Algebra 2, Spring Semester Review

1. (1 point)
   Graph the relation and its inverse. Use open circles to graph the points of the inverse.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>x</td>
<td>0</td>
<td>4</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>y</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td>-1</td>
</tr>
</tbody>
</table>

(a)   
(b)   
(c)   
(d)   
2. (1 point)
Is relation \( t \) a function? Is the inverse of relations \( t \) a function?

Relation \( t \)

<table>
<thead>
<tr>
<th>( x )</th>
<th>( 0 )</th>
<th>( 2 )</th>
<th>( 4 )</th>
<th>( 6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

a. Relation \( t \) is not a function. The inverse of relation \( t \) is a function.
b. Relation \( t \) is not a function. The inverse of relation \( t \) is not a function.
c. Relation \( t \) is not a function. The inverse of relation \( t \) is a function.
d. Relation \( t \) is a function. The inverse of relation \( t \) is not a function.

What is the inverse of the given relation?

3. (1 point)
\( y = 7x^2 - 3 \)

a. \( y = \pm \sqrt{\frac{x + 3}{7}} \)
b. \( x = \sqrt{\frac{y + 3}{7}} \)
c. \( y^2 = \frac{x - 3}{7} \)
d. \( y = \pm \sqrt{\frac{x - 3}{7}} \)

4. (1 point)
\( y = 3x + 9 \)

a. \( y = \frac{1}{3}x + 3 \)
b. \( y = 3x - 3 \)
c. \( y = 3x + 3 \)
d. \( y = \frac{1}{3}x - 3 \)
5. (1 point)
Graph $y = -4x^2 - 2$ and its inverse.

a. 

b. 

c. 

d. 
6. (1 point)
Graph $y = -2x + 3$ and its inverse.

7. (1 point)
For the function $f(x) = (8 - 2x)^2$, find $f^{-1}$. Determine whether $f^{-1}$ is a function.

a. $f^{-1}(x) = \pm \sqrt{\frac{8 + x}{2}}$; $f^{-1}$ is not a function.

b. $f^{-1}(x) = \frac{8 \pm \sqrt{x}}{2}$; $f^{-1}$ is not a function.

c. $f^{-1}(x) = \pm \sqrt{\frac{8 + x}{2}}$; $f^{-1}$ is a function.

d. $f^{-1}(x) = \frac{8 \pm \sqrt{x}}{2}$; $f^{-1}$ is a function.
8. (1 point)
For the function \( f(x) = \sqrt{x - 5} \), find \( f^{-1} \). What is the range of \( f^{-1} \)?

a. \( f^{-1}(x) = x^2 + 25; y \geq 25 \)
b. \( f^{-1}(x) = x^2 + 25; y \geq 5 \)
c. \( f^{-1}(x) = x^2 + 5; y \geq 25 \)
d. \( f^{-1}(x) = x^2 + 5; y \geq 5 \)

Graph the equation.

9. (1 point)
\( y = \sqrt{x + 1} \)

a. 

b. 

c. 

d. 

10. (1 point) \( y = \sqrt{x} - 3 \)

a. 

b. 

c. 

d.
11. (1 point) \[ y = \sqrt{x + 3} \]

a. 

b. 

c. 

d. 

12. (1 point) \[ y = 2 \sqrt{x} \]

a. 

b. 

c. 

d. 
13. (1 point)

\[ y = -0.5 \sqrt{x - 2} + 2 \]

a. 

b. 

c. 

d. 
Graph the exponential function.

14. (1 point)  
\[ y = 4^x \]

- a. 
- b. 
- c. 
- d.
15. (1 point)

\[ y = 4(3)^x \]

a. 

b. 

c. 

d. 
16. (1 point)
\[ y = 3(1.9)^x \]
\[ a. \]
\[ y = 3(1.9)^x \]
\[ b. \]
\[ y = 3(1.9)^x \]
\[ c. \]
\[ y = 3(1.9)^x \]
\[ d. \]
\[ y = 3(1.9)^x \]

17. (1 point)
Find the annual percent increase or decrease that \[ y = 0.35(2.3)^x \] models.
\[ a. \] 230% increase  
\[ c. \] 30% decrease  
\[ b. \] 130% increase  
\[ d. \] 65% decrease

18. (1 point)
An initial population of 820 quail increases at an annual rate of 23%. Write an exponential function to model the quail population. What will the approximate population be after 3 years?
\[ a. \] \[ f(x) = 820(1.23)^x ; 1526 \]
\[ b. \] \[ f(x) = 820(23)^x ; 9,976,940 \]
\[ c. \] \[ f(x) = (820 \cdot 0.23)^x ; 6,708,494 \]
\[ d. \] \[ f(x) = 820(0.23)^x ; 1526 \]
Graph the function.

