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Math 160 Binomial Probability Practice

1. According to Gallup (<http://www.gallup.com/poll/145913/City-Wellbeing-Tracking.aspx>), the percentage of San Diegans who smoke is **15.2%**. If we randomly pick **44 San Diegans**

A. identify each of the following (p and q are probabilities, they must be between 0 and 1)

$$n = \underline{\hspace{2cm}}$$

$$p = \underline{\hspace{2cm}}$$

$$q = \underline{\hspace{2cm}}$$

The formula is ${}_n C_x p^x q^{n-x}$. If you had to do ${}_{44} C_3 (.152)^3 (.848)^{41}$, you would type

$$44 \boxed{\text{MATH}} \boxed{\text{PRB}} \boxed{3: \text{nCr}} 3 \times 0.152 \boxed{\wedge} 3 \times .848 \boxed{\wedge} 41$$

B. Find

a. the probability that exactly 7 smoke, $P(x = 7)$

$$\frac{1}{n} C \frac{\underline{\hspace{2cm}}}{x} \frac{\underline{\hspace{2cm}}}{p} \frac{\underline{\hspace{2cm}}}{x} \frac{\underline{\hspace{2cm}}}{q} \frac{\underline{\hspace{2cm}}}{n-x} =$$

b. the probability that none of them smoke, $P(x = 0)$

$$\frac{1}{n} C \frac{\underline{\hspace{2cm}}}{x} \frac{\underline{\hspace{2cm}}}{p} \frac{\underline{\hspace{2cm}}}{x} \frac{\underline{\hspace{2cm}}}{q} \frac{\underline{\hspace{2cm}}}{n-x} =$$

c. the probability that **at least one** of them smokes

$$P(x \geq 1) = 1 - P(x = 0) =$$

d. the **mean** and **standard deviation** for the number of San Diegans out of 44 who smoke

$$\mu = np =$$

$$\sigma = \sqrt{npq} =$$

e. Would it be **unusual** to find 17 out of 44 randomly selected San Diegans who smoke?

(Unusual is anything outside of 2 standard deviations from the mean. Put the mean in the middle of the number line, then subtract 2 standard deviations and add two standard deviations. Those numbers define what is usual. Is 17 in there, or is it outside the usual area?)





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