Instructional Materials for WCSD Math Common Finals

The Instructional Materials are for student and teacher use and are aligned to the 2018-2019 Course Guides for the following courses:

**High School**

- #2222 Algebra 2 Semester 2
- #7780 Foundations in Algebra 2 Semester 2

When used as test practice, success on the Instructional Materials does not guarantee success on the district math common final.

Students can use these Instructional Materials to become familiar with the format and language used on the district common finals. Familiarity with standards and vocabulary as well as interaction with the types of problems included in the Instructional Materials can result in less anxiety on the part of the students. The length of the actual final exam may differ in length from the Instructional Materials.

Teachers can use the Instructional Materials in conjunction with the course guides to ensure that instruction and content is aligned with what will be assessed. *The Instructional Materials are not representative of the depth or full range of learning that should occur in the classroom.*

*Students will be allowed to use a Scientific or graphing calculator on Algebra 2 Semester 1 and Algebra 2 Semester 2 final exams.*

Released 2/15/19
## Algebra 2 Semester 2 Test Reference Sheet

### Sequences:

\[ a_n = \begin{cases} a_1, & n = 1 \\ r \cdot a_{n-1}, & n > 1 \end{cases} \]

\[ a_n = a_1 \cdot r^{n-1} \]

### Matrices:

**Identity Matrix:**
\[
\begin{bmatrix}
1 & 0 \\
0 & 1
\end{bmatrix}
\]

**Inverse Matrix:**
\[
\begin{bmatrix}
a & b \\
c & d
\end{bmatrix}
\begin{bmatrix}
d & e \\
f & g
\end{bmatrix}
= 
\begin{bmatrix}
1 & 0 \\
0 & 1
\end{bmatrix}
\]

\[ \det A = ad - bc \]

\[ A^{-1} = \frac{1}{\det A} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} \]

### Statistics:

\[ z - score = \frac{x - \mu}{\sigma} \]

![Normal Distribution](image)
1. Perform the indicated operation: \( \frac{7}{x-4} - \frac{11}{x-4} \)

A. \( \frac{-77}{x-4} \)  
B. \( \frac{-77}{(x-4)^2} \)
C. \( \frac{1}{x} \)  
D. \( \frac{-4}{x-4} \)

2. Perform the indicated operation: \( \frac{3x+4}{x^2-16} - \frac{2}{x+4} \)

A. \( \frac{x}{x^2-16} \)  
B. \( \frac{x+8}{x^2-16} \)
C. \( \frac{3x+2}{x-4} \)  
D. \( \frac{1}{x+4} \)

3. What would be the next logical step in simplifying the expression below?

<table>
<thead>
<tr>
<th>Step</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( \frac{6x-3}{x^2-x-12} - \frac{x}{x+3} )</td>
</tr>
<tr>
<td>2</td>
<td>( \frac{6x-3}{(x+3)(x-4)} - \frac{x}{x+3} )</td>
</tr>
<tr>
<td>3</td>
<td>( \frac{6x-3}{(x+3)(x-4)} - \frac{x}{x+3} \cdot \frac{x-4}{x-4} )</td>
</tr>
<tr>
<td>4</td>
<td>( \frac{(6x-3)-x(x-4)}{(x+3)(x-4)} )</td>
</tr>
</tbody>
</table>

A. \( \frac{6x-3-x^2+4x}{(x+3)(x-4)} \)
B. \( \frac{6x-3+x^2-4}{(x+3)(x-4)} \)
C. \( \frac{6x-3-x^2-4}{(x+3)(x-4)} \)
D. \( \frac{6x+3+x^2+4}{(x+3)(x-4)} \)
4. If each of the following expressions is defined, which is equivalent to \( x - 1 \)?

