1. If universal set $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{1, 2, 3, 5, 8\}$, $B = \{2, 3, 5, 7\}$, and $C = \{1, 4, 9\}$, find $(A \cup B) \cap \overline{C}$.

4. Write 0.000000515012 in scientific notation.

2. Simplify the expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.
$$\frac{x^{-5}y^{10}}{x^4 y^3}$$

5. A flagpole casts a shadow of 38 feet. Nearby, a 7-foot tree casts a shadow of 10 feet. What is the height (to the nearest tenth) of the flagpole?

3. Determine which value(s), if any, must be excluded from the domain of the variable in the expression.
$$\frac{x^2 + 7x + 12}{x^3 - 9x}$$

6. Use synthetic division to find the quotient and the remainder:
$$9x^3 + 63x^2 - 66x + 48 \text{ divided by } x + 8$$

(a) this is goog

7. Expand $(2x - 5y)^2$

8. Factor $18x^2 + 6xy - 21xy - 7y^2$

9. Factor $126 - 8x^3$

10. Find the quotient and the remainder:

$$x^4 + 256 \text{ divided by } x - 2$$

11. Perform the indicated operations and simplify the result. Leave the answer in factored form.

$$\frac{x^3 + 1}{x^3 - x^2 + x} \cdot \frac{8x}{-72x - 72}$$

12. Simplify the expression. Assume that all variables are positive when they appear.

$$\sqrt[3]{1000x^4y^5}$$

13. Simplify $\left(4^{-2}\right)^{-2}$

14. Determine which value(s), if any, must be excluded from the domain of the variable in the expression.

$$\frac{\sqrt{5 - x}}{x - 2}$$