19. (1 point)

\[ y = 8 \left( \frac{1}{3} \right)^x \]

a. 

b. 

c. 

d.
20. (1 point)

\[ y = \frac{1}{5} (3)^x \]

a. 

diagram showing an exponential function with a positive slope.

b. 

diagram showing an exponential function with a negative slope.

c. 

diagram showing a different exponential function.

d. 

diagram showing a completely different function, not exponential.
___ 21. (1 point)

\[ y = -2 \left( \frac{1}{8} \right)^x \]

- [ ] a.
- [x] b.
- [ ] c.
- [ ] d.
22. (1 point)

\[ y = 5 \left( \frac{1}{4} \right)^x + 2 \]

a.  

b.  

c.  

d.  

23. (1 point)
\[ y = 4 \left( \frac{1}{2} \right)^{x + 4} \]

a. [Graph]

b. [Graph]

c. [Graph]

d. [Graph]
24. (1 point)
\[ y = 7(6)^{x + 2} + 1 \]
\[ \begin{array}{c}
\text{a.} \\
\text{b.} \\
\text{c.} \\
\text{d.}
\end{array} \]

25. (1 point)
The half-life of a certain radioactive material is 32 days. An initial amount of the material has a mass of 361 kg. Write an exponential function that models the decay of this material. Find how much radioactive material remains after 5 days. Round your answer to the nearest thousandth.
\[ y = 361 \left( \frac{1}{2} \right)^{\frac{x}{32}} \]
\[ \begin{array}{c}
\text{a.} \\
\text{b.} \\
\text{c.} \\
\text{d.}
\end{array} \]

26. (1 point)
Use the graph of \( y = e^x \) to evaluate \( e^{1.7} \) to four decimal places.
\[ \begin{array}{c}
\text{a.} 5.4739 \\
\text{b.} 4.6211 \\
\text{c.} 2.7183 \\
\text{d.} 0.1827
\end{array} \]

27. (1 point)
Use the table feature on a graphing calculator to evaluate \( e^{1.8} \) to four decimal places.
\[ \begin{array}{c}
\text{a.} 6.0496 \\
\text{b.} 0.1653 \\
\text{c.} 2.7183 \\
\text{d.} 4.8929
\end{array} \]
28. (1 point)
Suppose you invest $1600 at an annual interest rate of 4.6% compounded continuously. How much will you have in the account after 4 years?
   a. $800.26   b. $6,701.28   c. $10,138.07   d. $1,923.23

29. (1 point)
How much money invested at 5% compounded continuously for 3 years will yield $820?
   a. $952.70   b. $818.84   c. $780.01   d. $705.78

Write the equation in logarithmic form.

30. (1 point)
   \[ 2^5 = 32 \]
   a. \( \log_2 32 = 5 \cdot 2 \)   c. \( \log 32 = 5 \)
   b. \( \log_2 32 = 5 \)   d. \( \log_5 32 = 2 \)

Evaluate the logarithm.

31. (1 point)
   \[ \log_5 \frac{1}{625} \]
   a. -3   b. 5   c. -4   d. 4

32. (1 point)
   \[ \log_3 243 \]
   a. 5   b. -5   c. 4   d. 3

33. (1 point)
   \[ \log 0.01 \]
   a. -10   b. -2   c. 2   d. 10

34. (1 point)
The pH of a liquid is a measure of how acidic or basic it is. The concentration of hydrogen ions in a liquid is labeled \([H^+]\). Use the formula \( \text{pH} = -\log[H^+] \) to find the pH level, to the nearest tenth, of a liquid with \([H^+]\) about \(6.5 \times 10^{-3}\).
   a. -3.8   b. 3.8   c. 2.2   d. 3.0
Graph the logarithmic equation.

35. (1 point)

\[ y = \log_3 x \]

- a.
- b.
- c.
- d.
36. (1 point)
\[ y = \log_5 x \]

a. 

b. 

c. 

d. 
37. (1 point)

\[ y = \log(x + 1) - 7 \]

a. 

b. 

c. 

d.
38. (1 point) 
\[ y = \log_2 x - 3 \]

a. 

b. 

c. 

d. 
39. \( y = \log_5(x - 2) \)

a. [Graph A]

b. [Graph B]

c. [Graph C]

d. [Graph D]

40. (1 point)
\[
3 \log_b q + 6 \log_b v
\]

a. \( \log_b (q^3 v^6) \)

b. \( \log_b \left( q^{3+6} \right) \)

c. \( (3 + 6) \log_b (q + v) \)

d. \( \log_b \left( q^3 + v^6 \right) \)

41. (1 point)
\[
\log_3 4 - \log_3 2
\]

a. \( \log_3 2 \)

b. \( \log_2 \)

c. \( \log 2 \)

d. \( \log 2 \)
**42.** (1 point)

\[ 4 \log x - 6 \log (x + 2) \]

a. \[ 24 \log \frac{x}{x + 2} \]

b. \[ \log x^4(x + 2)^6 \]

c. \[ \log (x + 2)^4 \]

d. none of these

**Expand the logarithmic expression.**

**43.** (1 point)

\[ \log_3 \frac{d}{12} \]

a. \[ \log_3 d - \log_3 12 \]

b. \[ -d \log_3 12 \]

c. \[ \frac{\log_3 d}{\log_3 12} \]

d. \[ \log_3 12 - \log_3 d \]

