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 Algebra 2 S2
- #2228 Algebra 2 Honors Semester 2

Middle School Algebra 2 S2
- #745 ACCEL Algebra 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 Honors Semester 1 and Algebra 2 Honors Semester 2 final exams.
# Algebra 2 Honors Semester 1 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:
\[
 z - \text{score} = \frac{x - \mu}{\sigma}
\]
1. 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: $y^{3/2} = \left(\sqrt[3]{y}\right)^2$</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: $y^{3/2} = \left(y \cdot y \cdot y\right)^{1/2}$</td>
</tr>
<tr>
<td>$= \left(\sqrt[3]{y} \cdot \sqrt[3]{y}\right)$</td>
<td>$= \sqrt[3]{y \cdot y \cdot y}$</td>
</tr>
<tr>
<td>$= \left(\sqrt[3]{y}\right)^2$</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 $y^{3/2} = (y \cdot y)^{1/3}$.

2. Simplify the expression: $\sqrt[4]{2401x^{28}y^{32}}$

A. $49|x^{49}|y^{64}$
B. $7|x^7|y^8$
C. $49x^{49}|y^{64}|$
D. $7x^7|y^8|$

3. Which of the following statements is true about the rational expression given below?

$$\frac{(-8)^{5/3}}{(-243)^{3/5}}$$

A. The numerator can be rewritten as $\sqrt[5]{(-8)^3}$.
B. The numerator can be rewritten as $(-8)^{-(5/3)}$.
C. The expression can be rewritten as $\frac{(3)^3}{(2)^5}$.
D. The expression can be rewritten as $\frac{(-2)^5}{(-3)^3}$. 

Released 2/15/19
4. Rewrite the expression in reduced radical form: \( \frac{6}{2-\sqrt{7}} \)

A. \(-6\sqrt{7}\)  
B. \(-\frac{3}{\sqrt{7}}\)  
C. \(-4 - 2\sqrt{7}\)  
D. \(-\frac{6 + 3\sqrt{7}}{22}\)

5. Which of the following expressions simplifies to \(y^2 \cdot \sqrt{y}\) ?

A. \(\frac{\sqrt{y^7}}{\sqrt{y^5}}\)  
B. \(\frac{(4x^{3/2}y^{1/4})^2}{(2x^{3/4}y^{-1/2})^4}\)  
C. \(\frac{y^{1/3}y^{3/2}}{y^{1/2}}\)  
D. \(\frac{\sqrt{9x^7y^2}}{3\sqrt{xy}}\)

6. Which of the following statements are true for the function \(f(x) = -\sqrt{x + 3} - 6\)? 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: \(\{x|\text{all real numbers}\}\)  
K. Domain: \(\{x|x \geq -3\}\)  
L. Range: \(\{y|\text{all real numbers}\}\)  
M. Range: \(\{y|y \leq -6\}\)
7. The function \( f(x) = \frac{1}{2}\sqrt{x - 1} - 4 \) is translated up two units and left five units. Which of the following is the graph of \( f(x) \) after the translations?

A.  
B.  
C.  
D.  

8. Let \( f(x) = \sqrt[3]{x} \) and let \( g(x) \) be a translation of \( f(x) \) expressed as \( g(x) = f(x - 27) \). What are the coordinates of the \( x \)-intercept of \( g(x) \)?

A. \((3, 0)\)  
B. \((-3, 0)\)  
C. \((27, 0)\)  
D. \((-27, 0)\)

9. Solve for \( x \): \( x - 5 = \sqrt{x + 7} \)

A. \( x = 2, x = 9 \)  
B. \( x = 4 \)  
C. \( x = 9 \)  
D. \( x = -3, x = 4 \)
10. Scientists have determined that the population for a particular species in a habitat can be modeled by the equation \( P = (500t - 180)^{6/7} \). How many years \( t \) will it take the species to grow to 729 members? Round your answer to the nearest hundredth if necessary. Bubble your answer in the grid below.

11. A particular jeweler uses the formula \( d = \sqrt[3]{\frac{4w}{0.02847}} \) to relate the average diameter \( d \) of a cultured pearl in millimeters to its weight \( w \) in carats. The jeweler sells the pearls to customers for $3.25 per carat. How much would a cultured pearl with a 9.5 mm average diameter cost?