A. \( \frac{(x + 1)(x - 1)}{x - 1} \)
B. \( \frac{(x - 1)(x + 2)}{x + 1} \cdot \frac{x + 1}{x + 2} \)
C. \( \frac{(x + 1)(x + 2)}{x - 2} \div \frac{x + 2}{x - 2} \)
D. \( \frac{x + 1}{x + 2} + \frac{x - 1}{x + 2} \)

5. Which of the following is equivalent to \( \frac{t + 2}{\frac{t^2 + 8t + 15}{t - 4}} \)?

A. \( \frac{(t + 2)(t - 4)}{(t + 3)^2(t + 5)} \)
B. \( \frac{(t + 2)(t + 5)}{(t - 4)(t - 5)} \)
C. \( \frac{(t + 2)}{(t - 4)(t + 5)} \)
D. \( \frac{(t + 2)(t - 4)}{(t + 3)(t + 5)} \)

6. Solve: \( \frac{x + 4}{x - 5} = \frac{x - 3}{x + 6} \)

A. \( x = 2 \)
B. \( x = -\frac{1}{2} \)
C. \( x = -2 \)
D. \( x = \frac{1}{2} \)
7. Solve: \( \frac{3x}{x-1} + \frac{2x}{x-6} = \frac{5x^2-15x+20}{x^2-7x+6} \)

A. \( x = 1 \)  
B. \( x = 6 \)  
C. \( x = 4 \)  
D. \( x = -4 \)

8. Jessie can install flooring in a room in 8 hours. Dustin can install flooring in the same sized room in 3 hours. Based on this information, which of the following statements are true? Select all that apply.

F. The equation \( 8x + 3x = 1 \) can be used to determine the amount of time it would take to install flooring if Jessie and Dustin work together.

G. The equation \( \frac{3}{x} + \frac{8}{x} = 1 \) can be used to determine the amount of time it would take to install flooring if Jessie and Dustin work together.

H. The equation \( \frac{x}{3} + \frac{x}{8} = 1 \) can be used to determine the amount of time it would take to install flooring if Jessie and Dustin work together.

I. If working together, Jessie and Dustin would complete the floor in about 1.1 hours.

J. If working together, Jessie and Dustin would complete the floor in about 2.2 hours.

K. If working together, Jessie and Dustin would complete the floor in about 5.5 hours.

L. If working together, Jessie and Dustin would complete the floor in about 11 hours.
9. Two students make claims about the expression \( y^{3/2} \). Each student’s work supporting their claim is shown below.

<table>
<thead>
<tr>
<th>Student #1</th>
<th>Student #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claim: ( y^{3/2} = \left( \frac{3}{\sqrt{y}} \right)^2 )</td>
<td>Claim: ( y^{3/2} = \sqrt[3]{y^3} )</td>
</tr>
<tr>
<td>Work: ( y^{3/2} = \left( y^{1/3} \cdot y^{1/3} \right) )</td>
<td>Work: ( y^{3/2} = (y \cdot y \cdot y)^{1/2} )</td>
</tr>
<tr>
<td>( = \left( \frac{3}{\sqrt{y}} \cdot \frac{3}{\sqrt{y}} \right) )</td>
<td>( = \sqrt[3]{y \cdot y \cdot y} )</td>
</tr>
<tr>
<td>( = \left( \frac{3}{\sqrt{y}} \right)^2 )</td>
<td>( = \sqrt[3]{y^3} )</td>
</tr>
</tbody>
</table>

Which of the following statements about each student’s work and claim is true?

A. Student 1 makes a correct claim and their supporting work shown is correct.
B. Student 1 makes an incorrect claim because \( y^{3/2} = (y^2 \cdot y^2 \cdot y^2)^{1/3} \)
C. Student 2 makes a correct claim and their supporting work shown is correct.
D. Student 2 makes an incorrect claim because \( y^{3/2} = (y \cdot y)^{1/3} \).

