

**Note:** You must show the details of the work to receive credit. Simply providing the final answer [from a calculator] will get **ZERO** points.

**Formulae:** Sample count  $X$  out of a simple random sample (SRS) of size  $n$ , where the population proportion is  $p$ , has a Binomial distribution with parameters  $n$  and  $p$ .

i.) If  $np \geq 10$  and  $n(1 - p) \geq 10$ , then  $X$  is approximately normal,  
 $N\left(\mu = np, \sigma = \sqrt{np(1 - p)}\right)$ .

ii.) If  $np \geq 10$  and  $n(1 - p) \geq 10$  then  $\hat{p} = \frac{x}{n}$  is approximately normal,  
 $N\left(\mu = p, \sigma = \sqrt{\frac{p(1 - p)}{n}}\right)$ .

1. According to the Gallup-Healthways Well-Being Index<sup>1</sup>, “9% of Americans are ‘stressed’ .”

(a) (2 points) If a simple random sample of 4 Americans is taken, what is the probability that 2 or more of them in the sample are “stressed”?

(b) (4 points) If a simple random sample of 200 Americans is taken, what is the probability that at least 23 of them in the sample are “stressed”? [Use the Normal Approximation.]

(c) (4 points) If a simple random sample of 240 Americans is taken, what is the probability that at most 13% the sample are “stressed”? [Use the Normal Approximation.]

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<sup>1</sup><http://www.gallup.com/poll/106915/Gallup-Daily-US-Mood.aspx>