Algebra 2: RC 1

2A.1A (R)

1. What is the domain of \( f(x)= -2x^3+x^2+1 \)?
   A. the set of all real numbers
   B. \( \{x| -3<x<2\} \)
   C. \( \{x| -2<x<3\} \)
   D. \( \{ \} \)

2. What is the range of the function below?
   \( f(x)= -|x-8|+3 \)
   F. all real numbers less than or equal to -8
   G. all real numbers less than or equal to 3
   H. all real numbers greater than -8
   J. all real numbers greater than 3

3. Which set contains all the real numbers that are not part of the domain of
   \( f(x)= \frac{x+4}{x^2+4x-32} \)?
   A. \( \{8\} \)
   B. \( \{-4\} \)
   C. \( \{-4, 8\} \)
   D. \( \{-8, 4\} \)

4. Nancy made the following statement:
   “The range of \( f(x)=ax+b \) is the set of all real numbers, given \( a \) and \( b \) are real numbers.”
   Which produces a counterexample to her statement?
   F. \( a=0 \)
   G. \( b=0 \)
   H. \( a<0 \)
   J. \( b<0 \)
Algebra 2: RC 1

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5. The volume of a cylinder with radius \( r \) centimeters and a height that is 3 centimeters shorter than the radius is represented by the function

\[ V(r) = \pi r^2 (r-3). \]

What is the range of \( V(r) \) in this situation?

A. all real numbers
B. all real numbers less than -3
C. all real numbers greater than 3
D. all real numbers greater than 0

6. Using set notation, state the domain and range of the following function.

![Diagram of a graph with points and set notation]
Algebra 2: RC 1

2A.1A (R)

7. A roll of aluminum with a width of 32-cm is to be bent into rain gutters by folding up two sides at 90° angles. A rain gutter’s greatest capacity, or volume, is determined by the gutter’s greatest cross-sectional area, as shown.

The function to describe the cross-sectional area in terms of \( x \) is \( A(x) = x(32 - 2x) \). Identify a meaningful domain and range for \( A(x) \).

A. \( d = \{ x: \ 0 < x < 16 \} \)
   \( r = \{ y: \ 0 < y < 128 \} \)

B. \( d = \{ x: \ 0 < x < 128 \} \)
   \( r = \{ y: \ 0 < y < 16 \} \)

C. \( d = \{ y: \ 0 < y < 128 \} \)
   \( r = \{ x: \ 0 < x < 16 \} \)

D. \( d = \{ x: \ x > 0 \} \)
   \( r = \{ y: \ y > 0 \} \)
Algebra 2: RC 1

2A.1B (R)

1. The following list shows the number of people (in millions) in the United States whose only means of getting to work was walking.

<table>
<thead>
<tr>
<th>Year (x)</th>
<th>Number (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>7.6</td>
</tr>
<tr>
<td>1950</td>
<td>7.0</td>
</tr>
<tr>
<td>1960</td>
<td>6.4</td>
</tr>
<tr>
<td>1970</td>
<td>5.7</td>
</tr>
<tr>
<td>1980</td>
<td>5.4</td>
</tr>
<tr>
<td>1990</td>
<td>4.5</td>
</tr>
</tbody>
</table>

If x=0 for the year 1940, which equation is the best fit linear model for the data?

A. \( y = -16.5x + 125 \)  
B. \( y = -0.06x + 7.6 \)
C. \( y = 0.06x + 10 \)  
D. \( y = 7.6x - 0.06 \)

2. The table below shows the number of families living in the city of Sunnyvale from 1965 to 2000.

<table>
<thead>
<tr>
<th>Year (after 1900)</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Families (thousands)</td>
<td>31.1</td>
<td>30.5</td>
<td>30.1</td>
<td>28.7</td>
<td>27.1</td>
<td>25.7</td>
<td>23.2</td>
<td>20.3</td>
</tr>
</tbody>
</table>

Approximately how many families will live in Sunnyvale in 2000?

