

MA396 In-Class Exercise - Group I

Names:

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| a) | b) |
| c) | d) |
| e) | f) |

1) Two random variables X and Y have joint density

$$f_{XY}(x, y) = \begin{cases} x(y+1)/3 & (x, y) \in [0, 2] \times [0, 1] \\ 0 & \text{otherwise} \end{cases}$$

a) Determine the support S of the joint density,

$$S = \{(x, y) : f_{XY}(x, y) > 0\}$$

b) Show that f_{XY} is a valid pdf (i.e., that it's nonnegative on S and the volume over S is 1).

c) Find the marginal density of X , $f_X(x)$, and verify that it is a pdf.

d) Find the marginal density of Y , $f_Y(y)$, and verify that it is a pdf.

e) Find $P(X < 0.5 \text{ and } Y < 0.5)$.

f) Find $P(X < Y)$.

g) Find $P(X < 1)$

h) Are the random variables X and Y independent? (i.e., does $f_{XY} = f_X \cdot f_Y$?)

MA396 In-Class Exercise - Group II

Names:

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| a) | b) |
| c) | d) |
| e) | f) |

1) Two random variables X and Y have joint density

$$f_{XY}(x, y) = \begin{cases} xy/4 & (x, y) \in [0, 2] \times [0, 2] \\ 0 & \text{otherwise} \end{cases}$$

a) Determine the support S of the joint density,

$$S = \{(x, y) : f_{XY}(x, y) > 0\}$$

b) Show that f_{XY} is a valid pdf (i.e., that it's nonnegative on S and the volume over S is 1).

c) Find the marginal density of X , $f_X(x)$, and verify that it is a pdf.

d) Find the marginal density of Y , $f_Y(y)$, and verify that it is a pdf.

e) Find $P(X < 0.5 \text{ and } Y < 0.5)$.

f) Find $P(X < Y)$.

g) Find $P(X < 1)$

h) Are the random variables X and Y independent? (i.e., does $f_{XY} = f_X \cdot f_Y$?)

MA396 In-Class Exercise - Group III

Names:

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| a) | b) |
| c) | d) |
| e) | f) |

1) Two random variables X and Y have joint density

$$f_{XY}(x, y) = \begin{cases} (x+2)y/5 & (x, y) \in [0, 1] \times [0, 2] \\ 0 & \text{otherwise} \end{cases}$$

a) Determine the support S of the joint density,

$$S = \{(x, y) : f_{XY}(x, y) > 0\}$$

b) Show that f_{XY} is a valid pdf (i.e., that it's nonnegative on S and the volume over S is 1).

c) Find the marginal density of X , $f_X(x)$, and verify that it is a pdf.

d) Find the marginal density of Y , $f_Y(y)$, and verify that it is a pdf.

e) Find $P(X < 0.5 \text{ and } Y < 0.5)$.

f) Find $P(X < Y)$.

g) Find $P(X < 1)$

h) Are the random variables X and Y independent? (i.e., does $f_{XY} = f_X \cdot f_Y$?)

MA396 In-Class Exercise - Group IV

Names:

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| a) | b) |
| c) | d) |
| e) | f) |

1) Two random variables X and Y have joint density

$$f_{XY}(x, y) = \begin{cases} (x + y)/3 & (x, y) \in [0, 2] \times [0, 1] \\ 0 & \text{otherwise} \end{cases}$$

a) Determine the support S of the joint density,

$$S = \{(x, y) : f_{XY}(x, y) > 0\}$$

b) Show that f_{XY} is a valid pdf (i.e, that it's nonnegative on S and the volume over S is 1).

c) Find the marginal density of X , $f_X(x)$, and verify that it is a pdf.

d) Find the marginal density of Y , $f_Y(y)$, and verify that it is a pdf.

e) Find $P(X < 0.5 \text{ and } Y < 0.5)$.

f) Find $P(X < Y)$.

g) Find $P(X < 1)$

h) Are the random variables X and Y independent? (i.e., does $f_{XY} = f_X \cdot f_Y$?)

MA396 In-Class Exercise - Group V

Names:

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| a) | b) |
| c) | d) |
| e) | f) |

1) Two random variables X and Y have joint density

$$f_{XY}(x, y) = \begin{cases} x^2y^2/9 & (x, y) \in [0, 1] \times [0, 1] \\ 0 & \text{otherwise} \end{cases}$$

a) Determine the support S of the joint density,

$$S = \{(x, y) : f_{XY}(x, y) > 0\}$$

b) Show that f_{XY} is a valid pdf (i.e., that it's nonnegative on S and the volume over S is 1).

c) Find the marginal density of X , $f_X(x)$, and verify that it is a pdf.

d) Find the marginal density of Y , $f_Y(y)$, and verify that it is a pdf.

e) Find $P(X < 0.5 \text{ and } Y < 0.5)$.

f) Find $P(X < Y)$.

g) Find $P(X < 1)$

h) Are the random variables X and Y independent? (i.e., does $f_{XY} = f_X \cdot f_Y$?)

MA396 In-Class Exercise - Group VI

Names:

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| a) | b) |
| c) | d) |
| e) | f) |

1) Two random variables X and Y have joint density

$$f_{XY}(x, y) = \begin{cases} 6x^2y & (x, y) \in [0, 1] \times [0, 1] \\ 0 & \text{otherwise} \end{cases}$$

a) Determine the support S of the joint density,

$$S = \{(x, y) : f_{XY}(x, y) > 0\}$$

b) Show that f_{XY} is a valid pdf (i.e, that it's nonnegative on S and the volume over S is 1).

c) Find the marginal density of X , $f_X(x)$, and verify that it is a pdf.

d) Find the marginal density of Y , $f_Y(y)$, and verify that it is a pdf.

e) Find $P(X < 0.5 \text{ and } Y < 0.5)$.

f) Find $P(X < Y)$.

g) Find $P(X < 1)$

h) Are the random variables X and Y independent? (i.e., does $f_{XY} = f_X \cdot f_Y$?)