

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) A southeastern college has an enrollment of 2951 female students. Records show that the mean height of these students is 64.7 inches and that the standard deviation is 2.3 inches. The table shows frequency and relative-frequency data for these heights. If you assume that the distribution of heights is approximately normal, then you can use the table to estimate areas under the associated normal curve (that is, under the normal curve that has parameters $\mu = 64.7$ and $\sigma = 2.3$). Making this assumption, estimate the area under the associated normal curve to the left of 62. 1) _____

Height (inches)	Freq.	Relative freq.
56 - 57	2	0.0007
57 - 58	7	0.0024
58 - 59	14	0.0047
59 - 60	31	0.0105
60 - 61	101	0.0342
61 - 62	194	0.0657
62 - 63	311	0.1054
63 - 64	410	0.1389
64 - 65	526	0.1782
65 - 66	482	0.1633
66 - 67	397	0.1345
67 - 68	254	0.0861
68 - 69	150	0.0508
69 - 70	49	0.0166
70 - 71	17	0.0058
71 - 72	5	0.0017
72 - 73	1	0.0003

- A) 0.8816 B) 0.1182 C) 0.0657 D) 0.1711

Fill in the blanks by standardizing the normally distributed variable.

- 2) Dave drives to work each morning at about the same time. His commute time is normally distributed with a mean of 47 minutes and a standard deviation of 8 minutes. The percentage of time that his commute time lies between 23 and 31 minutes is equal to the area under the standard normal curve between ___ and ___. 2) _____

- A) -2.5, -1.5 B) -3, -2 C) 0, 1 D) -3.5, -2.5

- 3) Dave drives to work each morning at about the same time. His commute time is normally distributed with a mean of 36 minutes and a standard deviation of 5 minutes. The percentage of time that his commute time is less than 26 minutes is equal to the area under the standard normal curve that lies to the ___ of ___. 3) _____

- A) right, -2 B) left, 2 C) right, 0.6 D) left, -2

Solve the problem.

- 4) Frequency data were reported for the ages of women who became mothers during one year in a selected U.S. city. The age distribution is given in the table. Obtain a relative-frequency histogram of these data and determine whether the ages are approximately normally distributed. 4) _____

Age (yrs)	Frequency
10 - 15	16
15 - 20	134
20 - 25	534
25 - 30	1043
30 - 35	982
35 - 40	399
40 - 45	94
45 - 50	7

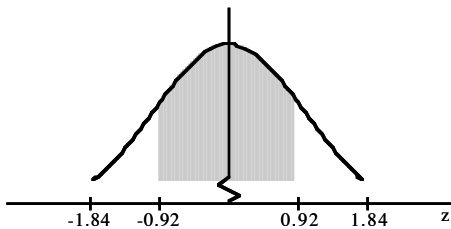
- A) Yes. The distribution is bell-shaped. B) No. The distribution is left-skewed.
 C) No. The distribution is right-skewed. D) No. The distribution is J-shaped.

Use a table of areas to find the specified area under the standard normal curve.

- 5) The area that lies between 0 and 3.01 5) _____
 A) 0.4987 B) 0.5013 C) 0.9987 D) 0.1217
- 6) The area that lies between -1.10 and -0.36 6) _____
 A) 0.2237 B) -0.2237 C) 0.4951 D) 0.2239
- 7) The area that lies to the right of 0.59 7) _____
 A) 0.2776 B) 0.2224 C) 0.2190 D) 0.7224

Use a table of areas to obtain the shaded area under the standard normal curve.

- 8) 8) _____



- A) 0.1788 B) 0.3576 C) 0.6424 D) 0.8212

Use a table of areas for the standard normal curve to find the required z-score.

- 9) Find the z-score having area 0.86 to its right under the standard normal curve; that is, find $z_{0.86}$. 9) _____
 A) 1.08 B) -1.08 C) 0.8051 D) 0.5557
- 10) Find the z-score for which the area under the standard normal curve to its left is 0.96 10) _____
 A) 1.03 B) 1.82 C) 1.75 D) -1.38

Find the indicated probability or percentage for the normally distributed variable.

- 11) The variable X is normally distributed. The mean is $\mu = 60.0$ and the standard deviation is $\sigma = 4.0$. Find $P(X < 53.0)$. 11) _____
- A) 0.0802 B) 0.9599 C) 0.0401 D) 0.5589

Use the empirical rule to solve the problem.