**44.** (1 point)

\[ \log_3 11p^3 \]

a. \[ \log_3 11 \cdot 3 \log_3 p \]

b. \[ \log_3 11 - 3 \log_3 p \]

c. \[ \log_3 11 + 3 \log_3 p \]

d. \[ 11 \log_3 p^3 \]

**45.** (1 point)

\[ \log_b \sqrt{\frac{57}{74}} \]

a. \[ \frac{1}{2} \log_b 57 + \frac{1}{2} \log_b 74 \]

b. \[ \frac{1}{2} \log_b 57 - \frac{1}{2} \log_b 74 \]

c. \[ \sqrt{\log_b 57 - \log_b 74} \]

d. \[ \log_b \frac{1}{2} (57 - 74) \]

**46.** (1 point)

Use the Change of Base Formula to evaluate \( \log_4 20 \).

a. 2.161

b. 2.996

c. 1.301

d. 2.161

**47.** (1 point)

Use the Change of Base Formula to evaluate \( \log_7 28 \).

a. 1.712

b. 3.332

c. 1.712

d. 1.447

**48.** (1 point)

A construction explosion has an intensity \( I \) of \( 4.85 \times 10^{-2} \) W/m\(^2\). Find the loudness of the sound in decibels if \( L = 10 \log \frac{I}{I_o} \) and \( I_o = 10^{-12} \) W/m\(^2\). Round to the nearest tenth.

a. 146.9 decibels

b. 115.8 decibels

c. 106.9 decibels

d. 48.5 decibels
49. (1 point)
A company with loud machinery needs to cut its sound intensity to 37% of its original level. By how many decibels would the loudness be reduced? Use the formula $L = 10 \log \frac{I}{I_o}$. Round to the nearest hundredth.

a. 2.01 decibels  
   b. 2.12 decibels  
   c. 1.37 decibels  
   d. 4.32 decibels

Solve the exponential equation.

50. (1 point)
\[
\frac{1}{16} = 64^{4x - 3}
\]

a. $\frac{1}{12}$  
   b. $\frac{1}{4}$  
   c. $\frac{7}{12}$  
   d. $\frac{11}{12}$

51. (1 point)
\[4^{4x} = 8\]

a. $\frac{3}{4}$  
   b. $\frac{8}{3}$  
   c. $\frac{3}{8}$  
   d. 2

52. (1 point)
\[125^{9x - 2} = 150\]

a. −1.8847  
   b. −0.1069  
   c. 0.3375  
   d. 1.0378

53. (1 point)
Solve $15^{2x} = 36$. Round to the nearest ten-thousandth.

a. 0.6616  
   b. 2.6466  
   c. 1.7509  
   d. 1.9091

54. (1 point)
The generation time $G$ for a particular bacteria is the time it takes for the population to double. The bacteria increase in population is shown by the formula $G = \frac{t}{3.3 \log a}$, where $t$ is the time period of the population increase, $a$ is the number of bacteria at the beginning of the time period, and $P$ is the number of bacteria at the end of the time period. If the generation time for the bacteria is 6 hours, how long will it take 8 of these bacteria to multiply into a colony of 7681 bacteria? Round to the nearest hour.

a. 177 hours  
   b. 76 hours  
   c. 4 hours  
   d. 85 hours

Solve the logarithmic equation. Round to the nearest ten-thousandth if necessary.

55. (1 point)
\[3 \log 2x = 4\]

a. 10.7722  
   b. 5  
   c. 2.7826  
   d. 0.6309

56. (1 point)
Solve $\log(4x + 10) = 3$.

a. $-\frac{7}{4}$  
   b. $\frac{495}{2}$  
   c. 250  
   d. 990

26
57. (1 point) 
\[ \log(x + 9) - \log x = 3 \]
   a. 0.0090  
   b. 0.3103  
   c. 3.2222  
   d. 111

58. (1 point) 
\[ 2 \log 4 - \log 3 + 2 \log x - 4 = 0 \]
   a. 12.3308  
   b. 43.3013  
   c. 86.6025  
   d. 1875

59. (1 point) 
Solve \( \log 3x + \log 9 = 0 \). Round to the nearest hundredth if necessary.
   a. 0.33  
   b. 0.04  
   c. 3  
   d. 27

60. (1 point) 
Write the expression as a single natural logarithm.

