1. Draw the following intervals on the number line.

   (a) $[-1, 4)$

   (b) $(2, 6)$

   (c) $(3, \infty)$

   (d) $(-\infty, 5]$

2. Write as an interval: $\{x : x \in \mathbb{R}\}$; i.e., "The set of all x, where x is a real number." Draw this interval on the number line.
   Solution: $(-\infty, \infty)$

3. Plot on the number line: $[-2, 3) \cap \mathbb{Z}$; i.e., "The intersection of $[-2, 3)$ with the set of integers."

4. Arrange from least to greatest: $|-\pi|$, $|-3|$, 3, $-|-4|$, -4.
   Use the symbols "$<$" and "$\leq$".
   Solution: $-4 \leq -|-4| < 3 \leq |-3| < |-\pi|$

5. Simplify to an integer: $|2(|-1-3| \cdot |6-8|) - 5|$
   Solution: 11

6. Rewrite $|x+2| - |1-x|$ without using the absolute value sign, where:

   (a) $x < -2$

   (b) $x \geq 4$

   (c) $x = 0$

   Solution: a)-3 b)3 c)1

7. Write using the absolute value sign the expression representing the distance on the number line between 3 and -1.
   Solution: $|-1-3|$

8. Write using the absolute value sign: "The distance between x and -2 is greater than or equal to 3."
   Solution: $|-2-x| \geq 3$

9. Consider the intervals $[-4, 3]$ and $[1, 8)$.

   (a) Draw these intervals on the number line and mark the interval representing their intersection.

   (b) Express the intersection in interval notation.
   Solution: $[1, 3]$

   (c) Express the intersection in set notation without using the absolute value sign.
   Solution: $\{x : 1 \leq x \leq 3\}$

   (d) Express the intersection using the absolute value sign.
   Solution: $\{x : |x-2| \leq 1\}$

10. Write as a union of two intervals: $\{x : |x-3| > 4\}$.
    Solution: $(-\infty, -1) \cup (7, \infty)$
11. Plot on the number line: $\{x : |x+2| \leq 5\}$
12. Plot on the number line: $\{x : |4-x| \geq 1\}$
13. Solve and write the answer in set notation: $-2 < x - 3 < 4$.
    Solution: $\{x : 1 < x < 7\}$
14. Solve and write the answer in interval notation: $|x+4| \leq 5$ and $x > -3$.
    Solution: $(-3, 1]$
15. Solve and write the answer using absolute value: $-7 < 1 - x < -5$.
    Solution: $|7 - x| < 1$