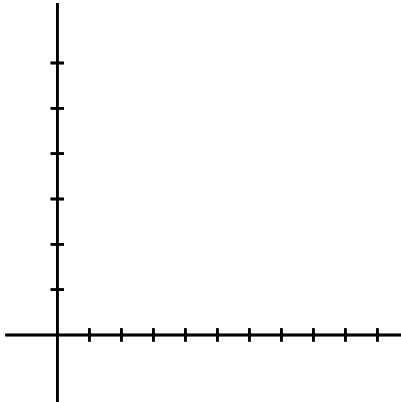
- 12) The lifetimes of lightbulbs of a particular type are normally distributed with a mean of 310 hours and a standard deviation of 7 hours. What percentage of the bulbs have lifetimes that lie within 2 standard deviations to either side of the mean? 12) _____
- A) 97.72% B) 99.74% C) 68.26% D) 95.44%
- 13) At one college, GPAs are normally distributed with a mean of 3.1 and a standard deviation of 0.4. What percentage of students at the college have a GPA between 2.7 and 3.5? 13) _____
- A) 84.13% B) 68.26% C) 99.74% D) 95.44%

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a normal probability plot of the given data.

- 14) The systolic blood pressure (in mmHg) is given below for a sample of 12 men aged between 60 and 65. 14) _____

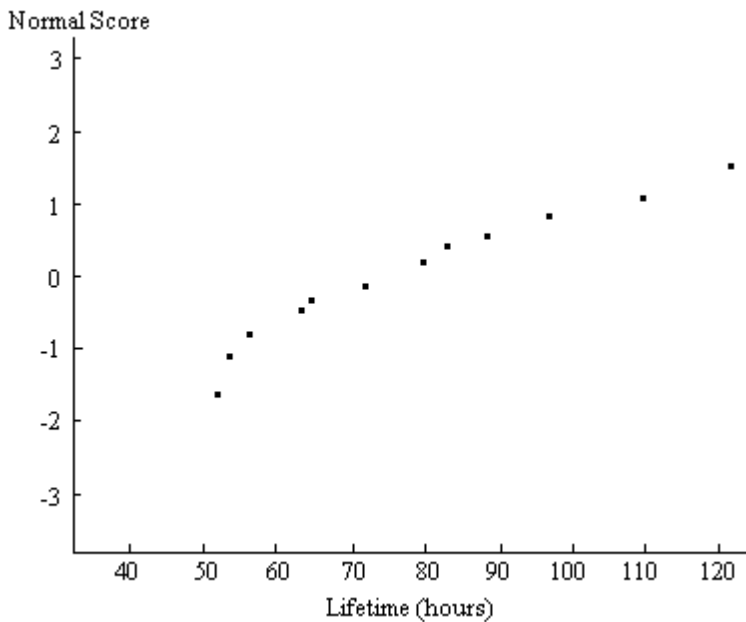
127 135 118 164
143 130 125 153
120 173 140 180



Provide an appropriate response.

- 15) A normal probability plot is given below for the lifetimes (in hours) of a sample of batteries of a particular brand. Use the plot to assess the normality of the lifetimes of these batteries. Explain your reasoning.

15) _____



Solve the problem.

- 16) The weights of five players on a football team are shown below.

16) _____

Player	A	B	C	D	E
Weight (lb)	290	310	250	255	220

Consider these players to be a population of interest. The mean weight, μ , for the population is 265 pounds. Construct a table that shows all of the possible samples of size two. For each of the possible samples, list the players in the sample, their weights, and the sample mean. The first line of the table is shown below.

Sample	Weights	\bar{x}
A, B	290, 310	300

Use your table to find the probability that, for a random sample of size two, the sample mean will equal the population mean.

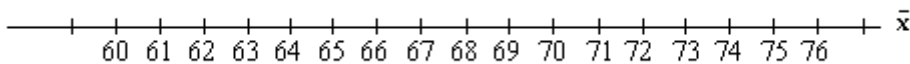
Draw the specified dotplot.

- 17) The heights (in inches) of 5 players on a basketball team are given in the table.

17) _____

Player	A	B	C	D	E
Height (inches)	65	78	72	68	57

Draw a dotplot for the sampling distribution of the sample mean for samples of size 2.



Solve the problem.

18) The weights of five players on a football team are shown below.

18) _____

Player	A	B	C	D	E
Weight (lb)	280	315	200	250	240

Consider these players to be a population of interest. The table below shows all of the possible samples of size two. For each sample, the players in the sample, their \bar{x} weights, and the sample mean are listed. Use the table to find the mean of the variable \bar{x} .

