

Advanced Algebra A – Accelerated Week 1

Lesson 1.1 Central Tendency

Lesson 1.2 Surveys and Studies

Lesson 1.3 Margin of Error

Lesson 1.4 Mean and Standard Deviation

Lesson 1.5 The Normal Curve

Lesson 1.6 Binomial Experiment

Lesson 2.1 Introduction to Sequences and Series

Lesson 2.2 Arithmetic Sequences and Series

Lesson 2.3 Geometric Sequences and Series

Before working the problems, study the lesson listed above each problem set
Record the answers on the answer sheet. Turn in the answer sheet to be
graded.

For some problem sets, answer boxes are given. Choices may be used more
than once if necessary.

Lesson 1.1 Central Tendency

Find the “Five Number Summary” for the following data sets.

$$A = \{14, 25, 22, 17, 18, 22, 19, 15, 21\}$$

1. Minimum

2. Q_1

3. Median

4. Q_3

5. Maximum

$$X = \{350, 900, 500, 475, 600, 475, 400, 475\}$$

6. Minimum

7. Q_1

8. Median

9. Q_3

10. Maximum

Choices for 1-10:

A) 14	B) 15
C) 16	D) 18
E) 19	AB) 20
AC) 21	AD) 22
AE) 25	BC) 350
BD) 400	BE) 437.5
CD) 475	CE) 500
DE) 550	ABC) 600
ABD) 700	ABE) 900

Lesson 1.2 Surveys and Studies

For the following statistical survey scenarios, identify the type of survey conducted and whether it is *biased* or *unbiased*. CHOOSE TWO ANSWERS.

11. Brianna wants to figure out college students' thoughts about the availability of parking spaces on campus. She asks students their opinion as they walk by her car.
12. The yearbook editor asks the student body at a local high school what type of cover they want on the yearbook. Every 4th student on an alphabetical list is surveyed.
13. A mall employee is asked to conduct a survey to find out how often people in the community visit the mall. The employee randomly asks 50 people at the mall how often they visit the mall.
14. A baseball league asks their fans to vote on their website for who their favorite pitcher was during the season.

Choices for 11-14:

A) Biased	B) Unbiased	C) Random	D) Self-Selected
E) Convenience	AB) Stratified	AC) Systematic	AD) Cluster

Answer the following questions concerning studies based on the given scenario.

A research group wants to study the effects of regular exercise on a person's heart rate. The group measures the heart rate of a person at rest and again after a 10 minute jog. The researchers use students who are not on an athletic team and students who are on an athletic team to participate in the research study.

15. What type of study is being conducted?
16. Students who are NOT on an athletic team belong to which group?
17. Students who ARE on an athletic team belong to which group?

Choices for 15-17:

A) Experimental Study	B) Observational Study
C) Control Group	D) Experimental group

A music teacher wants to show how music helps increase knowledge retention in his students' general studies. He gives all of his students an article to read and informs them they will have a quiz over the material after they finish reading it. One group of students take the quiz in a quiet room and another group take the quiz in a room while classical music is played.

18. What type of study is being conducted?
19. Students who are tested in the room with music belong to which group?
20. Students who are tested in the quiet room belong to which group?

Choices for 18-20:

A) Experimental Study	B) Observational Study
C) Control Group	D) Experimental group

Lesson 1.3 Margin of Error

Calculate the Margin of Error for the given population sample sizes to the nearest tenth of a percent.

21. 100
22. 1,200
23. 500
24. 5,000
25. 2,700

Find the population sample size to the nearest whole number based on the given Margin of Error.

26. 3%
27. 13.5%
28. 1%
29. 5.75%
30. 7.99%

Choices for 21-30:

A) $\pm 4.5\%$
B) $\pm 0.4\%$
C) $\pm 1.9\%$
D) $\pm 10.0\%$
E) $\pm 1.4\%$
AB) $\pm 1.0\%$
AC) $\pm 2.9\%$
AD) 55
AE) 157
BC) 1,111
BD) 302
BE) 10,000

Using the Margin of Error for the given sample size (n), find the interval of the expected response of the whole population given the response in percent (p) of the population surveyed.