A. $5.95  
B. $6.10  
C. $19.83  
D. $35.75

12. Find \( f(x) - g(x) \) and \( f(x) + g(x) \) for \( \begin{cases} f(x) = 6x^2 - x + 5 \\ g(x) = -4x^2 + 2x - 8 \end{cases} \)

A. \( f(x) - g(x) = 10x^2 - 3x + 13 \)  
\( f(x) + g(x) = 2x^2 + x - 3 \)  

B. \( f(x) - g(x) = 10x^2 - 3x + 13 \)  
\( f(x) + g(x) = 2x^2 + 3x + 13 \)  

C. \( f(x) - g(x) = 10x^2 - x - 3 \)  
\( f(x) + g(x) = 2x^2 + x - 3 \)  

D. \( f(x) - g(x) = 10x^2 - x - 3 \)  
\( f(x) + g(x) = 2x^2 + 3x + 13 \)
13. Let \( f(x) = 16x^{2/3} \) and \( g(x) = \frac{4}{x} \). Find \( g \circ f \).

A. \( g(f(x)) = \frac{\sqrt[3]{x}}{4x} \)
B. \( g(f(x)) = \frac{64 \cdot \sqrt[3]{x^2}}{x} \)
C. \( g(f(x)) = \frac{16 \cdot \sqrt[3]{16x}}{x} \)
D. \( g(f(x)) = \frac{\sqrt[3]{16x}}{4x} \)

14. Given the graph of \( f(x) \) below, what is the value of \( f^{-1}(2) \)?

A. \( f^{-1}(2) = -1 \)
B. \( f^{-1}(2) = 1 \)
C. \( f^{-1}(2) = 2 \)
D. \( f^{-1}(2) = 3 \)

15. Determine whether \( f(x) = x - 3 \) and \( g(x) = -x + 3 \) are inverse functions. Explain.

A. \( f(x) \) and \( g(x) \) are inverse functions because \( f(x) + g(x) = 0 \)
B. \( f(x) \) and \( g(x) \) are inverse functions because \( f(g(x)) = -x \)
C. \( f(x) \) and \( g(x) \) are not inverse functions because \( \frac{f(x)}{g(x)} = -1 \)
D. \( f(x) \) and \( g(x) \) are not inverse functions because \( f(g(x)) = -x \)
16. Find the inverse of \( f(x) = \frac{1}{6}x^3 + 8 \)

A. \( f^{-1}(x) = \frac{3\sqrt[3]{6x - 48}}{6} \)      
B. \( f^{-1}(x) = \frac{3\sqrt[3]{6x + 8}}{6} \)      
C. \( f^{-1}(x) = \frac{3\sqrt[3]{6x} - 2}{6} \)      
D. \( f^{-1}(x) = \frac{6x^3 - 8}{6} \)

17. Which equation is represented by the graph below?

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

18. Which of the following statements are true for the function \( f(x) = \left(\frac{1}{4}\right)^{x+2} - 1 \)? Select all that apply.

F. Domain: \((-2, \infty)\)
G. Range: \((-1, \infty)\)
H. \( x \) - intercept: \((-2, 0)\)
I. Asymptote: \( y = -2 \)
J. As \( x \to +\infty \), \( f(x) \to -1 \)
K. As \( x \to +\infty \), \( f(x) \to \infty \)
19. Two types of cars have different projected depreciation values. Their changing values are modeled as shown. Find the average rate of change of the value of each car over the 10-year period. Which of the following statements is correct?

A. The value of Car 1 decreases more rapidly.
B. The value of Car 2 decreases more rapidly.
C. The value of Car 1 decreased by an average of $13,947 per year.
D. The value of Car 2 decreased by an average of $9,840 per year.

![Graph showing depreciation values of Car 1 and Car 2]

\[ f(x) = 40(0.90)^x \]

(thousands of dollars in \(x\) years)

20. Three people in the business club are competing to see who can double their investment in the shortest amount of time. Each person starts with an initial amount of $3000, but they each choose different investment scenarios. Who will double their investment first based on the following information?

<table>
<thead>
<tr>
<th>Person A</th>
<th>Person B</th>
<th>Person C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest compounded quarterly: [ A = P \left(1 + \frac{r}{n}\right)^{nt} ] Rate: 6.2%</td>
<td>Interest compounded daily: [ A = P \left(1 + \frac{r}{n}\right)^{nt} ] Rate: 5.9%</td>
<td>Interest compounded continuously: [ A = Pe^{rt} ] Rate: 5.7%</td>
</tr>
</tbody>
</table>

A. Person A doubles their investment first.
B. Person B doubles their investment first.
C. Person C doubles their investment first.
D. They all double their investment at the same time.
21. A cup of soup is placed on a kitchen table. The temperature, $y$ (degrees Fahrenheit), of the soup can be modeled as $y = 68 + 122e^{-0.075x}$, where $x$ represents time, in minutes. Which of the following statements correctly describes the graph of the function?