Sample	Weights	\bar{x}
A, B	280, 315	297.5
A, C	280, 200	240
A, D	280, 250	265
A, E	280, 240	260
B, C	315, 200	257.5
B, D	315, 250	282.5
B, E	315, 240	277.5
C, D	200, 250	225
C, E	200, 240	220
D, E	250, 240	245

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

For samples of the specified size from the population described, find the mean and standard deviation of the sample mean \bar{x} .

19) The mean and the standard deviation of the sampled population are, respectively, 182.1 and 29.4. 19) _____

$n = 36$

A) $\mu_{\bar{x}} = 29.4$; $\sigma_{\bar{x}} = 4.9$

B) $\mu_{\bar{x}} = 356.9$; $\sigma_{\bar{x}} = 1.0$

C) $\mu_{\bar{x}} = 182.1$; $\sigma_{\bar{x}} = 4.9$

D) $\mu_{\bar{x}} = 4.9$; $\sigma_{\bar{x}} = 182.1$

Identify the distribution of the sample mean. In particular, state whether the distribution of \bar{x} is normal or approximately normal and give its mean and standard deviation.

20) The weights of people in a certain population are normally distributed with a mean of 157 lb and a standard deviation of 21 lb. Determine the sampling distribution of the mean for samples of size 8. 20) _____

A) Approximately normal, mean = 157 lb, standard deviation = 2.63 lb

B) Approximately normal, mean = 157 lb, standard deviation = 7.42 lb

C) Normal, mean = 157 lb, standard deviation = 21 lb

D) Normal, mean = 157 lb, standard deviation = 7.42 lb

Find the necessary sample size.

- 26) Scores on a certain test are normally distributed with a variance of 70. A researcher wishes to estimate the mean score achieved by all adults on the test. Find the sample size needed to assure with 95 percent confidence that the sample mean will not differ from the population mean by more than 2 units. 26) _____
- A) 135 B) 17 C) 4706 D) 68

Find the specified t-value.

- 27) For a t-curve with $df = 11$, find $t_{0.10}$. 27) _____
- A) 1.372 B) 1.280 C) 2.718 D) 1.363

- 28) For a t-curve with $df = 15$, find $t_{0.025}$. 28) _____
- A) 2.131 B) 1.960 C) 2.120 D) 2.145

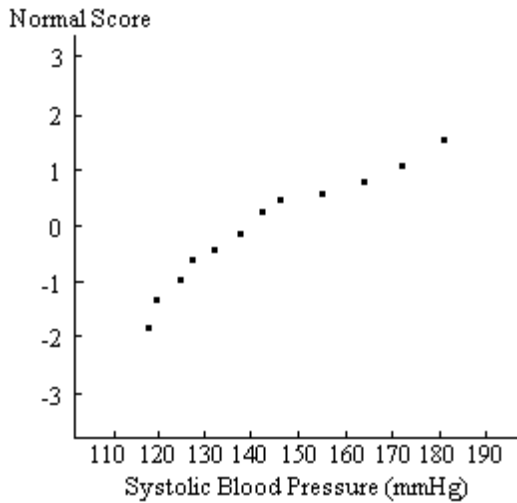
Find the confidence interval specified. Assume that the population is normally distributed.

- 29) The principal randomly selected six students to take an aptitude test. Their scores were: 71.3 83.3 78.7 87.7 84.6 80.5 29) _____
- Determine a 90% confidence interval for the mean score for all students.
- A) 85.81 to 76.22 B) 85.71 to 76.32 C) 76.32 to 85.71 D) 76.22 to 85.81

Answer Key

Testname: MATH181 EXAM3REVIEW

- 1) B
- 2) B
- 3) D
- 4) A
- 5) A
- 6) A
- 7) A
- 8) C
- 9) B
- 10) C
- 11) C
- 12) D
- 13) B
- 14)



15) Since the normal probability plot displays curvature, it appears that lifetimes of these batteries are probably not normally distributed.

16)

Sample	Weights	\bar{x}
A, B	290, 310	300
A, C	290, 250	270
A, D	290, 255	272.5
A, E	290, 220	255
B, C	310, 250	280
B, D	310, 255	282.5
B, E	310, 220	265
C, D	250, 255	252.5
C, E	250, 220	235
D, E	255, 220	237.5

Probability that sample mean equals population mean = 0.1

17)



Answer Key

Testname: MATH181 EXAM3REVIEW

18) 257 pounds

19) C

20) D

21) C

22) B

23) D

24) C

25) B

26) D

27) D

28) A

29) C