61. (1 point) 
\[ 3 \ln 3 + 3 \ln c \]
   a. \( \ln(27 + c^3) \)  
   b. \( \ln 9c^3 \)  
   c. \( \ln 27c \)  
   d. \( \ln 27c^3 \)

62. (1 point) 
\[ 3 \ln x - 2 \ln c \]
   a. \( \ln \left( \frac{x^3}{c^2} \right) \)  
   b. \( \ln (x^3 + c^2) \)  
   c. \( \ln (x^3 - c^2) \)  
   d. \( \ln x^3c^2 \)

63. (1 point) 
Simplify \( \ln e^3 \).
   a. 3  
   b. \( \frac{1}{3e} \)  
   c. 3e  
   d. \( \frac{1}{3} \)

64. (1 point) 
Solve \( \ln(2x - 1) = 8 \). Round to the nearest thousandth.
   a. 1,489.979  
   b. 2,979.958  
   c. 2,981.458  
   d. 1,490.979

65. (1 point) 
Solve \( \ln 2 + \ln x = 5 \). Round to the nearest thousandth, if necessary.
   a. 50,000  
   b. 74.2  
   c. 10  
   d. 3

66. (1 point) 
Solve \( \ln x - \ln 6 = 0 \).
   a. 6  
   b. 6e  
   c. \( e^6 \)  
   d. \( \ln 6 \)

67. (1 point) 
Use natural logarithms to solve the equation. Round to the nearest thousandth.
\[ 6e^{4x} - 2 = 3 \]
   a. -0.448  
   b. 0.327  
   c. 0.067  
   d. -0.046
Name: ________________________  ID: A

**68.** (1 point)  
\[2e^{2x+12} = 22\]
- a. -4.801  
- b. 1.417  
- c. -4.801  
- d. 0.576

**69.** (1 point)  
\[e^x = \frac{3}{4}\]
- a. -0.288  
- b. -0.275  
- c. 0.275  
- d. 0.288

**70.** (1 point)  
\[e^{2x} = 1.4\]
- a. -1.664  
- b. 0.073  
- c. 0.168  
- d. 0.190

**71.** (1 point)  
The sales of lawn mowers \(t\) years after a particular model is introduced is given by the function \(y = 5500 \ln(9t + 4)\), where \(y\) is the number of mowers sold. How many mowers will be sold 4 years after a model is introduced? Round the answer to the nearest whole number.
- a. 20,289 mowers  
- b. 41,709 mowers  
- c. 8,811 mowers  
- d. 19,713 mowers

**Generate the first five terms in the sequence using the explicit formula.**

**72.** (1 point)  
\[y_n = -5n - 5\]
- a. -30, -25, -20, -15, -10  
- b. 30, 25, 20, 15, 10  
- c. -10, -15, -20, -25, -30  
- d. 10, 15, 20, 25, 30

**73.** (1 point)  
\[c_n = 12n - 11\]
- a. 49, 37, 25, 13, 1  
- b. -1, -13, -25, -37, -49  
- c. 1, 13, 25, 37, 49  
- d. -49, -37, -25, -13, -1

**74.** (1 point)  
What is the 15\(^{th}\) term in the sequence using the given formula?
\[c_n = 3n - 1\]
- a. 14  
- b. 57  
- c. 44  
- d. -44
Name: ______________________

ID: A

75. (1 point)
Write a recursive formula for the sequence 7, 13, 19, 25, 31, ... Then find the next term.
a. \( a_n = a_{n-1} + 6 \), where \( a_1 = 7; 37 \)
b. \( a_n = a_{n-1} + 6 \), where \( a_1 = 37; 7 \)
c. \( a_n = a_{n-1} - 6 \), where \( a_1 = 6; -23 \)
d. \( a_n = a_{n-1} - 6 \), where \( a_1 = 7; 37 \)

76. (1 point)
Write a recursive formula for the sequence 7, 4, 1, -2, -5, .... Then find the next term.
a. \( a_n = a_{n-1} - 3 \), where \( a_1 = -8; 7 \)
b. \( a_n = a_{n-1} - 3 \), where \( a_1 = 7; -8 \)
c. \( a_n = a_{n-1} + 3 \), where \( a_1 = -3; 22 \)
d. \( a_n = a_{n-1} + 3 \), where \( a_1 = 7; -8 \)

77. (1 point)
Write an explicit formula for the sequence 8, 6, 4, 2, 0, ... Then find \( a_{14} \).
a. \( a_n = -2n + 10; -16 \)
b. \( a_n = -2n + 8; -18 \)
c. \( a_n = -2n + 8; 20 \)
d. \( a_n = -2n + 10; -18 \)

78. (1 point)
Suppose you drop a tennis ball from a height of 8 feet. After the ball hits the floor, it rebounds to 80% of its previous height. How high will the ball rebound after its third bounce? Round to the nearest tenth.
a. 3.3 feet  
b. 4.1 feet  
c. 5.1 feet  
d. 1 feet

79. (1 point)
The table shows the predicted growth of a particular bacteria after various numbers of hours. Write an explicit formula for the sequence of the number of bacteria.

