Data collected by the Substance Abuse and Mental Health

Services Administration (SAMSHA) suggests that 69.7% of 18-20 year olds consumed alcoholic

beverages in 2008.49

(a) Suppose a random sample of ten 18-20 year olds is taken. Is the use of the binomial distribution appropriate for calculating the probability that exactly six consumed alcoholic beverages?

Explain.

(b) Calculate the probability that exactly 6 out of 10 randomly sampled 18- 20 year olds consumed

an alcoholic drink.

(c) What is the probability that at most 2 out of 5 randomly sampled 18-20 year olds have

consumed alcoholic beverages?

Soln

(a) Binomial conditions are met: (1) In-

dependent trials: In a random sample, whether

or not one 18-20 year old has consumed alco-

hol does not depend on whether or not another

one has. (2) Fixed number of trials: n = 10.

(3) Only two outcomes at each trial: Consumed

or did not consume alcohol. (4) Probability of

a success is the same for each trial: p = 0:697.

(b) 0.203

(c)0.167