A. The $x$-intercept of the function is at (190, 0).
B. The $y$-intercept of the function is at (0, 190).
C. The temperature of the soup is initially at 68°F.
D. The temperature of the soup approaches 122°F over time.

22. The graph of an exponential function in the form $y = ab^x$ passes through the points (3, 12) and (7, 192). What is the value of $f(-2)$?

A. $f(-2) = \frac{1}{6}$
B. $f(-2) = \frac{3}{8}$
C. $f(-2) = \frac{3}{4,096}$
D. $f(-2) = \frac{3}{262,144}$

23. Scientists experimenting with the effects of a new antibiotic on a particular bacteria population found that the population of bacteria can be modeled with the function $f(t) = 2000(1 - 0.25)^t$, where $t$ is the time in days the antibiotic is taken. Scientists have also discovered that this antibiotic can only be taken for a maximum of 5 days before it is considered harmful to the patient. In order to consider a person “cured” of the bacterial infection, an initial population of 2000 bacteria must be reduced to less than 200. Is it possible to cure a person with the new antibiotic?

A. Yes, the bacteria population will be less than 200 after 4 days.
B. Yes, the bacteria population will be less than 200 after 6 days.
C. No, the bacteria population will be less than 200 after 7 days.
D. No, the bacteria population will be less than 200 after 9 days.
24. Which of the following sets of equations are NOT inverses of each other?

A. \( y = \log_2(x - 1) \)
   \( y = 2^x + 1 \)

B. \( y = \log_3(x) + 7 \)
   \( y = 3^{x-7} \)

C. \( y = 4^x + 1 \)
   \( y = \log_4(x) - 1 \)

D. \( y = 5^{x+2} \)
   \( y = \log_5(x) - 2 \)

25. Which graph represents the function \( y = \log_8 x \) and its inverse?
26. Find the x-intercept and y-intercept of the function \( f(x) = -2 \log_4(x + 8) \).

   A. x-intercept: \((-7, 0)\)  
      y-intercept: \((0, -3)\)  

   B. x-intercept: \((-8, 0)\)  
      y-intercept: \((0, -3)\)  

   C. x-intercept: \((-7, 0)\)  
      y-intercept: \((0, -4)\)  

   D. x-intercept: \((-8, 0)\)  
      y-intercept: \((0, -4)\)

27. Which of the following expressions is equivalent to \( \ln \left( \frac{5 \sqrt[3]{a}}{b^2c} \right) \)?

   A. \( \ln(5) + \frac{1}{3} \ln(a) - 2 \ln(b) - \ln(c) \)  
   B. \( \ln(5) + 3 \ln(a) - \frac{1}{2} \ln(b) - \ln(c) \)  
   C. \( \ln(5) + \frac{1}{3} \ln(a) - \frac{1}{2} \ln(b) + \ln(c) \)  
   D. \( \ln(5) + 3 \ln(a) - 2 \ln(b) + \ln(c) \)

28. Simplify: \( \log_3(81) - \ln(e^7) - \log_{10}(10^8) + \log_5(625) \)

   Round your answer to the nearest hundredth if necessary. Bubble your answer in the grid below.
29. Give an exact solution for the following equation: $62 + 2 \cdot 8^x = 14 + 3 \cdot 8^x$

A. $x = 6$  
B. $x = \frac{\log 48}{8}$  
C. $x = \log 6$  
D. $x = \frac{\log 48}{\log 8}$

30. Solve for $x$: $2.5^{8x-4} = \left(\frac{125}{8}\right)^{2x+4}$

A. $x = 8$  
B. $x = \frac{4}{3}$  
C. $x = 4$  
D. $x = \frac{7}{8}$

31. Solve: $\log_4(x + 3) = 2 - \log_4(x - 3)$

A. $x = -5, x = 5$  
B. $x = -5$  
C. $x = 5$  
D. no solution
32. For which of these pairs of formulas do the explicit formula and the recursive formula represent the same geometric sequence, assuming that \( a_n \) represents the \( n^{th} \) term of the sequence? Select all that apply.

