EXAM P QUESTIONS OF THE WEEK

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Week of February 4/08

Random variables X and Y have a joint distribution with joint pdf

$$f(x,y) = \frac{2x+y}{12} \text{ for } 0 \le x \le 2 \text{ and } 0 \le y \le 2$$

Find the conditional probability $P(X+Y \ge 2 | X \le 1)$

A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) $\frac{3}{8}$ D) $\frac{1}{2}$ E) $\frac{5}{8}$

The solution can be found below.

Week of February 4/08 - Solution

$P(X+Y \geq 2 | X \leq 1) = \frac{P(X+Y \geq 2 \cap X \leq 1)}{P(X \leq 1)}$.

$P(X \leq 1) = \int_0^1 \int_0^2 \frac{2x+y}{12}\, dy\, dx = \frac{1}{3}$.

$P(X+Y \geq 2 \cap X \leq 1) = \int_0^1 \int_{2-x}^2 \frac{2x+y}{12}\, dy\, dx = \int_0^1 \frac{3x^2+4x}{24}\, dx = \frac{1}{8}$.

$P(X+Y \geq 2 | X \leq 1) = \frac{1/8}{1/3} = \frac{3}{8}$. Answer: C