<table>
<thead>
<tr>
<th>Hours (( n ))</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bacteria</td>
<td>21</td>
<td>42</td>
<td>63</td>
<td>84</td>
<td>105</td>
</tr>
</tbody>
</table>

a. \( a_n = 21n \)  
b. \( a_n = \frac{1}{21}n \)  
c. \( a_n = n + 21 \)  
d. \( a_n = 21n + 21 \)

Is the sequence arithmetic? If so, identify the common difference.

80. (1 point)
13, 20, 27, 34, ...
a. yes; 7  
b. yes; -7  
c. yes; 13  
d. no

81. (1 point)
14, 21, 42, 77, ...
a. yes; 7  
b. yes; -7  
c. yes; 14  
d. no

82. (1 point)
-2.4, 9.8, 22, 34.2, ...
a. yes; 12  
b. yes; 12.2  
c. yes; 12.3  
d. no
83. (1 point)
Find the 110 term of the sequence −7, 3, 13, 23, ...
   a. 1083     b. −1097    c. 1093     d. 40

84. (1 point)
Find the missing term of the arithmetic sequence 22, ■, 34, ...
   a. 46     b. 16     c. 28     d. 40

85. (1 point)
Viola makes gift baskets for Valentine’s Day. She has 13 baskets left over from last year, and she plans to make 12 more each day. If there are 15 work days until the day she begins to sell the baskets, how many baskets will she have to sell?
   a. 193 baskets     c. 205 baskets
   b. 156 baskets     d. 181 baskets

Is the sequence geometric? If so, identify the common ratio.

86. (1 point)
   6, 12, 24, 48, ...
   a. yes; 2     b. yes; −2     c. yes; 4     d. no

87. (1 point)
   2, −4, −16, −36, ...
   a. yes; −2     b. yes; 2     c. yes; −3     d. no

88. (1 point)
   \( \frac{1}{3}, \frac{2}{9}, \frac{4}{27}, \frac{8}{81}, \frac{16}{243}, \ldots \)
   a. yes; \( \frac{2}{3} \)    c. yes; \( \frac{1}{6} \)
   b. yes; \( \frac{1}{9} \)     d. not geometric

What is the fifth term of the geometric sequence?

89. (1 point)
   5, 15, 45, ...
   a. 1215     c. 405
   b. 1875     d. 3645

Write the explicit formula for the geometric sequence. Then find the fifth term in the sequence.

90. (1 point)
   \( a_1 = -4, a_2 = 8, a_3 = -16 \)
   a. \( a_n = -4 \cdot (2)^n; -64 \)     c. \( a_n = -4 \cdot (-2)^n; 128 \)
   b. \( a_n = -4 \cdot (-2)^{n-1}; -64 \)     d. \( a_n = -2 \cdot (-4)^{n-1}; -512 \)
91. (1 point)
A rope is swinging in such a way that the length of the arc is decreasing geometrically. If the first arc is 18 feet long and the third arc is 8 feet long, what is the length of the second arc?

a. 12 feet  b. 10 feet  c. 5 feet  d. 72 feet

92. (1 point)
What is a possible value for the missing term of the geometric sequence?

39, □, 975, ...

a. –44  b. –195  c. –5  d. –4875

93. (1 point)
What is the sum of the finite arithmetic series?

26 + 29 + 32 + 35 + 38 + 41 + 44

a. 219  b. 245  c. –193  d. 201

94. (1 point)
7.6 + 6.3 + 5 + 3.7 + 2.4 + 1.1 + (–0.2) + (–1.5)

a. 17.4  b. 24.4  c. 27.8  d. 36.4

95. (1 point)
29 + 32 + 35 + 38 + 41 + ... + 59

a. 234  b. 425  c. 484  d. 455

96. (1 point)
(–5) + 0 + 5 + 10 + ... + 65

a. 900  b. 455  c. 450  d. 445

97. (1 point)
Use summation notation to write the series 49 + 54 + 59 + ... for 14 terms.

\[ \sum_{n=1}^{14} (49 + 5n) \]

a.  \[ \sum_{n=1}^{14} (44 + 5n) \]  c.  \[ \sum_{n=1}^{44} (49 + 5n) \]

b.  \[ \sum_{n=1}^{13} (44 + 5n) \]  d.  \[ \sum_{n=1}^{14} (44 + 5n) \]

98. (1 point)
Evaluate the series \( \sum_{n=1}^{4} (n + 4) \).

a. 26  b. 10  c. 16  d. –6
99. (1 point)

Evaluate the series \( \sum_{n=3}^{8} 5n. \)

a. 125  
   b. 38  
   c. 210  
   d. 165

100. (1 point)

Use a calculator to evaluate the series \( \sum_{x=1}^{85} 2x + 6. \)

a. 7,820  
   b. 4,165  
   c. 7,826  
   d. 12,035

101. (1 point)

