

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

- 1) An experiment consists of rolling two dice and observing the sum of the dots on their uppermost faces. What is the sample space for this experiment? 1) _____

- 2) An experiment consists of tossing a coin three times and recording the sequence of heads and tails. 2) _____
 - (a) What is the sample space?
 - (b) Determine the event $E = \text{"More heads than tails occur."}$
 - (c) Determine the event $F = \text{"The number of heads equals the number of tails."}$

- 3) An experiment consists of tossing a coin twelve times and observing the number of heads. 3) _____
 - (a) Determine the sample space for this experiment.
 - (b) Determine the event $E = \text{"At least 7 tails are observed."}$

- 4) A letter is selected at random from the word "TEXTBOOK." 4) _____
 - (a) What is the sample space for this experiment?
 - (b) Describe the event "the letter chosen is a vowel" as a subset of the sample space.

- 5) An experiment consists of arranging a white ball (W), a black ball (B), and a red ball (R) in a row. 5) _____
 - (a) What is the sample space S for this experiment?
 - (b) Describe the event $E = \text{"the white ball is in the middle,"}$ as a subset of the sample space.
 - (c) Describe the event $F = \text{"the red ball is next to the black ball,"}$ as a subset of the sample space.
 - (d) Describe the event $E \cup F$.

- 6) There are five finalists, A, B, C, D, E, in a lottery drawing. Three of them are to be selected to win \$10,000 prizes. 6) _____
 - (a) What is the sample space for this experiment?
 - (b) Describe the event "C and E win \$10,000 prizes" as a subset of the sample space.
 - (c) Describe the event "neither A nor B wins a \$10,000 prize".

A light bulb manufacturer tests a light bulb by letting it burn until it burns out. The experiment consists of observing how long (in hours) the light bulb burns. Let E be the event "the bulb lasts less than 100 hours," F be the event "the bulb lasts less than 50 hours," and G be the event "the bulb lasts more than 120 hours."

- 7) State the event $E \cup F$. 7) _____

- 8) State the event $F' \cap G'$. 8) _____

- 9) Let $S = \{1, 2, 3, 4, 5, 6\}$ be the sample space of a certain experiment, $E = \{2, 4, 5\}$. What is the largest event F in S such that E and F are mutually exclusive? 9) _____

- 10) Let $S = \{a, b, c, d, e\}$ be a sample space, $E = \{a, b, e\}$, and $F = \{b, c\}$. 10) _____
 - (a) Determine the events $E \cup F$ and $E' \cap F'$.
 - (b) Are $E \cup F$ and $E' \cap F'$ mutually exclusive?