

1.) Penn State students

proportion who smoke regularly,  $p$

$$\hat{p} = .43$$

2.) College students in US.

Average GPA,  $\mu = 2.7$

$$\bar{x} = 2.9$$

3.) Middle School students

Average time spent on HW,  $\mu = 2$

$$\bar{x} = 1.8$$

4.) All subscribers to a magazine

mean income,  $\mu = 56,000$

$$\bar{x} = 57,300$$

5.) a    6.) c    7.) b    8.) b    9.) a    10.) c

11.) a    12.) b    13.) a    14.) c    15.) a

16.) d    17.)

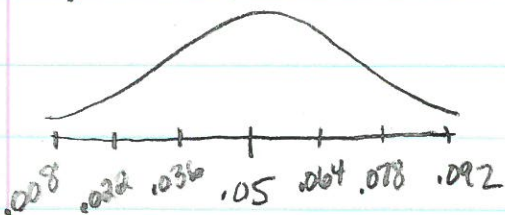
17.) a.)  $\mu_{\hat{p}} = .05$

b.)  $250 < \frac{1}{10}$  truck load of potatoes

$$\sigma_{\hat{p}} = \sqrt{\frac{.05(1-.05)}{250}} = .014$$

c.)  $250(.05) = 12.5$

$250(.95) = 237.5$



No, 10% is more than 3 s.d. above the mean  
very unlikely to happen.

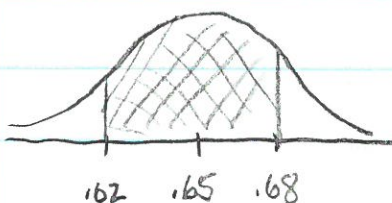
18.)  $\mu_{\hat{p}} = .65$

$$\sigma_{\hat{p}} = \sqrt{\frac{.65(1-.65)}{1000}} = .015$$

$1000 < \frac{1}{10}$  all H.S. students

$1000(.65) = 650$ ,  $1000(1-.65) = 350$

sampling distribution is approx normal

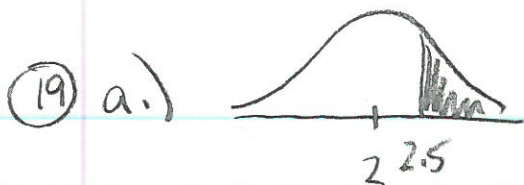


$$P(.62 < \hat{p} < .68) =$$

95% or .95

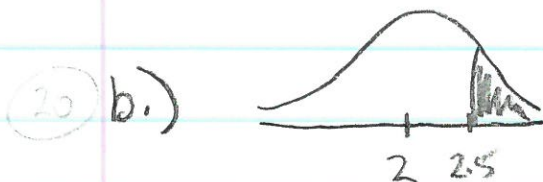
$$z = \frac{.62 - .65}{.015} = -2$$

$$z = \frac{.68 - .65}{.015} = 2$$



$$z = \frac{2.5 - 2}{.8} = .625$$

.2114  
 $P(z > .625) = .0$



$$\sigma_{\bar{x}} = \frac{.8}{\sqrt{20}} = .179$$

$20 < \frac{1}{10}$  (all 5<sup>th</sup> graders)

sampling dist. is normal because pop. is non.

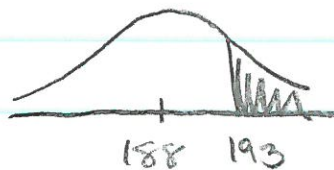
$$z = \frac{2.5 - 2}{.179} = 2.79$$

.0026  
 $P(\bar{x} > 2.5) = .0026$

20  $\mu_{\bar{x}} = 188$   $\sigma_{\bar{x}} = \frac{41}{\sqrt{250}} = 2.59$

$250 < \frac{1}{10}$  all adult men

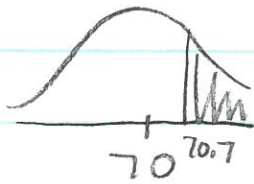
$n = 250$  which is greater than 30 so samp distribution is approx. normal



$$z = \frac{193 - 188}{2.59} = 1.93$$

.0268  
 $P(\bar{x} > 193) = .0268$

21 a.)



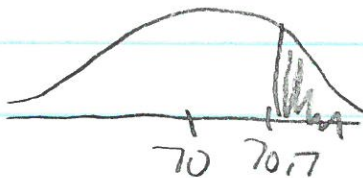
$$z = \frac{70.7 - 70}{.9} = .78$$

$$P(Z > .78) = .2184$$

b.) No, because approximately 22% of cars will have weights of 70.7 or greater when the filling equipment is working proper so this is not an unusual occurrence.

c.)  $\mu_{\bar{x}} = 70$      $\sigma_{\bar{x}} = \frac{.9}{\sqrt{10}} = .285$   $10 < \frac{1}{.10}$  all cars

pop. is normally dist. so sampling dist. is



$$z = \frac{70.7 - 70}{.285} = 2.46$$

$$P(\bar{x} > 70.7) = .007$$

d.) Yes, I would suspect the machine is overfilling. If it is working correctly there is only a .7% chance of getting a mean weight of 70.7 or higher.

22.) a.) A, C and D. The mean of each of these is about 75 which is the population parameter.

b.) A because it is an unbiased estimator  
B does not appear to be unbiased estimator

c.) C, is an unbiased estimator and it has less variability than D.