Review Quiz
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1. Let $X = \{1, 2, 3\}$ and $Y = \{0, 2\}$.

   (a) Find $X \cup Y$.

   (b) Find $X \cap Y$.

   (c) Find $X \times Y$.

   (d) Find all subsets of Y.

2. In the expansion of
$$(2x - 1)^{10}$$
   what is the coefficient of x^7?

3. Find A^2, A^3, and A^4 for the matrix
$$A = \begin{pmatrix} 1 & 2 \\ 0 & 3 \end{pmatrix}$$

   Can you conjecture a formula for A^n for any natural number n? How you would go about proving it?

4. What is the remainder of 2014^{2014} divided by 3?

5. **To think about:** Recall that a *binary string* or *bitstring* is a string made up of the symbols $\{0, 1\}$.

   (a) How many bitstrings of length n are there?

   (b) A bitstring is called a *palindrome* if it's the same when read backwards. For example, 111, 101, 1001 are all palindromes. How many palindromes of length n are there?