Choices for 31-35:

31. $n = 100, p = 52\%$

32. $n = 500, p = 27\%$

33. $n = 2700, p = 13.7\%$

34. $n = 1200, p = 18\%$

35. $n = 5000, p = 20\%$

A) 15.1% – 20.9%
B) 32.1% – 32.9%
C) 42% – 62%
D) 18.6% – 21.4%
E) 11.8% – 15.6%
AB) 7% – 9%
AC) 22.5% – 31.5%

Lesson 1.4 Mean and Standard Deviation

Find the mean and standard deviation using the given information.

Given: $n = 20, p = 0.4$

36. Mean

37. Standard deviation

Given: $n = 40, p = 0.3$

38. Mean

39. Standard deviation

Given: $n = 80, p = 0.7$

40. Mean

41. Standard deviation

Given: $n = 100, p = 0.75$

42. Mean

43. Standard deviation

Given: $n = 104, p = 0.25$

44. Mean

45. Standard deviation

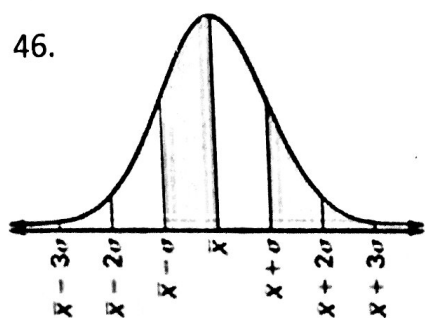
Choices for 36-45:

A) 2.2	B) 2.7	C) 2.8	D) 2.9	E) 3.5	AB) 3.9
AC) 4.1	AD) 4.3	AE) 4.4	BC) 8	BD) 10	BE) 12
CD) 18	CE) 26	DE) 56	ABC) 75	ABD) 24	ABE) 3.1

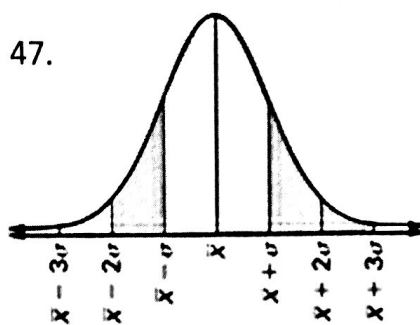
Lesson 1.5 The Normal Curve

Give the percent of the area under the normal curve represented by the shaded regions.

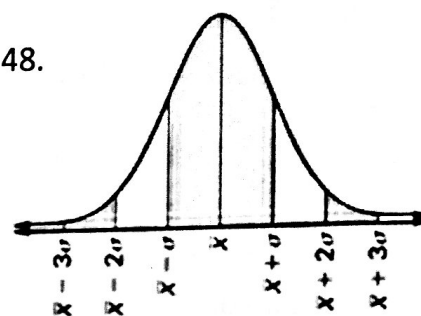
46.



47.



48.



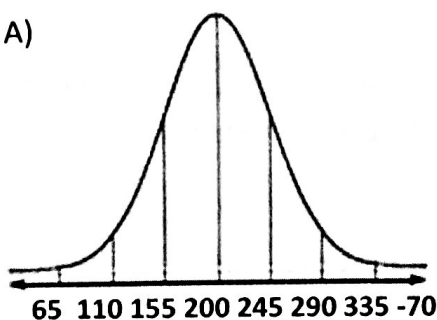
Choices for 46-48:

A) 72.85%	B) 50%	C) 29.35%	D) 81.5%	E) 34%	AB) 68%
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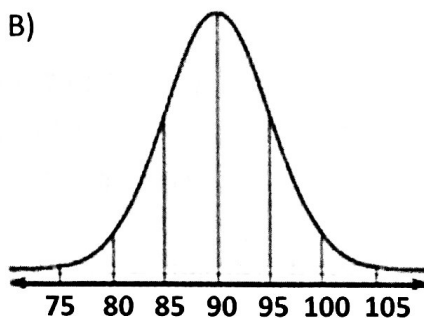
Given $n = 200$ and $p = 0.45$, construct a normal curve and answer the problems that follow. Round σ to the nearest whole number. Use the formula for z -score and the standard normal table to answer problems with an x -value that does not lie on a specific standard deviation from the mean.

