ECS 315: In-Class Exercise Solution

Instructions

1. Separate into groups of no more than three persons.
2. **The group cannot be the same as your former group.**
3. Only one submission is needed for each group.
4. ***Write down all the steps*** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
5. **Do not panic.**
6. **Only this page will be scanned and graded. Work only on this page.**

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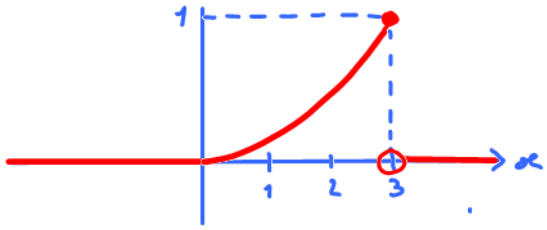
Consider a continuous random variable whose pdf is given by $f_X(x) = \begin{cases} \frac{1}{9}x^2, & x \in [0,3], \\ 0, & \text{otherwise.} \end{cases}$.

a) Plot $f_X(x)$

$f_X(3) = \frac{1}{9} \times 3^2 = 1$



b) Find $P[1 < X < 2]$

$$P[1<X<2] = \int_1^2 f_X(x)\,dx = \int_1^2 \frac{1}{9}x^2\,dx = \frac{1}{9}\frac{x^3}{3}\Big|_1^2 = \frac{8-1}{27} = \frac{7}{27}$$

c) Find $P[X < 1]$

$$P[X<1] = P[-\infty < X < 1] = \int_{-\infty}^{1} f_X(x)\,dx = \int_{-\infty}^{0} \underbrace{f_X(x)}_{0}\,dx + \int_0^1 f_X(x)\,dx$$

$$= 0 + \int_0^1 \frac{1}{9}x^2\,dx = \frac{1}{27}x^3\Big|_0^1 = \frac{1}{27}$$

d) Find $P[X > 4]$

$$P[X>4] = P[4<X<\infty] = \int_4^{\infty} f_X(x)\,dx = \int_4^{\infty} 0\,dx = 0$$