"As for everything else, so for mathematical theory: beauty can be perceived but not explained."

Arthur Cayley

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.
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 "$\leq$".
5. Simplify to an integer: $|2(|-1-3| \cdot |6-8|) - 5|$
6. Rewrite $|x+2| - |1-x|$ without using the absolute value sign, where:
   (a) $x < -2$
   (b) $x \geq 4$
   (c) $x = 0$
7. Write using the absolute value sign the expression representing the distance on the number line between 3 and $-1$.
8. Write using the absolute value sign: "The distance between $x$ and $-2$ is greater than or equal to 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.
   (c) Express the intersection in set notation without using the absolute value sign.
   (d) Express the intersection using the absolute value sign.
10. Write as a union of two intervals: $\{x : |x-3| > 4\}$.
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: $-2 < x - 3 < 4$.
14. Solve and write the answer in interval notation: $|x+4| \leq 5$ and $x > -3$.
15. Solve and write the answer using absolute value: $-7 < 1 - x < -5$.