1.6 Independent and Mutually Exclusive

1. Classify each pair as dependent or independent events:

	First Event	Second Event
(a)	Attending a rock concert on Tuesday night	Passing a final exam on the following Wednesday morning.
(b)	Eating chocolate	Winning at checkers
(c)	Having blue eyes	Having poor hearing
(d)	Attending an employee training session	Improving personal productivity
(e)	Graduating from university	Running a marathon
(f)	Going to a mall	Purchasing a new shirt

2. Classify each pair of events as mutually exclusive or non-mutually exclusive:

	Event A	Event B
(a)	Randomly drawing a grey sock from a drawer	Randomly drawing a wool sock from a drawer
(b)	Randomly selecting a student with brown eyes.	Randomly selecting a student on the honour roll.
(c)	Having an even number of students in your class.	Having an odd number of students in your class.
(d)	Rolling a six with a die	Rolling a prime number with a die
(e)	Your birthday falling on a Saturday next year	Your birthday falling on a weekend next year.
(f)	Getting an A on the next test	Passing the next test
(g)	Calm weather at noon tomorrow	Stormy weather at noon tomorrow
(h)	Sunny weather next week	Rainy weather next week

3. The probability of A is 0.2 and the probability of B is 0.4. What are the probabilities of each of the following events if A and B are independent and if they are mutually exclusive?

	A and B are independent	A and B are mutually exclusive
(a) $P(A \cap B)$		
(b) $P(A')$		
(c) $P(A' \cap B)$		
(d) $P(A' \cap B')$		
(e) $P(A \cup B)$		
(f) $P(A' \cup B)$		
(g) $P(A' \cup B')$		

4. (a) What is $P(A \cap A')$? Why?
   (b) What is $P(A \cup A')$? Why?

Answers

1. a. dep b. indep c. indep d. dep e. indep f. dep **2**. a. non b. non c. mutually d. mutually e. non f. non **3. indep** a. 0.08 b. 0.8 c. 0.32 d. 0.48 e. 0.52 f. 0.8 g. 0.92 **mutually exclusive** a. 0.6 b. 0.8 c. 0.4 d. 0.4 e. 0.6 f. 0.8 g. 1 **4**. a. 0. can't be in both A and in A'. They are mutually exclusive. b. sample space. everything is either in A or A'.