10. Simplify the expression: \( \sqrt[4]{1296x^{12}y^{32}} \)

A. \( 6x^6y^{28} \)  
B. \( 6|x^3|y^8 \)  
C. \( 324|x^3|y^8 \)  
D. \( |324x^{1/3}y^{1/8}| \)

11. What value of \( x \) makes the following equation true?

\[ \frac{y^{3/4}}{y^{x/8}} = \frac{8}{\sqrt{y}} \]

A. \( x = 7 \)  
B. \( x = 6 \)  
C. \( x = 5 \)  
D. \( x = 4 \)

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12. Simplify: \( \sqrt{4x^7} + 9x^2\sqrt{x^3} - 5x\sqrt{x^5} \)

   A. \( 6x^3\sqrt{x} \)  
   B. \( 8x^3\sqrt{x} \)  
   C. \( 16x^9\sqrt{x} \)  
   D. \( -90x^{10}\sqrt{x} \)

13. Simplify \( \sqrt[5]{x^7} \cdot \sqrt[3]{x} \)

   A. \( x^{22/15} \)  
   B. \( x \)  
   C. \( x^2 \)  
   D. \( x^{26/15} \)

14. Which of the following statements are true for the function \( f(x) = -\sqrt{x} + 5 \)? Select all that apply.

   F. as \( x \to +\infty \), \( f(x) \to +\infty \)
   G. as \( x \to +\infty \), \( f(x) \to -\infty \)
   H. \( f(x) \) is decreasing
   I. \( f(x) \) is increasing
   J. Domain: \( \{x | all \ real \ numbers\} \)
   K. Domain: \( \{x | x \geq -5\} \)
   L. Range: \( \{y | all \ real \ numbers\} \)
   M. Range: \( \{y | y \leq 0\} \)
15. Which of the following represents the graph of \( y = \sqrt{x - 3} \)

A. 

B. 

C. 

D.
16. Translate the graph of \( f(x) = \sqrt[3]{x} \) two units up and five units left. Which of the following is the graph after the translations?

- A. 
- B. 
- C. 
- D.

17. Solve: \( \sqrt{5x} + 9 - 10 = 12 \)

- A. \( x = 95 \)  
- B. \( x = 47 \)  
- C. \( x = -1 \)  
- D. no real solution

18. Solve: \( (x^2 - 4x + 516)^{2/3} = 64 \)

- A. \( x = -2, 2 \)  
- B. \( x = -2 \)  
- C. \( x = 2 \)  
- D. no real solution
19. The height \( h \), in centimeters, of a baby boy from birth to age 24 months can be modeled 
\[ h = 7.7\sqrt{t} + 50, \] 
where \( t \) is the age of the baby (in months). How old is a baby that is 72 cm tall? Round your answer to the nearest tenth.

A. 1.4 months  
B. 1.7 months  
C. 7.3 months  
D. 8.2 months

20. Find \( f(x) - g(x) \) and \( f(x) + g(x) \) for \[ \begin{cases} f(x) = 5x^2 + 6x - 4 \\ g(x) = 3x^2 - 5x + 24 \end{cases} \]

A. \( f(x) - g(x) = 2x^2 + 11x - 28 \)  
B. \( f(x) - g(x) = 2x^2 + 1x + 20 \)
C. \( f(x) + g(x) = 8x^2 + x + 20 \)  
D. \( f(x) + g(x) = 8x^2 + x + 20 \)

21. Find \( g \circ h \) and \( h \circ g \) for \( g(x) = 5x \) and \( h(x) = 3x + 8 \)

A. \( g(h(x)) = 40 - 15x \)  
B. \( g(h(x)) = 15x + 40 \)
C. \( h(g(x)) = 8 - 15x \)  
D. \( h(g(x)) = 15x + 8 \)

\[ \text{Released 2/15/19} \]
22. Which point lies on the graph of the inverse of the function shown below?

A. $(-1, -1)$
B. $(-2, 4)$
C. $(4, 12)$
D. $(9, 3)$

23. Find the inverse function of $f(x) = -7x + 6$.

A. $f^{-1}(x) = 7x - 6$
B. $f^{-1}(x) = \frac{-x + 6}{7}$
C. $f^{-1}(x) = 7x + 6$
D. $f^{-1}(x) = \frac{x - 6}{7}$

24. Find the inverse function of $g(x) = x^2 + 5$, over the domain $x \geq 0$.

A. $g^{-1}(x) = \sqrt{x - 5}$
B. $g^{-1}(x) = \sqrt{x} - 5$
C. $g^{-1}(x) = x^2 - 5$
D. $g^{-1}(x) = \pm \sqrt{y - 5}$
25. Which equation is represented by the graph below?

