Mutually Exclusive & Independent Events

1:   Are the following events mutually exclusive? Answer 'True' or 'False' and give a reason.

 a) Die A lands on a six; die B lands on a four.

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 b) A randomly-selected playing card is a Heart; the same card is a red card.

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 c) A coin lands Heads up; a coin lands Tails up.

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 d) You have a cat; you have a goldfish.

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 e) The first ball you pick from a bag is green; the first ball you pick from a bag is red.

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 f) A die lands on an even number; a die lands on a prime number.

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2: Two events, A and B, occur with probability p(A) and p(B) respectively.

 a) If p(A) = 0.07, p(B) = 0.1 and p(A or B) = 0.13, are A and B mutually exclusive?

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 b) If p(A) = 0.17, p(B) = 0.42 and p(A or B) = 0.59, are A and B mutually exclusive?

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 c) If p(A) = $\frac{23}{40}$, p(B) = $\frac{1}{8}$ and p(A or B) = $\frac{7}{10}$, are A and B mutually exclusive?

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 d) If p(A) = $\frac{1}{3}$, p(B) = $\frac{1}{6}$ and p(A or B) = 0, are A and B mutually exclusive?

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 e) If p(A) = 0.05, p(B) = 0.08 and p(A or B) = 0.0040, are A and B mutually exclusive?

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 f) If p(A) = 0.13, p(B) = 0.07 and p(A or B) = 0.20, are A and B mutually exclusive?

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3: Are the following events independent? Answer 'True' or 'False' and give a reason.

 a) Die A lands on a six; die B lands on a six.

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b) It rains today; a coin lands Tails up.

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c) You pick a green ball from a bag (and don't replace it); you pick a green ball from the same bag.

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d) The first baby born today is a girl; the last baby born today is a girl.

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e) The first card dealt from a pack of cards is a Heart; the second card dealt is a Heart.

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f) The first egg in a box is broken; the second egg in a box is broken.

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4: Two events, A and B, occur with probability p(A) and p(B) respectively.

a) If $p(A) = \frac{1}{12}$, $p(B) = \frac{1}{4}$ and $p(A \text{ and } B) = \frac{1}{3}$, are A and B independent?

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b) If $p(A) = \frac{4}{5}$, $p(B) = \frac{1}{20}$ and $p(A \text{ and } B) = \frac{1}{25}$, are A and B independent?

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c) If $p(A) = \frac{1}{2}$, $p(B) = \frac{3}{10}$ and $p(A \text{ and } B) = \frac{4}{5}$, are A and B independent?

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d) If $p(A) = 0.17$, $p(B) = 0.06$ and $p(A \text{ and } B) = 0.0102$, are A and B independent?

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e) If $p(A) = 0.11$, $p(B) = 0.15$ and $p(A \text{ and } B) = 0.26$, are A and B independent?

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f) If $p(A) = \frac{19}{30}$, $p(B) = \frac{3}{10}$ and $p(A \text{ and } B) = \frac{19}{100}$, are A and B independent?

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