Evaluate the series \( 1 + 4 + 16 + 64 + 256 + 1024.\)

a. 1365  
   b. 1364  
   c. 341  
   d. 5461

102. (1 point)

What is \( S_5 \) for \( 1000 + 500 + 250 + \ldots? \)

a. 968.75  
   b. 1062.5  
   c. 1937.5  
   d. 12,500

103. (1 point)

What is the sum of the geometric series \( \sum_{x=1}^{10} 6(2)^x? \)

a. 15,658  
   b. 6,138  
   c. 12,276  
   d. 756

104. (1 point)

Justine earned $26,000 during the first year of her job at city hall. After each year she received a 3% raise. Find her total earnings during the first five years on the job.

a. $138,037.53  
   b. $1,004,704.20  
   c. $4,020.51  
   d. $108,774.30

105. (1 point)

A rubber ball dropped on a hard surface takes a sequence of bounces, each one \( \frac{3}{5} \) as high as the preceding one. If this ball is dropped from a height of 10 feet, what is the total vertical distance it has traveled after it hits the surface the 5th time?

a. \( \frac{237}{125} \) feet  
   b. \( \frac{3614}{125} \) feet  
   c. \( \frac{43111}{125} \) feet  
   d. \( \frac{4614}{125} \) feet

106. (1 point)

Find the sine of 180º. Round your answers to the nearest hundredth if necessary.

a. -0.5  
   b. -1.1  
   c. 0  
   d. 0.5

107. (1 point)

Find the cosine 315º. Round your answers to the nearest hundredth if necessary.

a. 0  
   b. 0.71  
   c. 1  
   d. -0.78
108. (1 point)
Find the exact value of $\sin 120^\circ$.

a. $\sin = \frac{\sqrt{3}}{2}$

b. $\sin = -\frac{\sqrt{3}}{2}$

c. $\sin = \frac{1}{2}$

d. $\sin = -\frac{1}{2}$

109. (1 point)
Find the exact value of $\cos 300^\circ$.

a. $\cos = -\frac{1}{2}$

b. $\cos = \frac{1}{2}$

c. $\cos = -\frac{\sqrt{3}}{2}$

d. $\cos = \frac{\sqrt{3}}{2}$

110. (1 point)
Find the exact values of $\cos 150^\circ$ and $\sin 150^\circ$.

a. $\cos = -\frac{1}{2}$, $\sin = \frac{\sqrt{3}}{2}$

b. $\cos = \frac{1}{2}$, $\sin = -\frac{\sqrt{3}}{2}$

c. $\cos = -\frac{\sqrt{3}}{2}$, $\sin = \frac{1}{2}$

d. $\cos = \frac{\sqrt{3}}{2}$, $\sin = -\frac{1}{2}$

111. (1 point)
Find the radian measure of an angle of $-280^\circ$.

a. $\frac{9}{-14\pi}$

b. $\frac{-14\pi}{9}$

c. $\frac{9\pi}{-14}$

d. $\frac{-14}{9\pi}$

112. (1 point)
Find the degree measure of an angle of $\frac{3\pi}{5}$ radians.

a. $1.88^\circ$  

b. $108^\circ$  

c. $108^\circ$  

d. $\frac{\pi}{300}^\circ$

113. (1 point)
Find the radian measure of an angle of $110^\circ$.

a. $\frac{11}{18\pi}$

b. $\frac{11\pi}{18}$

c. $\frac{18}{11\pi}$

d. $\frac{18\pi}{11}$

114. (1 point)
Find the degree measure of an angle of $-\frac{4\pi}{3}$ radians.

a. $-4.19^\circ$

b. $-240^\circ$

c. $-240^\circ$

d. $-\frac{\pi}{135}^\circ$

115. (1 point)
Find the exact values of $\cos \left( \frac{3\pi}{4} \text{ radians} \right)$ and $\sin \left( \frac{3\pi}{4} \text{ radians} \right)$.

a. $\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}$

b. $-\frac{1}{2}, \frac{\sqrt{3}}{2}$

c. $-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}$

d. $\frac{\sqrt{3}}{2}, \frac{1}{2}$
116. (1 point)
Find the exact value of \( \sin \left( -\frac{\pi}{6} \right) \).

a. \(-\frac{\sqrt{3}}{2}\)  
b. \(-\frac{1}{2}\)  
c. \(-\frac{\sqrt{2}}{2}\)  
d. \(-1\)

117. (1 point)
Find the exact value of \( \cos \left( -\frac{7\pi}{4} \right) \).

a. \(\frac{\sqrt{2}}{2}\)  
b. \(\frac{1}{2}\)  
c. \(\frac{\sqrt{3}}{2}\)  
d. \(-\frac{1}{2}\)

Use the graph of \( y = \sin \theta \) to find the value of \( \sin \theta \) for each value of \( \theta \).