A. \( y = 2 \cdot 4^{x-3} - 1 \)
B. \( y = 2 \cdot 4^{x-3} + 1 \)
C. \( y = 3 \cdot 4^{x-2} - 1 \)
D. \( y = 3 \cdot 4^{x-2} + 1 \)

26. Describe the domain and range of \( y = 2 \cdot 4^{x+3} - 6 \)

A. Domain: \((-\infty, +\infty)\)  
   Range: \((-\infty, +\infty)\)  
B. Domain: \((-\infty, 3)\)  
   Range: \((-\infty, -6)\)  
C. Domain: \((-\infty, +\infty)\)  
   Range: \((-6, +\infty)\)  
D. Domain: \((-3, +\infty)\)  
   Range: \((-\infty, +\infty)\)

27. The population of a city is studied over time and modeled by the equation
\[
P(t) = 10,650 \left( \frac{2}{8} \right)^t,\]
where \( t \) is the time in years. What happens to the population during the first 6 years of the study?

A. The population increases by about 45,260 people.
B. The population increases by about 46,590 people.
C. The population decreases by about 4,540 people.
D. The population decreases by about 5,870 people.
28. You want to invest $2500 in a savings account. The bank gives you three options below to choose from, which option would yield the highest return on your investment?

<table>
<thead>
<tr>
<th>Option A</th>
<th>Option B</th>
<th>Option C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest compounded quarterly</td>
<td>Interest compounded monthly</td>
<td>Interest compounded continuously</td>
</tr>
<tr>
<td>( A = P \left( 1 + \frac{r}{n} \right)^{nt} )</td>
<td>( A = P \left( 1 + \frac{r}{n} \right)^{nt} )</td>
<td>( A = P e^{rt} )</td>
</tr>
<tr>
<td>Rate: 2.5% for 4 years</td>
<td>Rate: 3.5% for 3 years</td>
<td>Rate: 2.5% for 3 years</td>
</tr>
</tbody>
</table>

A. Option A
B. Option B
C. Option C
D. All three options yield the same amount.

29. An investment of $1 is in an account that pays a 100% annual interest rate for one year. As the number of compounding periods increases, what value would the account continue to get closer to?

A. About $1.00
B. About $1.10
C. About $2.00
D. About $2.72

30. Write an exponential function in the form \( y = ab^x \) whose graph passes through the points (2, 12.5) and (4, 312.5).