F. Explicit formula: \( a_n = 3 \cdot 9^{n-1} \) for \( n \geq 1 \)
   Recursive formula: \( a_n = \begin{cases} a_1 = 27 \\ 9 \cdot a_{n-1} \text{ for } n \geq 2 \end{cases} \)

G. Explicit formula: \( a_n = 6 \cdot 2^n \) for \( n \geq 1 \)
   Recursive formula: \( a_n = \begin{cases} a_1 = 6 \\ 2 \cdot a_{n-1} \text{ for } n \geq 2 \end{cases} \)

H. Explicit formula: \( a_n = 4 \cdot 8^{n-1} \) for \( n \geq 1 \)
   Recursive formula: \( a_n = \begin{cases} a_1 = 4 \\ 8 \cdot a_{n-1} \text{ for } n \geq 2 \end{cases} \)

I. Explicit formula: \( a_n = 7 \cdot 5^n \) for \( n \geq 1 \)
   Recursive formula: \( a_n = \begin{cases} a_1 = 35 \\ 5 \cdot a_{n-1} \text{ for } n \geq 2 \end{cases} \)

33. 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 40% off sale, then which matrix shows the price of the item after the discount?

<table>
<thead>
<tr>
<th>Backpack</th>
<th>R</th>
<th>Y</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder</td>
<td>35.50</td>
<td>27.00</td>
<td>45.25</td>
</tr>
<tr>
<td>2.50</td>
<td>1.75</td>
<td>3.00</td>
<td></td>
</tr>
</tbody>
</table>

A. \[
\begin{bmatrix}
35.10 & 26.60 & 44.85 \\
2.10 & 1.35 & 2.60 
\end{bmatrix}
\]

B. \[
\begin{bmatrix}
34.90 & 36.40 & 44.65 \\
1.9 & 1.05 & 2.40 
\end{bmatrix}
\]

C. \[
\begin{bmatrix}
14.20 & 10.80 & 18.10 \\
1.00 & 0.70 & 1.20 
\end{bmatrix}
\]

D. \[
\begin{bmatrix}
21.30 & 16.20 & 27.15 \\
1.50 & 1.05 & 1.80 
\end{bmatrix}
\]

Released 2/15/19
34. Which matrix is the additive inverse of \( A = \begin{bmatrix} -5 & 3 \\ -10 & 8 \\ 25 & 1 \end{bmatrix} \)

A. \( \begin{bmatrix} 5 & -3 \\ 10 & -8 \\ -25 & -1 \end{bmatrix} \)

B. \( \begin{bmatrix} -5 & -10 \\ 3 & 25 \\ 8 & 1 \end{bmatrix} \)

C. \( \begin{bmatrix} 3 & -5 \\ 8 & -10 \\ 1 & 25 \end{bmatrix} \)

D. \( \begin{bmatrix} 3 & 8 \\ -5 & -10 \\ 1 & 25 \end{bmatrix} \)

35. A segment with endpoints \( D(-4, 5) \) and \( E(-1, 7) \) can be represented by the matrix \( \begin{bmatrix} -4 & -1 \\ 5 & 7 \end{bmatrix} \). \( \overline{DE} \) is translated using the matrix operation \( \begin{bmatrix} -4 & -1 \\ 5 & 7 \end{bmatrix} + \begin{bmatrix} -3 & -2 \\ -2 & -2 \end{bmatrix} \). Which of the following statements describes how \( \overline{DE} \) is translated?

A. \( \overline{DE} \) is translated to the left 2 units and down 3 units.

B. \( \overline{DE} \) is translated to the left 3 units and down 2 units.

C. \( \overline{DE} \) is translated to the right 2 units and up 3 units.

D. \( \overline{DE} \) is translated to the right 3 units and up 2 units.

36. Find the value of \( y \) below:

\[
\begin{bmatrix} 15 & 12 \\ 5x & 0 \end{bmatrix} + \begin{bmatrix} 13 & 9 \\ x & 2y + 4 \end{bmatrix} = \begin{bmatrix} 28 & 21 \\ 36 & 3y + 6 \end{bmatrix}
\]
Round your answer to the nearest tenth if needed. Bubble your answer in the grid below.
37. Find the product of $SR$, given $R = \begin{bmatrix} 12 & 3 \\ -4 & -2 \end{bmatrix}$ and $S = \begin{bmatrix} -7 & 15 \\ 11 & 5 \end{bmatrix}$.