118. (1 point)  
\( 270^\circ \)

a. \(-0.4\)  
b. \(-0.8\)  
c. \(-0.6\)  
d. \(-1\)
119. (1 point)
Find the period of the graph shown below.

\[ y \]

\[ O \]

\[ 2\pi \theta \]

a. \( 2\pi \)  

b. \( \frac{2}{3}\pi \)  

c. \( \frac{1}{2}\pi \)  

d. \( 4\pi \)

120. (1 point)
A particular sound wave can be graphed using the function \( y = -3 \sin x \). Find the period of the function.

a. period = \( 2\pi \)  

b. period = \( -3 \)  

c. period = \( 3 \)  

d. period = \( \frac{1}{2} \)

121. (1 point)
Find the amplitude of the sine curve shown below.

\[ y \]

\[ O \]

\[ 2\pi \theta \]

a. \( 2\pi \)  

b. 8  

c. 2  

d. 4

122. (1 point)
A particular sound wave can be graphed using the function \( y = 3 \sin 5x \). Find the amplitude of the function.

a. amplitude = \( \frac{5}{2}\pi \)  

b. amplitude = \( \frac{2}{5}\pi \)  

c. amplitude = 3  

d. amplitude = \(-3 \)
What is the graph of one cycle of a sine curve with the given characteristics? Using the form \( y = a \sin b \theta \), what is an equation for the sine curve?

123. (1 point)
amplitude = 3, period = \(2\pi\), and \(a > 0\)

a. \( y = 3 \sin 2\theta \)  

b. \( y = -3 \sin 2\theta \)  

c. \( y = 3 \sin \theta \)  

d. \( y = 3 \sin \theta \)
124. (1 point)

amplitude = 4, period = \(\frac{1}{2}\pi\), and \(a < 0\)

\[
y = -4 \sin 8\theta
\]

\[
y = -4 \sin 4\theta
\]

\[
y = -4 \sin \frac{1}{4}\theta
\]
Find the period, range, and amplitude of the cosine function.

125. (1 point)
\[ y = 2 \sin \theta \]

- a. period = \[ \frac{\pi}{2} \]; range: \[ -1 \leq y \leq 1 \]; amplitude = 2
- b. period = \[ \frac{\pi}{2} \]; range: \[ -1 \leq y \leq 1 \]; amplitude = 2
- c. period = \[ \frac{\pi}{2} \]; range: \[ -1 \leq y \leq 1 \]; amplitude = 2
- d. period = \[ \frac{\pi}{2} \]; range: \[ -1 \leq y \leq 1 \]; amplitude = 2

126. (1 point)
\[ y = \frac{3}{2} \cos \frac{\theta}{2} \]

- a. period = \[ 4\pi \]; range: \[ -\frac{3}{2} \leq y \leq \frac{3}{2} \]; amplitude = \[ \frac{3}{2} \]
- b. period = \[ \frac{\pi}{2} \]; range: \[ -\frac{3}{2} \leq y \leq \frac{3}{2} \]; amplitude = \[ -\frac{3}{2} \]
- c. period = \[ 4\pi \]; range: \[ -\frac{3}{2} \leq y \leq \frac{3}{2} \]; amplitude = \[ -\frac{3}{2} \]
- d. period = \[ \frac{\pi}{2} \]; range: \[ y \leq \frac{3}{2} \]; amplitude = \[ \frac{3}{2} \]
127. (1 point)
\[ y = -3 \cos 4x \]

a. period = \(3\pi\); range: \(-3 \leq y \leq 3\); amplitude = \(\frac{1}{2}\)

b. period = \(\frac{1}{2}\); range: \(-3 \leq y \leq 3\); amplitude = -3

c. period = \(\frac{1}{2}\pi\); range: \(-3 \leq y \leq 3\); amplitude = 3

d. period = 3; range: \(-3 \leq y \leq 3\); amplitude = \(\frac{1}{2}\)

Sketch one cycle of the cosine function.

128. (1 point)
\[ y = -\cos 3\theta \]
129. (1 point)
\[ y = 2 \cos 2\theta \]

a. 

b. 

c. 

d.
130. (1 point)
What is the graph of one cycle of a cosine curve with amplitude 2, period $2\pi$, and $a < 0$?

a. 

b. 

c. 

d. 

131. (1 point)
The graph below shows height as a function of time for a ride on a Ferris wheel. Find a sine equation for the graph.

\[ y = \pm 25 \sin \left( \frac{\pi}{3} x \right) + 20 \]

Find the exact value. If the expression is undefined, write \textit{undefined}.