A. \( y = \frac{1}{5}(2)^x \)
B. \( y = \frac{1}{2}(5)^x \)
C. \( y = 2(5)^x \)
D. \( y = 5(2)^x \)
31. If $7000 is invested at a rate of 7% compounded continuously, what amount of time would be needed to have a balance of $7700? Use the formula $A = Pe^{rt}$. Round your answer to the nearest hundredth. Bubble your answer in the grid below.

```
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

32. Which graph represents the function $y = \log_8 x$ and its inverse?
33. State the domain and range of the function: \( y = \log_3(x - 2) \)

A. Domain: \( \{x | x \text{ is all real numbers}\} \)  
   Range: \( \{y | y \text{ is all real numbers}\} \)

B. Domain: \( \{x | x > 2\} \)  
   Range: \( \{y | y \geq -2\} \)

C. Domain: \( \{x | x > 2\} \)  
   Range: \( \{y | y \geq 0\} \)

D. Domain: \( \{x | x > 2\} \)  
   Range: \( \{y | y \text{ is all real numbers}\} \)

34. Which of the following expressions is equivalent to \( 3 \ln a + 2 \ln b - 4 \ln c + \ln e^5 \)?

A. \( \ln \left( \frac{a^3 b^2}{c^4} \right) + 5 \)

B. \( \ln \left( \frac{a^3 + b^2 + 5}{c^4} \right) \)

C. \( \ln (a^3 + b^2 - c^4 + 5) \)

D. \( \ln \left( \frac{30ab}{4c} \right) \)

35. Evaluate the expression:
\[ \log_4 24 \]

Round your answer to the nearest hundredth if necessary. Bubble your answer in the grid below.
36. Solve: \(11^x = 247\)

A. \(x = \log 247 - \log 11\)  
B. \(x = \frac{\log 247}{\log 11}\)  
C. \(x = \log(247 - 11)\)  
D. \(x = \log\left(\frac{247}{11}\right)\)

37. Solve: \(4^{5x} = 64^{x+8}\)

A. \(x = -4\)  
B. \(x = -2\)  
C. \(x = 2\)  
D. \(x = 12\)

38. Solve: \(\log_7(2x + 9) = \log_7(x) + \log_7(x + 10)\)

A. \(x = -9\)  
B. \(x = -1\) and \(x = 9\)  
C. \(x = 1\)  
D. no real solution

39. Which equation represents the geometric sequence in the table below, given that \(a_n\) is the \(n^{th}\) term of the sequence?

<table>
<thead>
<tr>
<th>(n)</th>
<th>1</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a_n)</td>
<td>4</td>
<td>(-\frac{1}{2})</td>
</tr>
</tbody>
</table>

A. \(a_n = 4\left(-\frac{1}{2}\right)^{n-1}\)  
B. \(a_n = 4\left(-\frac{1}{2}\right)^n\)  
C. \(a_n = 4\left(\frac{1}{2}\right)^{n-1}\)  
D. \(a_n = 4\left(\frac{1}{2}\right)^n\)

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40. Every week, Don plans to save 2 times as much money as he saved during the previous week. He saved $3 during the first week of his savings plan. Which of the following may be used to represent Don’s total savings? Select all that apply.

F. \( a_n = 2 \cdot 3^{n-1} \)

G. \( a_n = \begin{cases} 
  a_1 = 3 \\
  2 \cdot a_{n-1}, n > 1 
\end{cases} \)

H. \( a_n = \begin{cases} 
  a_1 = 2 \\
  3 \cdot a_{n-1}, n > 1 
\end{cases} \)

I. \( a_n = 3 \cdot 2^{n-1} \)

J. \( f(n) = \begin{cases} 
  f(1) = 2 \\
  3 \cdot f(n-1), n \geq 2 
\end{cases} \)

K. \( f(n) = 3 \cdot 2^{n-1} \)

41. The matrix below represents the prices of backpacks and binders a company has in stock. The backpacks and binders are offered in three different colors: red, yellow, and purple. If the company has a 15% off sale, then which matrix shows the discounted amount for each item?

\[
\begin{bmatrix}
26 & 30 & 32 \\
7 & 4 & 5
\end{bmatrix}
\]

A. \[
\begin{bmatrix}
3.90 & 30 & 32 \\
1.05 & 4 & 5
\end{bmatrix}
\]

B. \[
\begin{bmatrix}
3.90 & 4.50 & 4.80 \\
1.05 & 0.60 & 0.75
\end{bmatrix}
\]

C. \[
\begin{bmatrix}
25.85 & 30.85 & 31.85 \\
7 & 4 & 5
\end{bmatrix}
\]

D. \[
\begin{bmatrix}
25.85 & 30.85 & 31.85 \\
6.85 & 3.85 & 4.85
\end{bmatrix}
\]
42. If \( M = \begin{bmatrix} -3 & 6 \\ 9 & 10 \end{bmatrix} \), \( N = \begin{bmatrix} -12 \\ 13 \end{bmatrix} \), and \( O = \begin{bmatrix} 21 & 15 \\ -17 & 21 \end{bmatrix} \), then which of the following statements is true?