A. $\begin{bmatrix} -39 & -2 \\ 147 & -54 \end{bmatrix}$

B. $\begin{bmatrix} -51 & 225 \\ 6 & -70 \end{bmatrix}$

C. $\begin{bmatrix} -84 & 45 \\ -44 & -10 \end{bmatrix}$

D. $\begin{bmatrix} -144 & -51 \\ 112 & 23 \end{bmatrix}$

38. Three matrices are given below.

$X = \begin{bmatrix} -2 & 0 \\ 5 & 7 \end{bmatrix}$  $Y = \begin{bmatrix} -1 & 3 \\ -5 & 8 \end{bmatrix}$  $Z = \begin{bmatrix} 11 & 3 \\ 5 & -7 \end{bmatrix}$

Which of the following statements are true? Select all that apply.

F. $(X + Y)Z = XZ + YZ$

G. $XY = YX$

H. $-5(XY) = (-5X)Y$

I. $X(Y + Z) = XY + XZ$

J. $X + Y = Y + X$

K. $Y - Z = Z - Y$

39. Three matrices are described below:

- $A$ is any $2 \times 2$ matrix
- $Z$ is a $2 \times 2$ zero matrix
- $I$ is a $2 \times 2$ identity matrix

Which of the following equations is true?

A. $AI = Z$

B. $AZ = I$

C. $A + Z = A$

D. $A + I = A$
40. Find the value of \( \det B \), given \( B = \begin{bmatrix} -27 & 18 \\ -5 & 7 \end{bmatrix} \)

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

![Grid]

41. Is the matrix \( A = \begin{bmatrix} 9 & -3 \\ 27 & -9 \end{bmatrix} \) an invertible matrix? Explain.

A. No, \( A \) is not an invertible matrix because \( \det A = 0 \).
B. Yes, \( A \) is an invertible matrix because \( \det A = 0 \).
C. No, \( A \) is not an invertible matrix because \( \det A \neq 0 \).
D. Yes, \( A \) is an invertible matrix because \( \det A \neq 0 \).

42. Find the inverse of \( M = \begin{bmatrix} 4 & 2 \\ 10 & -5 \end{bmatrix} \).

A. \( M^{-1} = \begin{bmatrix} -1 & 1 \\ 10 & 20 \end{bmatrix} \)
B. \( M^{-1} = \begin{bmatrix} 200 & 80 \\ 400 & -160 \end{bmatrix} \)
C. \( M^{-1} = \begin{bmatrix} 1 & 1 \\ 8 & 20 \\ 1 & 1 \end{bmatrix} \)
D. \( M^{-1} \) does not exist
43. Which matrix equation represents the system of equations below?
\[
\begin{align*}
2x - 10y - 12z &= -42 \\
5y - 17z &= 50 \\
11x + 6y &= -27
\end{align*}
\]
A. \[
\begin{bmatrix}
2 & -10 & -12 \\
5 & -17 & 0 \\
11 & 6 & 0
\end{bmatrix}
\begin{bmatrix}
x \\
y \\
z
\end{bmatrix} =
\begin{bmatrix}
-42 \\
50 \\
-27
\end{bmatrix}
\]
B. \[
\begin{bmatrix}
2 & -10 & -12 \\
5 & -17 & 0 \\
11 & 6 & 0
\end{bmatrix}
\begin{bmatrix}
x \\
y \\
z
\end{bmatrix} =
\begin{bmatrix}
-42 \\
50 \\
-27
\end{bmatrix}
\]
C. \[
\begin{bmatrix}
2 & -10 & -12 \\
0 & 5 & -17 \\
11 & 6 & 0
\end{bmatrix}
\begin{bmatrix}
x \\
y \\
z
\end{bmatrix} =
\begin{bmatrix}
-42 \\
50 \\
-27
\end{bmatrix}
\]
D. \[
\begin{bmatrix}
2 & -10 & -12 \\
0 & 5 & -17 \\
11 & 6 & 0
\end{bmatrix}
\begin{bmatrix}
x \\
y \\
z
\end{bmatrix} =
\begin{bmatrix}
-42 \\
50 \\
-27
\end{bmatrix}
\]

44. Two students are each asked to use the inverse matrix to solve the system of equations:
\[
\begin{align*}
2x + y &= 6 \\
x - 3y &= 10
\end{align*}
\]
Each student makes a different claim about how to determine the solution to the system.
- \text{Student 1 claims that the solution can be determined by solving the matrix equation } \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ 1 & -3 \end{bmatrix} \begin{bmatrix} 6 \\ 10 \end{bmatrix}.
- \text{Student 2 claims that the solution can be determined by solving the matrix equation } \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -1 & -7 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} 6 \\ 10 \end{bmatrix}.

