EC 320: Introduction to Econometrics
Instructor: P. Economides
Problem Set 1
Winter 2022
Due: 1:00 p.m. on Monday, January 10th

Setup

Your typed responses/answers to the question (in a Word file or something similar). Ideally, use LaTeX to fill out your answers. Otherwise, feel free print off this sheet and fill in the blanks. Answers must be submitted online through Canvas by the stated deadline (see above).

Questions

1) Let $\sum_{i=1}^{n} x_i = 30$. Then $\sum_{i=1}^{n} x_i^3 =$

2) If $\mathbb{E}(X) = 28$ and $Y = 32 + \frac{9}{5}X$, what is $\mathbb{E}(Y)$?

3) Random variable X takes the value of 1 with probability 0.5 and value 2 with probability 0.5, what is the expectation of $E(X^2)$?

4) Let X be the total when two dice are thrown.

   Calculate the possible values of Y, where $Y(X)$ is given by

   $$Y = 3X + 4$$

   and hence calculate $\mathbb{E}(Y)$. Show that this is equal to $2\,\mathbb{E}(X) + 3$.

   Provide the population variance and standard deviation of X as defined above.

5) Let $\mathrm{Var}(X) = 25$ and $Y = 32 + \frac{9}{5}X$, what is the standard dev of the random variable Y?

6) Fill in the gaps:

$$\mathrm{Cov}(X,Y) \equiv \mathbb{E}\left[(X - \mu_X)(Y - \mu_Y)\right]$$

$$=$$

$$=$$

$$= \mathbb{E}(XY) - \mu_x\mu_y$$

Definition: If X and Y are statistically independent then, $\mathbb{E}(XY) = \mathbb{E}(X)\,\mathbb{E}(Y)$.

Evaluate the following statement : If $\mathrm{Cov}(X,Y) = 0$ then X and Y are necessarily independent. Is this true or false?