A. \( N - O = \begin{bmatrix} -33 & -27 \\ 30 & -8 \end{bmatrix} \)
B. \( M + N = \begin{bmatrix} -15 & -6 \\ 22 & 23 \end{bmatrix} \)
C. \( M + O = \begin{bmatrix} 18 & 24 \\ -11 & 31 \end{bmatrix} \)
D. \( O - M = \begin{bmatrix} 24 & 9 \\ -26 & 11 \end{bmatrix} \)

43. A segment with endpoints \( A(1, 6) \) and \( B(4, 5) \) can be represented by the matrix \( \begin{bmatrix} 1 & 4 \\ 6 & 5 \end{bmatrix} \). Which of the following matrix operations will translate \( \overline{AB} \) to the right 3 units and down 2 units?

A. \( \begin{bmatrix} 1 & 4 \\ 6 & 5 \end{bmatrix} + \begin{bmatrix} 3 & 3 \\ -2 & -2 \end{bmatrix} \)
B. \( \begin{bmatrix} 1 & 4 \\ 6 & 5 \end{bmatrix} + \begin{bmatrix} 3 & -2 \\ 3 & -2 \end{bmatrix} \)
C. \( \begin{bmatrix} 1 & 4 \\ 6 & 5 \end{bmatrix} + \begin{bmatrix} 3 \\ -2 \end{bmatrix} \)
D. \( \begin{bmatrix} 1 & 4 \\ 6 & 5 \end{bmatrix} + \begin{bmatrix} 3 & -2 \end{bmatrix} \)

44. Find the value of \( t \) below:

\[
\begin{bmatrix} 8 - t & 0 \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} -5 & 0 \\ 8 & -4y + 2 \end{bmatrix}
\]

Round your answer to the nearest tenth if needed. Bubble your answer in the grid below.
45. Find the product of $XY$, given $X = \begin{bmatrix} 5 & -2 \\ -1 & 3 \end{bmatrix}$ and $Y = \begin{bmatrix} 8 & 4 \\ -1 & 0 \end{bmatrix}$.

A. $\begin{bmatrix} 32 \\ 4 \end{bmatrix}$
B. $\begin{bmatrix} 36 & -4 \\ -5 & 2 \end{bmatrix}$
C. $\begin{bmatrix} 40 & -8 \\ 1 & 0 \end{bmatrix}$
D. $\begin{bmatrix} 42 & 20 \\ -11 & -4 \end{bmatrix}$

46. Teresa is given the matrices $A = \begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 \\ 0 & 3 \end{bmatrix}$. Teresa multiplied $AB$ and $BA$ to get $AB = \begin{bmatrix} 2 & 17 \\ 1 & 19 \end{bmatrix}$ and $BA = \begin{bmatrix} 6 & 23 \\ 3 & 15 \end{bmatrix}$. Which statement below best describes Teresa’s work?

A. Teresa’s work is incorrect because matrix multiplication is commutative.
B. Teresa’s work is correct because matrix multiplication is not commutative.
C. Teresa’s work is incorrect because matrix multiplication is not commutative.
D. Teresa’s work is correct because matrix multiplication is commutative.

47. Which of the following equations are true for the following matrices:

$A = \begin{bmatrix} -3 & 4 \\ 7 & -9 \end{bmatrix}$  \hspace{1cm}  Z = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$  \hspace{1cm}  I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Select all that apply.

F. $A \cdot I = A$
G. $A \cdot Z = A$
H. $A + I = A$
I. $A + Z = A$
J. $A \cdot I = Z$
K. $A \cdot Z = I$
48. Find the value of \( \det S \), given \( S = \begin{bmatrix} -2 & -9 \\ -7 & 1 \end{bmatrix} \)

Round your answer to the nearest tenth if needed. Bubble your answer in the grid below.

49. A matrix equation is shown below:
\[
\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} h & i \\ j & k \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}
\]

Which of the following statements must be true?

A. \( ab - cd \neq 0 \)  
B. \( ad - bc = 0 \) 
C. \( ab - cd = 0 \) 
D. \( ad - bc \neq 0 \)

50. Find the inverse of \( M = \begin{bmatrix} 11 & 3 \\ 15 & 5 \end{bmatrix} \).

A. \( \begin{bmatrix} 11 & 3 \\ 10 & 10 \\ 3 & 1 \\ 2 & 2 \end{bmatrix} \) 
B. \( \begin{bmatrix} 50 & -30 \\ -15 & 11 \end{bmatrix} \) 
C. \( \begin{bmatrix} 1 & -3 \\ 2 & 10 \\ 3 & 11 \\ 2 & 10 \end{bmatrix} \) 
D. \( \begin{bmatrix} -11 & -3 \\ -15 & -5 \end{bmatrix} \)
51. Which matrix equation represents the system of equations below?
\[
\begin{align*}
4x - 14y + 3z &= 17 \\
5y - 12z &= 10 \\
6x - 11z &= -22
\end{align*}
\]
A. \[
\begin{bmatrix}
4 & -14 & 3 \\
5 & -12 & 0 \\
6 & -11 & 0
\end{bmatrix}
\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 17 \\ 10 \\ -22 \end{bmatrix}