Which of the following statements about the student’s claims are true? Select all that apply.

F. The claim Student 1 makes is correct.
G. The claim Student 1 makes is incorrect because they should have multiplied by \(-7\).
H. The claim Student 1 makes is incorrect because their inverse matrix is not correct.
I. The claim Student 2 makes is correct.
J. The claim Student 2 makes is incorrect because they multiplied by the coefficient matrix and not the inverse matrix.
45. At a bake sale, three different customers purchase plates of cookies, boxes of muffins, and boxes of cupcakes. Their purchases and total costs are shown in the table below.

<table>
<thead>
<tr>
<th>Customer</th>
<th>Plate of Cookies</th>
<th>Boxes of Muffins</th>
<th>Boxes of Cupcakes</th>
<th>Total Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luther</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>17.00</td>
</tr>
<tr>
<td>Watson</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>13.50</td>
</tr>
<tr>
<td>Belinda</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>21.50</td>
</tr>
</tbody>
</table>

Given that the inverse of the matrix \[
\begin{bmatrix}
1 & 3 & 4 \\
4 & 1 & 3 \\
5 & 2 & 5
\end{bmatrix}
\] is \[
\begin{bmatrix}
0.25 & 1.75 & -1.25 \\
1.25 & 3.75 & -3.25 \\
-0.75 & -3.25 & 2.75
\end{bmatrix}
\], what is the cost of one box of cupcakes?

A. $1.00          C. $4.33
B. $2.50          D. $6.00

46. Which of the following is an example of a statistical question?

A. Which month is your birthday in?
B. How many people have white cars?
C. Which color of car do people prefer: black, red, blue, or white?
D. How many people in your class have a birthday in June?

47. A potato chip company monitors the amount of chips in every bag by randomly selecting and weighing 100 bags of chips each day. Which of the following statements are true? Select all that apply.

F. The population is the 100 bags of chips randomly selected in a single day.
G. The population is all of the bags of chips made in a single day.
H. The population is all of the bags of chips produced by the company.
I. A sample is the 100 bags of chips randomly selected in a single day.
J. A sample is all of the randomly selected bags of chips.
K. The sample is all of the bags of chips produced by the company.
48. A book publisher is about to release a new novel. If the novel is likely to sell to more than 20% of all book store customers, the company will print 1 million copies of the book. If it is likely to sell to less than 20%, then the company will print 250,000 copies. The publisher sent a survey to book store customers who recently purchased a novel. Of the 300 people surveyed, 78 said there were “very likely” to purchase the new novel. Based on the results the publisher decided to print 1 million copies of the novel. Was this a good decision? Explain why or why not.

A. This was a good business decision since 26% of the people surveyed said they were likely to buy the novel.

B. This was a good business decision since 26% of the people surveyed already bought a novel.

C. This was a poor business decision since the survey only included people who recently purchased a novel. The sample was biased since these people are more likely to purchase another novel. The publisher could make a better decision by surveying 300 randomly selected customers at the book store.

D. This was a poor business decision since the survey only included people who recently purchased a novel. The sample was biased since these people are more likely to purchase another novel. The publisher could make a better decision by surveying the first 300 customers at the book store.

49. Megan is studying the sleep habits of high school students. She randomly selects students at her school to fill out a questionnaire about the number of hours they sleep each night. What type of study is this?

A. an experiment
B. a sample survey
C. an observational survey
D. a random phenomenon

50. In the data set below, determine which of the values is an outlier and describe how it affects the mean and standard deviation.

72, 97, 86, 37, 69, 82, 59, 92, 71, 47, 110, 80, 85, 85

A. 37 is the outlier, causing the mean to decrease and the standard deviation to increase.
B. 37 is the outlier, causing the mean to increase and the standard deviation to decrease.
C. 110 is the outlier, causing the mean to decrease and the standard deviation to increase.
D. 110 is the outlier, causing the mean to increase and the standard deviation to decrease.
51. The age distribution of girls and boys on different sports teams are represented by the graphs below.

Which of the following statements are true? Select all that apply.

