Mid Term

Instruction:only upload answer copy in google classroom only

1. A random variable X takes values between -2 and 3 with a probability density function

$$f(x) = \begin{cases} \frac{15}{64} + \frac{x}{64}, & -2 \le x \le 0 \\ \frac{3}{8} + cx, & 0 \le x \le 3 \end{cases}$$

and $f(x) = 0$ elsewhere. Find the value of c and what is $P(-1 \le X \le 1)$

2. A continuous random variable has a probability density $f(x) = Ax^{2.5}$ for $2 \le x \le 3$. find the value of A and expectation and standard deviation.

3. Suppose that two continuous random variables X and Y have a joint probability density function $f(x, y) = A(x - 3)y$ for $-2 \le x \le 3$ and $4 \le y \le 6$ and $f(x, y) = 0$ elsewhere. Find the value of A and find $P(0 \le X \le 1, 4 \le Y \le 5)$

END SEM MAL 1404

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1. The radius of a soap bubble has a probability density $f(r) = A(1 - (r-1)^2)$ for $0 \leq r \leq 2$.
   (a) What is the value of A?
   (b) What is the probability density function of the volume of the soap bubble?
   (c) What is the expected value of the volume oft he soap bubble?

2. A flu virus hits acompany employing 180 people. Independent of the other employees, there is a probability of $p = 0.35$ that each person needs to take sick leave. What are the expectation and variance of the proportion of the workforce who need to take sick leave? In general, what value of the sick rate p produces the largest variance for this proportion?