



1. a. estimator: 
$$\hat{p} = \frac{\sum x_i}{N}$$

estimate  $= \frac{\sum x_i}{n} = \frac{2|q.8}{27} \approx 8|4$ 

b. estimator:  $\hat{p} = \frac{\sum x_i}{n} = \frac{2|q.8}{27} \approx 8|4$ 

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estimate  $= \frac{1}{12} (x_{\frac{1}{2}+1} - x_i) \hat{x}$ 
 $= \frac{1}{12} (x_{\frac{1}{2}+1} - x_i$ 

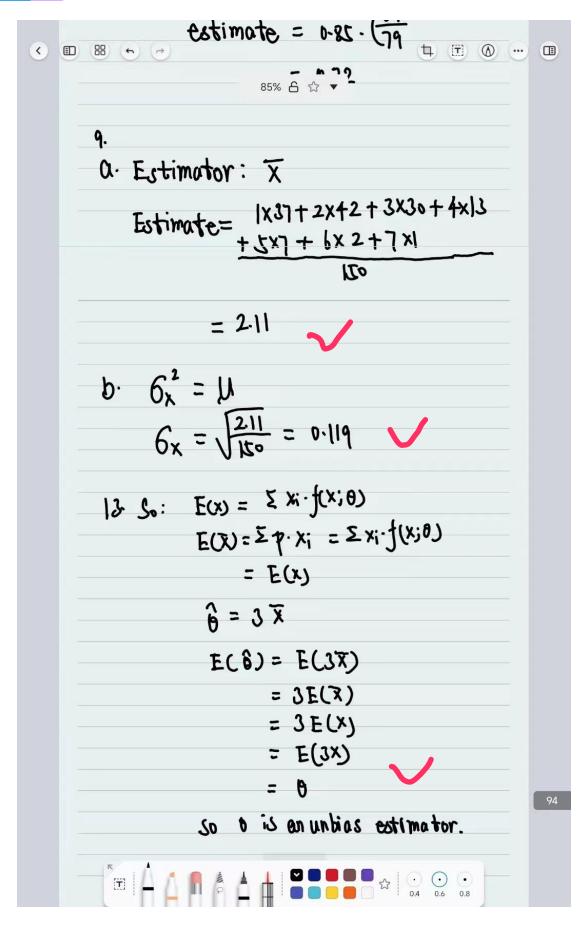


a. estimator: 
$$\hat{p} = 1 - \frac{x}{N}$$

estimate = 
$$+\frac{12}{80} = 0.81$$

$$p = p \cdot \left( \frac{N-x-1}{N-1} \right)$$







So 0 is an unbias estimator.

6.2

a. 
$$\hat{p} = \frac{x}{N}$$

estimate =  $\frac{2}{20} = 0.15$ 

b.  $\hat{p} = \frac{x}{N}$ 

$$E(\hat{p}) = E(\frac{x}{n})$$

$$= \frac{1}{n}E(x)$$

for binomial random variable

$$E(x) = np$$

$$E(\hat{p}) = p$$
Therefore  $\hat{p} = \frac{x}{n}$  is an unbiased extimator

c. Denote A as that none of next five tests done on desease - free individuals are positive.

$$\hat{p} = \frac{1}{20} = 2 I I$$

$$P(A) = (1 \cdot 0.15)^2 = 0.473$$



