First graders who misbehave in school may be more likely to be regular smokers as young adults according to a new study presented in the July 2004 issue of the American Journal of Epidemiology. After following a group of U.S. first graders for 15 years, it was found that among those kids who had tried smoking and misbehaved, 63% were daily smokers.

a) i got a just need b & c

(b) What is the probability that exactly 8 of the next 12 randomly selected young adults who misbehaved in early grades and have tried smoking are daily smokers?

(c) What is the probability that exactly 20 of the next 30 randomly selected young adults who misbehaved in early grades and have tried smoking are daily smokers?

Solution

We can use binomial distribution

$$\mathrm{P(x, n)} = C(n, x) * p^x * (1 - p)^{n-x},$$

Where p is percent of daily smokers.

(b) What is the probability that exactly 8 of the next 12 randomly selected young adults who misbehaved in early grades and have tried smoking are daily smokers?

$$P = \mathrm{P(x = 8, n = 12)} = C(12{,}8) * 0.63^8 * (1 - 0.63)^{12-8} = 495 * 0.63^8 * 0.37^4 = 0.23$$

(c) What is the probability that exactly 20 of the next 30 randomly selected young adults who misbehaved in early grades and have tried smoking are daily smokers?

$$P = \mathrm{P(x = 20, n = 30)} = C(30{,}20) * 0.63^{20} * (1 - 0.63)^{30-20}$$
$$= 30045015 * 0.63^{20} * 0.37^{10} = 0.14$$

Answer: $(\mathbf{b})\ \mathbf{0.23};\ (\mathbf{c})\mathbf{0.14}$.