

VERSION A (Blue/White)

1. a

2. a

3. d

4. c

5. c

6. b

7. b

8. e

9. a

10. c

11. d

12. b

Version A
Blue/White

1. Weight is measured on the ratio scale.

The correct answer is a.

2. Given the stem and leaf plot, determine the median and mode.

The mode is the most frequently occurring data value. Thus, the mode is 25 because an age of 25 occurs 7 times.

The median is the middle value in an ordered data set. The median is 26.

The correct answer is a.

3. Given 12 students labeled 1–12, we need to choose a random sample of 3 students such that there are no repeats and the two-digit numbers do not exceed 12.

List of 2-digit #'s.

51, 28, 70, 57, 54, 04, 20, 49, 37, 12, 79, 39, 68, 73, 99, 51, 77,
33, 30, 75, 97, 06.

Students chosen are 04, 06, and 12.

They are, Kathy, Francesca, and Debbi.

The correct answer is d.

4. The histogram of the data from Single Focus is most spread out. Thus it has the greatest standard deviation.

The correct answer is c.

5. Given the Box and Whisker Plot, determine which statements are true.

I. 50% of new car buyers keep their cars between 3 years and 8 years.

This is true, since 50% of the data is between the two quartiles located at 3 and 8.

II. 75% of new car buyers keep their cars less than 3 years.

This is false. 75% of new car buyers keep their cars less than 8 years.

III. 25% of new car buyers keep their cars more than 8 years.

This is true. According to the box plot.

Thus, I and III are true. The correct answer is c.

6. Determine $\Pr(z \leq -2.15)$



Area = .0158
low = -4 up = -2.15

Look up $z = 2.15$ in the z -table. The associated area is .4842. This is the unshaded area to the left of the mean.

To find the shaded area subtract this number from .5000. Thus, the shaded area is:

$$\begin{array}{r} .5000 \\ - .4842 \\ \hline .0158 \end{array}$$

$$\underline{\Pr(z \leq -2.15) = .0158}$$

The correct answer is b.

7. Find z such that 10% of the standard normal curve lies to the right of z .



Area = .1002
low = 1.28 up = 4

If 10% lies to the right of z , then 40% lies between z and the mean. Look up .4000 in the body of the table. The closest # is .3997.

Thus $z = 1.28$.

The correct answer is b.

Use the following information for questions 8, 9, and 10.

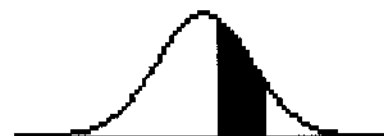
$$\mu = 1475$$

$$\sigma = 92$$

8. $\Pr(1500 \leq x \leq 1600)$.

$$z_1 = \frac{1500 - 1475}{92} = \frac{25}{92} = .27 \sim .1064$$

$$z_2 = \frac{1600 - 1475}{92} = \frac{125}{92} = 1.36 \sim .4131$$



Area = .3067
low = .27 up = 1.36

Area is the difference.

$$\begin{array}{r} .4131 \\ - .1064 \\ \hline .3067 \end{array}$$

$$\underline{\Pr(1500 \leq x \leq 1600) = .3067}$$

The correct answer is e.

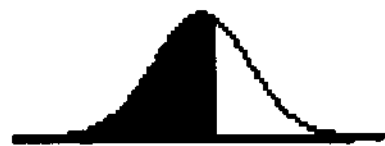
9. $\Pr(x \leq 1500)$

$$z_1 = \frac{1500 - 1475}{92} = \frac{.27}{.1064}$$

Area is the sum of .1064 and .5000.

$$\Pr(x \leq 1500) = \underline{.6064}$$

The correct answer is a.



Area = .6064
low = -.4 up = .27

10. $\Pr(\bar{x} \geq 1500)$

Need the Sampling Distribution.

$$\mu_{\bar{x}} = \mu = 1475.$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{\mu}} = \frac{92}{\sqrt{25}} = \frac{92}{5} = 18.4$$

$$z_{\bar{x}} = \frac{1500 - 1475}{18.4} = \frac{25}{18.4}$$

$$z_{\bar{x}} = \underline{1.36}$$

Look up $z_{\bar{x}} = 1.36$ in the table. The unshaded area is .4131. To find the shaded area, we subtract from .5000.

$$\begin{array}{r} .5000 \\ -.4131 \\ \hline .0869 \end{array}$$

$$\text{Thus, } \Pr(\bar{x} \geq 1500) = \underline{.0869}.$$

The correct answer is c.