F. The interquartile range and median should be used to compare data sets 1 and 2 because both are approximately normally distributed.

G. The standard deviation and mean should be used to compare data sets 1 and 2 because both are approximately normally distributed.

H. The interquartile range and median should be used to compare data sets 3 and 4 because both are skewed.

I. The standard deviation and mean should be used to compare data sets 3 and 4 because both are skewed.
52. Determine which of the following statements are correct about the test scores for two different students shown below.

<table>
<thead>
<tr>
<th>Student A</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student B</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
</tr>
</tbody>
</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.

53. A standardized test has normal distribution and a mean of 72 with a standard deviation of 5. Find the probability that a score is between 77 and 87 OR 62 and 67.

A. 0.024
B. 0.159
C. 0.207
D. 0.294

54. Mortgage statistics for a particular city show the probability that a new homeowner will occupy a house before moving or selling is normally distributed with a mean of 9.2 years and a standard deviation of 2 years. Using the Standard Normal Table below, what is the probability that a homeowner will sell or move after 5 to 7 years?

<table>
<thead>
<tr>
<th>z</th>
<th>.0</th>
<th>.1</th>
<th>.2</th>
<th>.3</th>
<th>.4</th>
<th>.5</th>
<th>.6</th>
<th>.7</th>
<th>.8</th>
<th>.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>−2</td>
<td>0.0228</td>
<td>0.0179</td>
<td>0.0139</td>
<td>0.0107</td>
<td>0.0082</td>
<td>0.0062</td>
<td>0.0047</td>
<td>0.0035</td>
<td>0.0026</td>
<td>0.0019</td>
</tr>
<tr>
<td>−1</td>
<td>0.1587</td>
<td>0.1357</td>
<td>0.1151</td>
<td>0.0968</td>
<td>0.0808</td>
<td>0.0668</td>
<td>0.0548</td>
<td>0.0446</td>
<td>0.0359</td>
<td>0.0287</td>
</tr>
<tr>
<td>−0</td>
<td>0.5000</td>
<td>0.4602</td>
<td>0.4207</td>
<td>0.3821</td>
<td>0.3446</td>
<td>0.3085</td>
<td>0.2743</td>
<td>0.2420</td>
<td>0.2119</td>
<td>0.1841</td>
</tr>
<tr>
<td>0</td>
<td>0.5000</td>
<td>0.5398</td>
<td>0.5793</td>
<td>0.6179</td>
<td>0.6554</td>
<td>0.6915</td>
<td>0.7257</td>
<td>0.7580</td>
<td>0.7881</td>
<td>0.8159</td>
</tr>
<tr>
<td>1</td>
<td>0.8413</td>
<td>0.8643</td>
<td>0.8849</td>
<td>0.9032</td>
<td>0.9192</td>
<td>0.9332</td>
<td>0.9452</td>
<td>0.9554</td>
<td>0.9641</td>
<td>0.9713</td>
</tr>
<tr>
<td>2</td>
<td>0.9772</td>
<td>0.9821</td>
<td>0.9861</td>
<td>0.9893</td>
<td>0.9918</td>
<td>0.9938</td>
<td>0.9953</td>
<td>0.9965</td>
<td>0.9974</td>
<td>0.9981</td>
</tr>
</tbody>
</table>

A. 0.1178
B. 0.1536
C. 0.1587
D. 1.8464
55. A statistician determines that the scores earned on a certain video game have a normal distribution, with a mean of 35,000 points and a standard deviation of 8,000 points. Which of the following statements are true? Select all that apply.

F. Approximately 23% of the scores are greater than 41,000 points.

G. A score of 41,000 points is associated with a $z$-score of 0.75.

H. Approximately 17% of the scores are between 33,000 and 41,000 points.

I. A score of 33,000 points is associated with a $z$-score of $-0.25$.

J. Approximately 40% of the scores are less than 33,000 points.
# Algebra 2 Honors Semester 2 Instructional Materials 2018-19 Answers

<table>
<thead>
<tr>
<th>Unit 5</th>
<th>Unit 6</th>
<th>Unit 10</th>
<th>Unit 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. C</td>
<td>27. A</td>
<td>43. D</td>
<td></td>
</tr>
<tr>
<td>12. A</td>
<td>28. −7</td>
<td>44. F, J</td>
<td></td>
</tr>
<tr>
<td>14. D</td>
<td>30. A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. D</td>
<td>31. C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. A</td>
<td>32. H, I</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>