Math 131 - Dr. Miller - Supplement to HW #29: Multiplication Principle - Fall 2024

Leave all answers in exponent form, unless they appear very easy to simplify.

1. A typical Illinois license plate number contains 3 letters followed by 4 digits.
   (a) How many different license plate numbers are possible?
   (b) How many do not repeat any letters?
   (c) How many do not repeat any digits?
   (d) How many repeat neither letters nor digits?
   (e) How many have an A, B, or C as the first letter (repeated letters or digits are allowed)?
   (f) How many use only even digits (repeated letters/digits are allowed)?
   (g) How many do not contain the digit 2? (Repeats are allowed.)

2. A typical Wyoming license plate number has 2 letters followed by 5 digits.
   (a) How many different license plate numbers are possible?
   (b) How many Wyoming license plates begin with the letters WY? (Repeats are allowed.)
   (c) How many use the numbers 12345 in that order? (Repeats allowed.)
   (d) How many do *not* use the digit 1 at all? (Repeated letters or digits are NOT allowed.)
   (e) How many don't contain vowels (A,E,I,O,U)? (Repeated letters NOT allowed.)
   (f) How many don't use the letter X at all? (Repeats allowed.)

3. A sixth-grade teacher makes fraction cards for a game, using only the numbers 1-20 for numerators and denominators.
   (a) How many different cards are possible if she allows numerator and denominator to be equal?
   (b) How many cards are possible if she disallows this?
   (c) How many cards have a 1 or 2 for the numerator? (Repeats allowed.)
   (d) How many cards have even numbers in both positions? (Repeats allowed.)
   (e) How many use only prime numbers? (Repeats allowed.)