\]
B. \[
\begin{bmatrix}
4 & -14 & 3 \\
5 & -12 & 0 \\
6 & -11 & 0
\end{bmatrix}
\begin{bmatrix} x \\ 17 \\ y \\ 10 \end{bmatrix} = \begin{bmatrix} 17 \\ 10 \\ -22 \end{bmatrix}
\]
C. \[
\begin{bmatrix}
0 & 5 & -12 \\
6 & 0 & -11
\end{bmatrix}
\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 17 \\ 10 \\ -22 \end{bmatrix}
\]
D. \[
\begin{bmatrix}
0 & 5 & -12 \\
6 & 0 & -11
\end{bmatrix}
\begin{bmatrix} 17 \\ 10 \\ -22 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}
\]

52. In the matrix equation below, \(C\) represents the coefficient matrix and \(C^{-1}\) represents its inverse matrix.
\[
\begin{bmatrix} 5 & 7 \\ 10 & 5 \end{bmatrix}
\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 330 \\ 390 \end{bmatrix}
\]
Which of the following statements are true? Select all that apply.

F. \[
C^{-1} = \begin{bmatrix}
-1 & 2 \\
7 & 9
\end{bmatrix}
\]

G. \[
C^{-1} = \begin{bmatrix}
-1 & 7 \\
2 & 45
\end{bmatrix}
\]

H. \[
C^{-1} = \begin{bmatrix}
1 & 7 \\
2 & 45
\end{bmatrix}
\]

I. \(x = 24\)

J. \(x = 30\)

K. \(x = 50\)
53. Every week, Milla buys bagels and donuts at a bakery. Last week, she bought 4 bagels and 3 donuts for $5.55. This week she bought 5 bagels and 5 donuts for $8.00. The systems of equations that represents this situation can be expressed using the matrix equation below:
\[
\begin{bmatrix}
4 & 3 \\
5 & 5
\end{bmatrix}
\begin{bmatrix}
x \\
y
\end{bmatrix}
=
\begin{bmatrix}
5.55 \\
8.00
\end{bmatrix}
\]
What is the cost of a donut?
A. $0.75  
B. $0.85  
C. $1.60  
D. $2.22

54. Is the question below a statistical question? Why or why not?
“What is the area (in square feet) of the library?”

A. It is a statistical question because it can be answered by collecting and analyzing only one piece of information.
B. It is a not statistical question because it can be answered by collecting and analyzing only one piece of information.
C. It is a statistical question because it can be answered by collecting and analyzing many pieces of information.
D. It is a not statistical question because it can be answered by collecting and analyzing many pieces of information.

55. A wildlife biologist measures the weight of 50 randomly selected rabbits in Yosemite National Park. Which of the following statements are true? Select all that apply.

F. The sample is all of the rabbits in Yosemite National Park.
G. The sample is the 50 randomly selected rabbits.
H. The sample is all of the rabbits in the state.
I. The population is all of the rabbits in the state.
J. The population is all of the rabbits in Yosemite National Park.
K. The population is the 50 randomly selected rabbits.
56. A student in a statistics course wants to determine how many students in the school have after school jobs. Which of the following surveys would give the best representation of the school’s population?

A. Go to the mall in the evening and ask how many employees attend your school.

B. Give 100 randomly selected seniors a questionnaire asking them if they have jobs.

C. Go to a basketball game after school and ask all of the students attending if they have jobs.

D. Give 20 randomly selected students from each grade level a questionnaire asking them if they have jobs.

57. Dovan wants to know if a person’s arm span is approximately equal to his or her height. He randomly samples 30 classmates and takes their measurements. What type of study is this?

A. an experiment

B. a sample survey

C. an observational survey

D. a random phenomenon

58. If the following scores on a student’s test so far are 78, 88, 92, 95, 83, and 89, how will a score of an 88 on the next test affect the mean and standard deviation of the student’s grades?

