

Statistics Midterm Review Solutions

1.) c 2a.) $\mu_{\hat{p}} = p = .4$

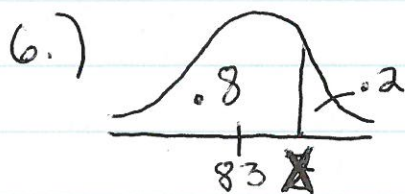
$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{.4(.6)}{1200}} = .014$$

3.) Binomial cdf (Nspire)

1 - Binomial cdf (8, .5, 1) (TI-84) e



5.) c



look up .8 in table

$$z = .84$$

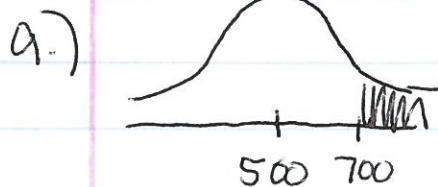
$$.84 = \frac{x - 83}{11} \quad x = 92.24$$

7.) A

8.) $IQR = Q_3 - Q_1 = 64$

$$Q_1 - 1.5IQR = 405$$

$$Q_3 + 1.5IQR = 661$$



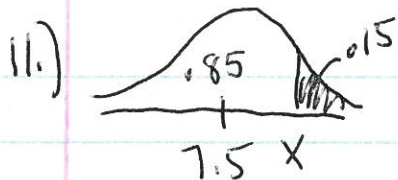
$$z = \frac{700 - 500}{100} = 2$$

look up $z=2$ in table

$$1 - .9772$$

$$= .0228$$

10.) Bar Graph is for categorical data and does not have to have a scale on horizontal axis
Histogram is quantitative data with scale on horizontal axis.



look up .85 in table
 $Z = 1.04$

$$\frac{1.04 = X - 7.5}{3}$$

$$X = 7.812 \text{ microns}$$

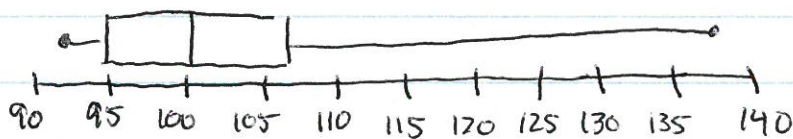
12.) a) 9 | 33569 b) 5# summary 93, 95, 100, 107, 138

10 | 0017

11 | 2

12 |

13 | 8



Skewed right

c.) $IQR = Q_3 - Q_1 = 12$, Boundries for outliers 77, 125
 yes, 138 is an outlier

13.) All probabilities must
 add up to 1 so $P(5) = .4$

$$14.) \hat{\gamma} = 71.3 - 1.14(23)$$

$$\hat{\gamma} = 45.08$$

15.) Pick 3 digits at a time
 255, 100, 120, 126, 008

16.) influential

17.) Neither the subject nor treatment administrator
 knows which treatment the subject is getting.

18.) a.) True b.) True c.) True

19a.) roughly linear

$$b.) \hat{y} = 21.4x + 32.9$$

with possible outlier (1, 113)

c.) $r = .88$ strong positive linear association

$$d.) \hat{y} = 21.4(5) + 32.9 = 139.9$$

e.) For each increase of 1 hour density will increase 21.4 units

f.) pretty good, even scattering, maybe too many points under x-axis.

$$g.) y - \hat{y} = 120 - 139.9 = -19.9$$

20.) statistic

$$21.) \text{Binomial pdf (Nspire)} = .124$$
$$\text{Binomial pdf}(25, .25, 8)$$

$$22.) a.) .05 + .23 = .28$$

$$b.) .05 + .23 + .36 + .25 = .89$$

$$c.) .36 + .25 + .10 + .01 = .72$$

d.) Use 1-var stat in calculator.

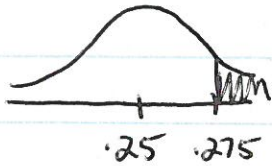
$$\bar{x} = 2.15 \quad \sigma = 1.07$$

23.) Nothing, there is no control group. This could be the placebo affect.

$$24.) \text{Binomial cdf (Nspire)} = A$$
$$1 - \text{Binomial cdf}(5, .02, 0) = A$$

25.) Stratified random sampling

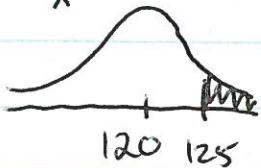
26.) $\mu_p = .25$ $\sigma_p = \sqrt{\frac{.25(.75)}{1000}} = .0137$



$Z = \frac{.275 - .25}{.0137} = 1.35$ $1 - .9115 = .0885$
 look up in table

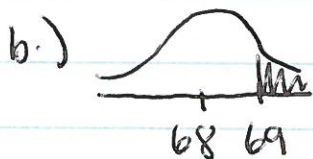
27.) They must be on or above the x-axis and the area under must be 1.

28.) $\mu_{\bar{x}} = 120$ $\sigma_{\bar{x}} = \frac{6}{\sqrt{9}} = 2$



$Z = \frac{125 - 120}{2} = 2.5$ $1 - .9938 = .0062$
 look up

29.) a.) $\mu_{\bar{x}} = 68$ $\sigma_{\bar{x}} = \frac{7.5}{\sqrt{200}} = .53$



b.) $Z = \frac{69 - 68}{.53} = 1.89$ $1 - .9706 = .0294$
 look up

30.) undercoverage, response bias, non response

31.) A and C

32.) $\mu_p = .22$ $\sigma_p = \sqrt{\frac{.22(.78)}{1000}} = .0131$



$Z = \frac{.25 - .22}{.0131} = 2.29$ $1 - .9890 = .011$
 look up

33.) B

34.) C

35.) convenience
voluntary response

36.) A

37.) C

38.) ① Label the population
② Use a random digit
table or generator to
select random #'s.

39.) No matter what the distribution of the population is, if our sample is larger than 30 ($n > 30$) our sampling distribution will be approximately normal.

40.) We want the 50th data \rightarrow 81-90

41.) Q2

42.) Lowest value, Q1, Q2, Q3, highest value
(median)

43.) greater

44.) less


45.) equal

$$46.) \frac{4.25(12) + 7.50}{13} = \$ 4.50$$

$$47.) \frac{83(25) + 78(37)}{62} = 80.01$$

48.) Somewhere between .8-.9 (strong)

49.) They all have about the same satisfaction level. Their satisfaction levels are all above 92%. (Look at vertical axis)

50.)  Look up .95 or .05 in table
 $z^* = \pm 1.64$

- 51.)
- ① Randomly selected sample
 - ② Population is 10x larger than sample
 - ③ $np \geq 10$, $n(1-p) \geq 10$

52.) Assume all conditions are met

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \quad z^* = 1.64 \text{ (see \# 50)}$$
$$\hat{p} = .36 \text{ (given)}$$

$$.36 \pm 1.64 \sqrt{\frac{.36(.64)}{1006}}$$

$$.36 \pm .025 = .335, .385$$

We are 90% confident that the interval 33.5% to 38.5% captures the true proportion of U.S. adults who are baseball fans.