49. Select the normal curve that fits the given information.

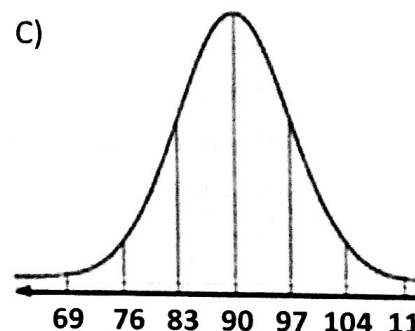
A)



B)



C)



50. $P(69 \leq x \leq 83)$

51. $P(x \leq 97)$

52. $P(76 \leq x \leq 104)$

53. $P(x \leq 70)$

54. $P(x \leq 89)$

55. $P(x \leq 112)$

Choices for 50-55:

A) 0.5	B) 0.0019	C) 0.16
D) 0.4602	E) 0.84	AB) 0.9990
AC) 0.1585	AD) 0.025	AE) 0.95

A coin is tossed 20 times. Find the probability that the given number of "tails" results in the 20 trials. Round to four decimal places.

56. 5

57. 10

58. 13

59. 8

60. 17

A large company surveys their employees and find that 71% of employees prefer to take vacation during the summer. A group of 5 employees is then asked what season they prefer to take vacation. Round to four decimal places.

61. What is the probability that all 5 prefer to take vacation in the summer?

62. What is the probability that 3 employees prefer to take vacation in the summer?

63. What is the probability that 2 or fewer employees prefer to take vacation in the summer?

64. Of the 5 employees, what is the most likely number of them that prefer to take vacation during the summer?

A survey group found that 82% of players in the PGA Tour Championship held in Atlanta, GA were able to par hole 18. After the tournament was finished, 10 players were asked if they were able to par hole 18. Round to four decimal places.

65. What is the probability 8 of the 10 players asked were able to par hole 18?

66. What is the probability 5 of the 10 players asked were able to par hole 18?

67. What is the probability 4, 5, or 6 of the players asked were able to par hole 18?

Choices for 56-67:

A) 0.0739	B) 0.1804	C) 0.2980	D) 0.0011	E) 0.3010	AB) 0.1762	AC) 0.0000
AD) 0.1501	AE) 0.0177	BC) 0.0148	BD) 0.0879	BE) 0.1201	CD) 3	CE) 4

Lesson 2.1 Introduction to Sequences and Series

Identify the following as either a sequence or series. Then identify whether the sequence or series is finite or infinite (CHOOSE TWO ANSWERS FOR EACH.)

A) sequence

B) series

C) finite

D) infinite

68. 12, 15, 18, 21, 24, 27

69. $10 + 11 + 13 + 16 + 20$

70. $0.5 + 1 + 1.5 + 2 + 2.5 + \dots$

71. -3, 6, -12, 24, -72, ...

72. $\frac{1}{4} + \frac{1}{2} + 1 + \dots + 64$

73. 25, 20, 15, 10, ...

Find the indicated term of the sequence.

74. Find a_{20} of $a_n = 8n - 12$.

75. Find a_6 of $a_n = 0.5(4)^{n-1}$.

76. Find a_{13} of $a_n = -4n + 30$.

77. Find a_{50} of $a_n = \frac{n-6}{n+5}$.

78. Find a_8 of $a_n = n^2 - 4n - 16$.

Choices for 74-78:

A) $-\frac{6}{5}$	B) $\frac{1}{729}$	C) $\frac{3}{32}$
D) $\frac{1}{2}$	E) $\frac{4}{5}$	AB) $\frac{56}{55}$
AC) -404	AD) -102	AE) -32
BC) -22	BD) 16	BE) 22
CD) 31	CE) 32	DE) 64
ABC) 82	ABD) 148	ABE) 160
BCD) 199	BCE) 464	BDE) 511
CDE) 512	ABCD) 729	ABCE) 2047

Write out the series.

