

Assignment for Wednesday, October 22

-> TO HAND IN:

1. A box contains ten marbles, five red and five blue. Two marbles are randomly drawn from the box. If they are the same color, you win \$1.10. If they are different colors, you lose \$1.00.

- Find the probability that you win.
- Calculate the expected value of the amount you win.
- Calculate the variance of the amount you win.

2. Temperature can be considered a random variable. Let C be the random variable temperature as measured in degrees Celsius, and let F be the random variable temperature as measured in degrees Fahrenheit. Then $F = 1.8C + 32$. Let g be the probability density function of C . Let h be the probability density function of F .

- Find an expression for h in terms of g .
- Find an expression for $E(F)$ in terms of g .
(Be sure to give reasons!)

3. A random variable X has the probability density function

$$f(x) = \begin{cases} 3e^{-3x} & \text{if } 0 \leq x < \infty \\ 0 & \text{otherwise} \end{cases}$$

Calculate $E(e^X)$ (that is, the expected value of the random variable e^X .)

4. Let X be a continuous random variable with probability density function

$$f(x) = \begin{cases} \frac{2}{x^3} & \text{if } x > 1 \\ 0 & \text{otherwise} \end{cases}$$

Find $E(X)$ and $\text{Var}(X)$ if they exist. If one or the other of them does not exist, show why.