132. (1 point)
\[ \csc 135^\circ \]

a. 0 b. undefined c. \( \frac{1}{2} \) d. \( \sqrt{2} \)

133. (1 point)
\[ \sec (-270^\circ) \]

a. undefined b. 1 c. 0 d. -1

134. (1 point)
\[ \cot 45^\circ \]

a. 0 b. 1 c. -1 d. undefined

135. (1 point)
Evaluate \( \csc \frac{7\pi}{6} \) to the nearest hundredth. The angle is given in radians.

a. -0.5 b. -2 c. 0 d. 2

136. (1 point)
Evaluate \( \sec \frac{3\pi}{2} \) to the nearest hundredth. The angle is given in radians.

a. 0 b. 1 c. undefined d. -1

137. (1 point)
Evaluate \( \sec 60^\circ \). Round your answer to the nearest hundredth.

a. 2.00 b. 0.58 c. 0.87 d. 1.15
138. (1 point)
Evaluate \( \cot 290^\circ \). Round your answer to the nearest hundredth.
\[
a. \ -1.06 \quad b. \ -0.36 \quad c. \ 2.92 \quad d. \ -2.75
\]

Use the unit circle to find the inverse function value in degrees.

139. (1 point)
\[
\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)
\]
\[
a. \ 30^\circ \quad c. \ 240^\circ \\
b. \ 60^\circ \quad d. \ 150^\circ
\]

140. (1 point)
\[
\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)
\]
\[
a. \ 60^\circ \quad c. \ 240^\circ \\
b. \ 30^\circ \quad d. \ 150^\circ
\]

Find the height of the triangle.

141. (1 point)
\[
\begin{align*}
\text{Height} &= \frac{95 \times \sin 61^\circ}{\cos 20^\circ} \\
\text{Options} &= 83.1 \quad 46.1 \quad 171.4 \quad 108.6
\end{align*}
\]

142. (1 point)
\[
\begin{align*}
\text{Height} &= \frac{10 \times \sin 20^\circ}{\cos 70^\circ} \\
\text{Options} &= 3.4 \quad 9.4 \quad 3.6 \quad 6.6
\end{align*}
\]
143. (1 point)
The line of sight from a small boat to the light at the top of a 35-foot lighthouse built on a cliff 25 feet above the water makes a 25° angle with the water. To the nearest foot, how far is the boat from the cliff?

a. 141 feet  
   b. 128 feet  
   c. 27 feet  
   d. 75 feet

**In \(\triangle ABC\), \(\angle C\) is a right angle, what is the measure of \(x\)?**

144. (1 point)
**145.** (1 point)

What is the area of $\triangle ABC$ to the nearest tenth of a square meter?

- a. 22.4°
- b. 67.6°
- c. 20.9°
- d. 69.1°

**146.** (1 point)

What is the area of $\triangle ABC$ to the nearest tenth of a square meter?

- a. 2,450 in.$^2$
- b. 1,780 in.$^2$
- c. 1,440.1 in.$^2$
- d. 2,880.1 in.$^2$

**147.** (1 point)

What is the area of $\triangle ABC$ to the nearest tenth of a square meter?

- a. 3,151 mm$^2$
- b. 601.2 mm$^2$
- c. 612.5 mm$^2$
- d. 1,202.5 mm$^2$
Use the Law of Sines to find the missing side of the triangle.

148. (1 point)
Find $b$.

\[ \triangle ABC \]
- $\angle B = 48^\circ$
- $\angle A = 58^\circ$
- $\angle C = 50^\circ$
- $b$

a. 70.1  b. 43.8  c. 57.1  d. 31.5

149. (1 point)
Find the measure of $AB$ given $m\angle A = 55^\circ$, $m\angle B = 44^\circ$, and $b = 68$.

a. 45.22  c. 88.19
b. 96.68  d. 81.12

150. (1 point)
Find the measure of $b$, given $m\angle A = 38^\circ$, $m\angle B = 74^\circ$, and $a = 31$.

a. 19.9  b. 18.3  c. 37.8  d. 48.4
Use the Law of Sines to find the missing angle of the triangle.

151. (1 point)
Find \( m \angle C \) to the nearest tenth.

a. 11.1°  b. 58.8°  c. 121.2°  d. 168.9°

152. (1 point)
Find \( m \angle B \) to the nearest tenth.

a. 70°  b. 153.9°  c. 26.1°  d. 70.0°
Use the Law of Cosines to solve the problem.

153. (1 point)

On a baseball field, the pitcher’s mound is 60.5 feet from home plate. During practice, a batter hits a ball 216 feet deep. The path of the ball makes a 34° angle with the line connecting the pitcher and the catcher, to the right of the pitcher’s mound. An outfielder catches the ball and throws it to the pitcher. How far does the outfielder throw the ball?

a. 207.4 ft  b. 224.3 ft  c. 169.3 ft  d. 198.7 ft
Use the Law of Cosines to find the missing angle.

154. (1 point)
Find $m \angle A$ to the nearest tenth of a degree.

- 155. (1 point)
Find $m \angle B$, given $a = 11$, $b = 12$, and $c = 17$.

- 156. (1 point)
In $\triangle JKL$, $j = 10$ in., $k = 7$ in., and $l = 6.58$ in. Find $m \angle J$.
Algebra 2, Spring Semester Review  
Answer Section

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