A. The mean increases, the standard deviation decreases.

B. The mean increases, the standard deviation increases.

C. The mean decreases, the standard deviation decreases.

D. The mean decreases, the standard deviation increases.
59. Determine which of the following statements is correct about the test scores for two different students shown below.

<table>
<thead>
<tr>
<th></th>
<th>Student A</th>
<th></th>
<th>Student B</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
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<td>26</td>
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<tr>
<td>31</td>
<td>32</td>
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</table>

A. Student A’s data is symmetrical.
B. Student B’s data is symmetrical.
C. Student A’s data is skewed left.
D. Student B’s data is skewed left.

60. The data distributions below show the running times of a group before and after training for a marathon.

Which statement correctly explains the summary statistics that should be used to compare the running times?

A. The distributions are approximately normal, so the mean and standard deviation should be used to compare the running times.
B. The distributions are skewed, so the mean and standard deviation should be used to compare the running times.
C. The distributions are approximately normal, so the median and interquartile range should be used to compare the running times.
D. The distributions are skewed, so the median and interquartile range should be used to compare the running times.
61. A standardized test has a normal distribution with a mean of 68 and a standard deviation of 7. Find the probability that a score is between 61 and 68 OR above 89.

A. 0.002
B. 0.340
C. 0.339
D. 0.342

62. A particular study has shown that the life expectancy for elephants is normally distributed with an average life span of 52 years and a standard deviation of 18 years. Using the Standard Normal Table below, what is the probability that an elephant will live between 60 to 70 years?

<table>
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<th>.2</th>
<th>.3</th>
<th>.4</th>
<th>.5</th>
<th>.6</th>
<th>.7</th>
<th>.8</th>
<th>.9</th>
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</thead>
<tbody>
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<td>.9918</td>
<td>.9938</td>
<td>.9953</td>
<td>.9965</td>
<td>.9974</td>
</tr>
</tbody>
</table>

A. 0.1605
B. 0.6554
C. 0.1859
D. 1.4713

63. At a certain car dealership with a large number of cars, the mileages on the cars are approximately normally distributed with a mean of 50,000 miles and a standard deviation of 12,500 miles. Randy just bought a car from the dealership with 60,000 miles on it. Which of the following statements comparing Randy’s cars to the cars at the dealership are true? Select all that apply.

F. The z-score associated with the mileage on his car is 0.8.
G. The z-score associated with the mileage on his car is 1.25.
H. His car has less mileage than approximately 11% of the cars at the dealership.
I. His car has less mileage than approximately 21% of the cars at the dealership.
J. His car has less mileage than approximately 79% of the cars at the dealership.
K. His car has less mileage than approximately 89% of the cars at the dealership.

Released 2/15/19
## Algebra 2 Semester 2 Instructional Materials 2018-19 Answers

<table>
<thead>
<tr>
<th>Unit 4</th>
<th>Unit 5</th>
<th>Unit 6</th>
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<td>35. 2.29</td>
<td>51. C</td>
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<td>38. C</td>
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<tr>
<td>23. B</td>
<td>39. A</td>
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