79. $\sum_{k=1}^4 2k + 1$

80. $\sum_{k=1}^5 k^2 + 1$

81. $\sum_{k=1}^5 2(-3)^{k-1}$

82. $\sum_{k=1}^4 k^2 + 0.5k$

Choices for 79-82:

A) $3 + 5 + 7 + 9$	B) $3 + 5 + 10 + 17 + 26$
C) $2 + (-6) + 12 + (-24) + 48$	D) $1 + 6 + 36 + 216 + 1296$
E) $\frac{2}{3} + \frac{4}{3}$	AB) $\frac{2}{3} + 1 + \frac{6}{5} + \frac{4}{3}$
AC) $\frac{1}{3} + \frac{2}{3} + \frac{3}{3} + \frac{4}{3}$	AD) $\frac{1}{3} + \frac{4}{3}$
AE) $2 + (-6) + 18 + (-54) + 162$	BC) $4 + 6 + 8 + 10$
BD) $3 + 9$	BE) $1.5 + 18$
CD) $0 + (-6) + 36 + (-216) + 1296$	CE) $2 + 5 + 10 + 17 + 26$
DE) $1.5 + 5 + 10.5 + 18$	ABC) $2 + 162$

Evaluate the series.

83. $\sum_{k=1}^6 3k + 5$

84. $\sum_{k=1}^4 k^2 - 4$

85. $\sum_{k=1}^5 2^{k-1}$

86. $\sum_{k=2}^5 2(-10)^{k-1}$

Choices for 83-86:

A) 9	B) 14	C) 16
D) 17	E) 18	AB) 24
AC) 28	AD) 31	AE) 35
BC) 37.5	BD) 40.5	BE) 54
CD) 88	CE) 90	DE) 93
ABC) 105	ABD) 124	ABE) 1980
BCD) 18,180	BCE) 18,182	BDE) 19,180

Lesson 2.2 and 2.3 Arithmetic and Geometric Sequences and Series

Identify the sequence as arithmetic, geometric, or neither.

A) arithmetic

B) geometric

C) neither

87. 11, 22, 33, 44, 55, 66, 77, 88, 99

88. 100, 50, 25, 12.5, ...

89. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}$

90. 7, -3, -13, -23, -33, -43

91. 1, 0.1, 0.01, 0.001, 0.0001, ...

92. 0, 10, 30, 60, 100, 150, ...

Lesson 2.2 Arithmetic Sequences and Series

Find the common difference (d) of the arithmetic sequence.

93. 3, 15, 27, 39, 51, ...

94. -1, -5, -9, -13, -17, ...

95. 1.2, 1.8, 2.4, 3.0, ...

96. $1, \frac{5}{4}, \frac{3}{2}, \frac{7}{4}, 2, \dots$

97. $a_n = 20 + 6n$

Choices for 93-97:

A) $-\frac{1}{2}$	B) $-\frac{1}{4}$	C) $\frac{1}{4}$	D) $\frac{1}{2}$
E) -0.8	AB) -0.6	AC) 0.6	AD) 0.8
AE) -26	BC) -12	BD) -8	BE) -6
CD) -5	CE) -4	DE) -2	ABC) -1
ABD) 1	ABE) 2	ACD) 4	ACE) 5
ADE) 6	BCD) 8	BCE) 12	BDE) 26

Find the n th term of the arithmetic sequence.

98. 18, 9, 0, -9, -18, ...

99. -4, -1, 2, 5, 8, ...

100. 14, 11, 8, 5, 2, ...

101. 1.00, 1.25, 1.50, 1.75, 2.00, ...

