{5, 10, 15, 20, 25\}$
5. $N = \{2, 3, 5, 7, 11, 13, 17, 19\}$
6. $P = \{\dots, -2, -1, 0, 1, 2, \dots\}$
7. $K = \{\dots, -5, -3, -1, 1, 3, 5, \dots\}$

Write the solutions of each inequality in set-builder notation.

8. $2x + 6 < 22$
9. $4x + 3 > 63$
10. $12 - 7x \geq 60$

List all the subsets of each set.

11. $\{0, 1, 5\}$
12. $\{x, y, z\}$

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13. Given $A \subseteq B$, $B = \{1, 2, 3, 4, 5\}$, and $A = \{2, 3\}$. Find A' .
14. Given $P \subseteq U$, $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, and $P = \{2, 4, 6, 8\}$. Find P' .
15. Suppose $U = \{0, 2, 4, 6, 8, 10, 12, 14\}$ is the universal set and $A = \{2, 4, 6\}$. What is A' ?
16. Suppose $U = \{x \mid x \text{ is a real number, } x < -3\}$ is the universal set and $A = \{x \mid x \text{ is a real number, } x < -10\}$. What is A' ?

Suppose $U = \{0, 1, 2, 3, 4, 5, 6\}$, $A = \{2, 5, 6\}$ and $B = \{1, 2, 6\}$. Tell whether each statement is true or false. Explain.

17. $B \subseteq A$
18. $U \subseteq B$
19. $\emptyset \subseteq B$
20. $A \subseteq U$

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ANSWER

Write each set in roster form.

1. $A = \{x \mid x \text{ is a positive multiple of 2 and } x < 18\}$ $A = \{2, 4, 6, 8, 10, 12, 14, 16\}$

2. $B = \{x \mid x \text{ is an integer and } x \geq 12\}$ $B = \{12, 13, 14, 15, 16, \dots\}$

Write each set in set-builder notation.

3. $L = \{11, 12, 13, 14, \dots\}$ $L = \{n \mid n \text{ is a natural number and } n \geq 11\}$

4. $M = \{5, 10, 15, 20, 25\}$ $M = \{x \mid x \text{ is a factor of 5 and } x \leq 25\}$

5. $N = \{2, 3, 5, 7, 11, 13, 17, 19\}$ $N = \{x \mid x \text{ is a prime number and } x < 20\}$

6. $P = \{\dots, -2, -1, 0, 1, 2, \dots\}$ $P = \{n \mid n \text{ is an integer}\}$

7. $K = \{\dots, -5, -3, -1, 1, 3, 5, \dots\}$ $K = \{x \mid x \text{ is an odd integer}\}$

Write the solutions of each inequality in set-builder notation.

$$\begin{array}{rcl}
 8. & 2x + 6 & < 22 \\
 & 2x + 6 - 6 & < 22 - 6 \\
 & 2x & < 16 \\
 & \frac{2x}{2} & < \frac{16}{2} \\
 & x & < 8 \\
 & \{x \mid x < 8\}
 \end{array}$$

$$\begin{array}{rcl}
 9. & 4x + 3 & > 63 \\
 & 4x + 3 - 3 & > 63 - 3 \\
 & 4x & > 60 \\
 & \frac{4x}{4} & > \frac{60}{4} \\
 & x & > 15 \\
 & \{x \mid x > 15\}
 \end{array}$$

$$\begin{array}{rcl}
 10. & 12 - 7x & \geq 60 \\
 & 12 - 12 - 7x & \geq 60 - 12 \\
 & -7x & \geq 48 \\
 & \frac{-7x}{-7} & \leq \frac{48}{-7} \\
 & x & \leq -6 \\
 & \{x \mid x \leq -6\}
 \end{array}$$

List all the subsets of each set.

11. $\{0, 1, 5\}$ $\{\}$ $\{0\}$ $\{1\}$ $\{5\}$ $\{0, 1\}$ $\{1, 5\}$ $\{0, 5\}$ $\{0, 1, 5\}$

12. $\{x, y, z\}$ $\{\}$ $\{x\}$ $\{y\}$ $\{z\}$ $\{x, y\}$ $\{x, z\}$ $\{y, z\}$ $\{x, y, z\}$

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13. Given $A \subseteq B$, $B = \{1, 2, 3, 4, 5\}$, and $A = \{2, 3\}$. Find A' . $A' = \{1, 4, 5\}$
14. Given $P \subseteq U$, $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, and $P = \{2, 4, 6, 8\}$. Find P' . $P' = \{1, 3, 5, 7, 9\}$
15. Suppose $U = \{0, 2, 4, 6, 8, 10, 12, 14\}$ is the universal set and $A = \{2, 4, 6\}$. What is A' ? $A' = \{0, 8, 10, 12, 14\}$
16. Suppose $U = \{x \mid x \text{ is a real number, } x < -3\}$ is the universal set and $A = \{x \mid x \text{ is a real number, } x < -10\}$. What is A' ? $A' = \{x \mid x \text{ is a real number, } -10 < x < -3\}$

Suppose $U = \{0, 1, 2, 3, 4, 5, 6\}$, $A = \{2, 5, 6\}$ and $B = \{1, 2, 6\}$. Tell whether each statement is true or false. Explain.

17. $B \subseteq A$ **FALSE** B is not a subset of A
18. $U \subseteq B$ **FALSE** $B \subseteq U$
19. $\emptyset \subseteq B$ **TRUE** \emptyset is always a subset of any given set
20. $A \subseteq U$ **TRUE** A is the subset of U