1. Let X and Y be discrete random variables with the following distributions.

x	2	3	6	10
$P(X = x)$	0.2	0.2	0.5	0.1

y	-8	-2	0	3	7
$P(Y = y)$	0.2	0.3	0.1	0.3	0.1

   (a) Find the expected value for X.

   (b) Find the expected value for Y.

2. A fair coin is tossed 6 times. Let X be the number of heads that appear in the 6 tosses.

   (a) Write the probability distribution for X.

   (b) What is the expected number of heads in 6 tosses?

3. Let X and Y be a continuous random variables with probability density functions

$$f(x) = \begin{cases} \frac{1}{10}(3x^2 + 1) & 0 \le x \le 2 \\ 0 & \text{otherwise} \end{cases}, \qquad p(y) = \begin{cases} \frac{1}{100} & 0 \le y \le 100 \\ 0 & \text{otherwise} \end{cases}$$
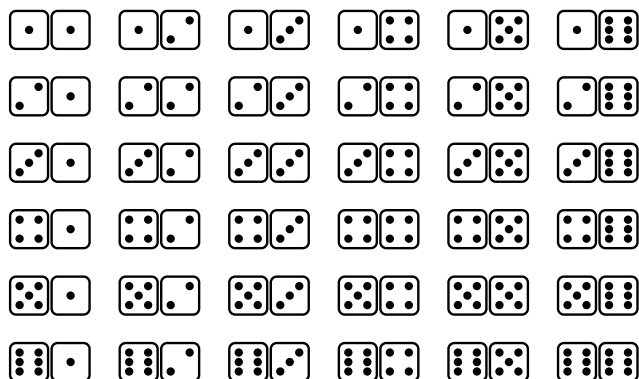
Find $E(X)$ and $E(Y)$.

4. The lifetime (in years) of a certain machine component is a random variable with probability density function

$$f(x) = \begin{cases} 4(1 - x)^3 & 0 \le x \le 1 \\ 0 & \text{otherwise} \end{cases}$$

What is the expected lifetime of this component?

5. You arrive at a bus stop at 10:00 AM knowing that the bus will arrive some time between 10:00 AM and 10:30 AM with equal likelihood. What is your expected wait time in minutes?

6. A pair of fair 6-sided dice are tossed. Let X be the maximum of the two numbers and Y the sum of the two numbers.

   (a) Find $E(X)$ and $E(Y)$.

   (b) Write the probability distribution for Z where $Z = X + Y$.

   (c) Verify that $E(Z) = E(X) + E(Y)$.