Choices for 98-101:

A) $a_n = 18 - 9n$	B) $a_n = 14 - 3n$	C) $a_n = 17 - 3n$
D) $a_n = 7 - 3n$	E) $a_n = 27 - 9n$	AB) $a_n = 14 + 3n$
AC) $a_n = 1 + 9n$	AD) $a_n = -8 + 9n$	AE) $a_n = 27 - 11n$
BC) $a_n = -4 + 3n$	BD) $a_n = 1 - 9n$	BE) $a_n = -7 + 3n$
CD) $a_n = 1 + 0.25n$	CE) $a_n = 0.75 + 0.25n$	DE) $a_n = 0.25 + n$
ABC) $a_n = -\frac{1}{4} + n$	ABD) $a_n = \frac{3}{4} + n$	ABE) $a_n = \frac{3}{4} + 4n$

Write the arithmetic series using summation notation.

102. $12 + 9 + 6 + 3 + 0 + (-3)$

103. $-10 + (-7) + (-4) + (-1) + 2 + \dots$

104. $48 + 60 + 72 + 84 + 96$

105. $2.8 + 3.9 + 5.0 + 6.1 + 7.2$

106. $-1 + (-13) + (-25) + (-37) + (-49) + \dots$

Choices for 102-106:

A) $\sum_{k=1}^{\infty} 36 + 12k$	B) $\sum_{k=1}^{\infty} -1 - 12k$	C) $\sum_{k=1}^6 12 - 3k$	D) $\sum_{k=1}^5 2.8 + 1.1k$
E) $\sum_{k=1}^5 36 + 12k$	AB) $\sum_{k=1}^{\infty} 1.7 + 1.1k$	AC) $\sum_{k=1}^{\infty} 11 - 12k$	AD) $\sum_{k=1}^5 -13 + 3k$
AE) $\sum_{k=1}^{\infty} 12 - 3k$	BC) $\sum_{k=1}^5 48 - 12k$	BD) $\sum_{k=1}^{\infty} -13 + 3k$	BE) $\sum_{k=1}^5 1.7 + 1.1k$
CD) $\sum_{k=1}^5 11 - 12k$	CE) $\sum_{k=1}^5 -10 + 3k$	DE) $\sum_{k=1}^{\infty} 2.8 + 1.1k$	ABC) $\sum_{k=1}^6 15 - 3k$
ABD) $\sum_{k=1}^{\infty} 48 - 12k$	ABE) $\sum_{k=1}^{\infty} -10 + 3k$	ACD) $\sum_{k=1}^5 -1 - 12k$	ACE) $\sum_{k=1}^{\infty} 15 - 3k$

Find the partial sum of the arithmetic series by using the partial sum formula.

107. $\sum_{k=1}^{15} 3k + 10$

108. $\sum_{k=1}^{100} 0.5k$

109. $\sum_{k=1}^{45} 6k - 24$

110. $\sum_{k=5}^{25} -0.25k + 1.5$

Choices for 107-110:

A) -64	B) -52	C) -47.25	D) -45
E) -43.75	AB) -41.75	AC) 480	AD) 510
AE) 630	BC) 672	BD) 1975	BE) 2240
CD) 2310	CE) 2525	DE) 3960	ABC) 4200
ABD) 4316	ABE) 5130	ACD) 5218	ACE) 5412
ADE) 10,878	BCD) 11,400	BCE) 11,448	BDE) 12,024

Lesson 2.3 Geometric Sequences and Series

Find the common ratio (r) of the geometric sequence.

111. 1, 9, 81, 729, 6561, ...

112. 1, -10, 100, -1000, 10000, ...

113. 4, 0.8, 0.16, 0.032, 0.0064, ...

114. $1, \frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \frac{16}{81}, \dots$

115. $a_n = 2(3)^{n-1}$

Choices for 111-115:

A) $\frac{2}{3}$	B) $\frac{1}{3}$	C) $\frac{4}{3}$	D) $\frac{1}{2}$
E) 0.8	AB) 0.2	AC) 0.4	AD) 3.2
AE) -1	BC) -8	BD) -10	BE) -11
CD) 1	CE) 2	DE) 3	ABC) 4
ABD) 6	ABE) 8	ACD) 9	ACE) 10

Find the n th term of the geometric sequence.

116. 10, 50, 250, 1250, 6250, ...

117. 6400, 1600, 400, 100, 25, ...

118. 1, 6, 36, 216, 1296, ...