Area = .0869
low = 1.36 up = .4

11. The Central Limit states the following:
The sampling distribution of the sample mean is approximately normal if:
1. The sample size is sufficiently large. (I)
 2. The parent population is known to be normally distributed and a sample of any size is drawn. (IV)

Thus, I and IV are true.

The correct answer is **d**.

12. Determine a 95% C.I. for the mean length of sentences in a psychology text.

$$95\% \text{ C.I. } \bar{x} \pm 1.96 \left(\frac{s_x}{\sqrt{n}} \right)$$

$$24 \pm 1.96 \left(\frac{6}{\sqrt{100}} \right)$$

$$24 \pm 1.18$$

$$24 \pm 1.2$$

$$\underline{22.8 \text{ to } 25.2}$$

The correct answer is **b**.

FREE RESPONSE1. Matching

1. Simple Random Sample **c**
2. Parameter **d**
3. Standard Error of the mean **b**
4. Median **e**
5. Skewed left **a**

2. Given the data, create a grouped frequency table with 8 classes.

$$\text{Range} = 114 - 40 = 74$$

$$\text{Class width} = \frac{\text{Range}}{\# \text{ of classes}} = \frac{74}{8} = 9.25 \sim \underline{10}$$

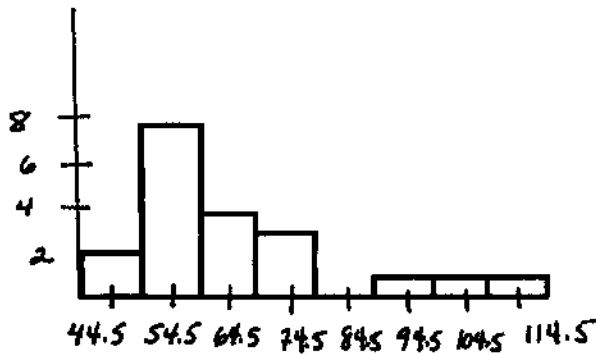
Begin with 40.

Class Limits	Class Boundaries	Frequency	Class Marks
40 - 49	39.5 - 49.5	2	44.5
50 - 59	49.5 - 59.5	8	54.5
60 - 69	59.5 - 69.5	4	64.5
70 - 79	69.5 - 79.5	3	74.5
80 - 89	79.5 - 89.5	0	84.5
90 - 99	89.5 - 99.5	1	94.5
100 - 109	99.5 - 109.5	1	104.5
110 - 119	109.5 - 119.5	1	114.5
		$n = 20$	

Only need class limits and frequency but other columns are useful for later work.

2b. Based on the Frequency Table.

Histogram of
Prices of Running Shoes.



The histogram is skewed to the right.

c. Based on the Frequency Table with the given class marks,

mean = \$66 and standard deviation = \$19

d. Based on $Q_1 = 55$, and $Q_3 = 70$, identify any outliers in the data set.

$$\text{IQR} = Q_3 - Q_1 = 70 - 55 = 15$$

$$1.5 * 15 = \underline{22.5}$$

$$Q_3 + 22.5 = 70 + 22.5 = \$92.50$$

$$Q_1 - 22.5 = 55 - 22.5 = \$32.50$$

Any data value outside of this new range, \$32.50 to \$92.50 is an outlier.
Thus, \$109 and \$114 are outliers.

3. National Banker's Exam

$$\mu = 600$$

$$\sigma = 70$$

$$x = 630 \quad (\text{Jim})$$

Salem College Bankers'

$$\mu = 500$$

$$\sigma = 25$$

$$x = 530 \quad (\text{June})$$

- a. Sketch the distribution for both exams and calculate the standard z -score for Jim and June.

National Bankers' Exam

$$\text{Area} = .6664$$

$$z = .43$$

$$z = \frac{630 - 600}{70} = \frac{30}{70} = \underline{.43}$$

$$\underline{z = .43} \sim .6664$$

Salem College Bankers' Exam

$$\text{Area} = .8849$$

$$z = 1.2$$

$$z = \frac{530 - 500}{25} = \frac{30}{25} = \underline{1.2}$$

$$\underline{z = 1.2} \sim .8849$$

- b. June has the better chance of being hired because her score is 1.2 standard deviations above the mean versus Jim's which is only .43 standard deviations above the mean. June did better than approximately 88% of the others who took her exam while Jim did better than 67%.