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Problem 1: Let $A = \{1, 2, 3, 4, 5, 6, 7\}$ and $B = \{1, 4, 8\}$.

(a) List all elements of $\mathcal{P}(B)$ (the power-set of B).

(b) List all elements of $A \cap B$.

(c) In how many ways we can choose a three-element subset of A?

(d) In how many ways we can list all elements of A?

(e) What is the number of functions that map A into B?

In parts (c), (d), (e) it is sufficient to give the correct formula; you do not have to calculate the numerical value.

Problem 2: (a) Solve equation $2x^2 - x - 2 = 0$. Show your work.

(b) Solve equation $x^3 + x^2 - 4x + 2 = 0$. Compute all roots and show your work.

Problem 3: Determine the numerical values of the expressions below:

$$6! =$$

$$\gcd(117, 195) =$$

$$9 + 10 + ... + 38 + 39 =$$

$$\binom{15}{3} =$$

$$\sum_{i=0}^{\infty} (1/5)^i =$$