119. $\frac{1}{3}, \frac{1}{6}, \frac{1}{12}, \frac{1}{24}, \frac{1}{48}, \dots$

120. 4, -8, 16, -32, 64, ...

121. 1, 0.2, 0.04, 0.008, 0.0016, ...

Choices for 116-121:

A) $a_n = 4(-2)^{n-1}$	B) $a_n = 2^{n-1}$	C) $a_n = 6(2)^{n-1}$	D) $a_n = 2(-4)^{n-1}$
E) $a_n = 10(5)^{n-1}$	AB) $a_n = (-2)^{n-1}$	AC) $a_n = 6^{n-1}$	AD) $a_n = 0.2^{n-1}$
AE) $a_n = -2(4)^{n-1}$	BC) $a_n = 10(50)^{n-1}$	BD) $a_n = 0.2(1)^{n-1}$	BE) $a_n = 5(10)^{n-1}$
CD) $a_n = 6(1)^{n-1}$	CE) $a_n = -4(-2)^{n-1}$	DE) $a_n = \frac{1}{4}(6400)^{n-1}$	ABC) $a_n = \frac{1}{3}(2)^{n-1}$
ABD) $a_n = 6400\left(\frac{1}{2}\right)^{n-1}$	ABE) $a_n = \frac{1}{3}\left(\frac{1}{2}\right)^{n-1}$	ACD) $a_n = 6400\left(\frac{1}{4}\right)^{n-1}$	ACE) $a_n = \frac{1}{2}\left(\frac{1}{3}\right)^{n-1}$

Write out the geometric series using summation notation.

122. $3 + 4.5 + 6.75 + 10.125 + 15.1875$

123. $1 + 10 + 100 + 1000 + \dots$

124. $2 + 14 + 98 + 686 + 4802 + 33614$

125. $10 + 20 + 40 + 80 + 160 + 320$

126. $5000 + 2500 + 1250 + 625 + \dots$

Choices for 122-126:

A) $\sum_{k=1}^{\infty} 10(1)^{k-1}$	B) $\sum_{k=1}^{\infty} 0.5^{k-1}$	C) $\sum_{k=1}^6 2(7)^{k-1}$	D) $\sum_{k=1}^5 3(1.5)^{k-1}$
E) $\sum_{k=1}^5 1.5^{k-1}$	AB) $\sum_{k=1}^{\infty} 0.5(5000)^{k-1}$	AC) $\sum_{k=1}^{\infty} 10(10)^{k-1}$	AD) $\sum_{k=1}^5 1.5(3)^{k-1}$
AE) $\sum_{k=1}^{\infty} 5000(0.5)^{k-1}$	BC) $\sum_{k=1}^6 2(10)^{k-1}$	BD) $\sum_{k=1}^{\infty} 10^{k-1}$	BE) $\sum_{k=1}^6 20^{k-1}$
CD) $\sum_{k=1}^6 7(2)^{k-1}$	CE) $\sum_{k=1}^6 10(2)^{k-1}$	DE) $\sum_{k=1}^{\infty} 5000(-0.5)^{k-1}$	ABC) $\sum_{k=1}^6 2(12)^{k-1}$

Find the partial sum of the geometric series by using the partial sum formula.

127. $\sum_{k=1}^5 3^{k-1}$

128. $\sum_{k=1}^8 8(2)^{k-1}$

129. $\sum_{k=1}^6 -5(-2)^{k-1}$

130. $\sum_{k=1}^5 \frac{1}{5} \left(\frac{1}{2} \right)^{k-1}$

Choices for 127-130:

A) $\frac{31}{80}$	B) $\frac{27}{53}$	C) $\frac{10}{9}$	D) $\frac{31}{16}$
E) -364	AB) -360	AC) -182	AD) -40
AE) -20	BC) 75	BD) 85	BE) 105
CD) 121	CE) 136	DE) 142	ABC) 1365
ABD) 1852	ABE) 2040	ACD) 3650	ACE) 4870
ADE) 5115	BCD) 5810	BCE) 21,844	BDE) 21,845