F. 14,000  
G. 15,000  
H. 18,000  
J. 19,000
2A.1B (R)

3. The table and scatterplot below display the calories and water-content percentages for a variety of fruits.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Calories per Piece</th>
<th>Water Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple (1 average)</td>
<td>44</td>
<td>85%</td>
</tr>
<tr>
<td>Apple (cooked)</td>
<td>35</td>
<td>88%</td>
</tr>
<tr>
<td>Apricot</td>
<td>30</td>
<td>85%</td>
</tr>
<tr>
<td>Avocado</td>
<td>150</td>
<td>60%</td>
</tr>
<tr>
<td>Banana</td>
<td>107</td>
<td>75%</td>
</tr>
<tr>
<td>Blackberries (each)</td>
<td>1</td>
<td>85%</td>
</tr>
<tr>
<td>Blueberries (100 g)</td>
<td>49</td>
<td>81%</td>
</tr>
<tr>
<td>Cherry (each)</td>
<td>2.4</td>
<td>83%</td>
</tr>
<tr>
<td>Clementine</td>
<td>24</td>
<td>66%</td>
</tr>
<tr>
<td>Damson</td>
<td>28</td>
<td>70%</td>
</tr>
<tr>
<td>Grapes (100 g) seedless</td>
<td>50</td>
<td>82%</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>100</td>
<td>65%</td>
</tr>
<tr>
<td>Mango</td>
<td>40</td>
<td>80%</td>
</tr>
</tbody>
</table>

Which value is the best estimate for the correlation coefficient?

A. -0.99
B. -0.65
C. 0.65
D. 0.99
Algebra 2: RC 1

2A.1B (R)

4. The table shows the amount of oil, in liters, needed to fill a cylindrical can based on the radius, in centimeters, of the can. The height of each can is the same.

<table>
<thead>
<tr>
<th>Radius of Can (in centimeters)</th>
<th>Amount of Oil (in liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>4.5</td>
</tr>
<tr>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>25</td>
<td>12.5</td>
</tr>
</tbody>
</table>

This data is best modeled by which type of function?

- F. cubic
- H. quadratic
- G. linear
- J. logarithmic

5. Brittany recorded the total number of ladybugs observed in a garden over a 7-day period. The scatterplot below represents the data she collected.

Which type of function do these data points best fit?

- A. cubic
- C. linear
- B. exponential
- D. quadratic
The graph shows average monthly precipitation for Spokane, Washington and Bakersfield, California.

Which statement about the data shown is true?

F. Spokane has a greater range of precipitation values than Bakersfield.

G. Bakersfield receives its greatest amount of precipitation in December.

H. Bakersfield has a greater annual average precipitation than Spokane.

J. Spokane receives its greatest amount of precipitation in January.
Algebra 2: RC 1

2A.1B (R)

7. Dylan performed an experiment by tossing pennies onto a table. He removed the pennies that landed face-up, recorded the number of pennies remaining, and then tossed the remaining pennies onto the table. The chart below shows the number of pennies Dylan had remaining on the table after 4 tosses.

<table>
<thead>
<tr>
<th>Number of Tosses, ( t )</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Pennies Remaining, ( p )</td>
<td>500</td>
<td>232</td>
<td>120</td>
<td>63</td>
<td>30</td>
</tr>
</tbody>
</table>

Which equation best models this data?

A. \( p = -111t + 411 \)  
B. \( p = 458t^{1/2} \)  
C. \( p = 263t^{-1.4} \)  
D. \( p = 485\left(\frac{1}{2}\right)^t \)

8. The table shows carbon dioxide concentration levels measured at Mauna Loa, Hawaii.

<table>
<thead>
<tr>
<th>Year</th>
<th>Carbon Dioxide (in parts per million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>316.9</td>
</tr>
<tr>
<td>1970</td>
<td>325.6</td>
</tr>
<tr>
<td>1980</td>
<td>338.7</td>
</tr>
<tr>
<td>1990</td>
<td>354.2</td>
</tr>
<tr>
<td>2000</td>
<td>369.4</td>
</tr>
</tbody>
</table>

Using a linear model, which is the best estimation of the carbon dioxide concentration level, measured in parts per million, at Mona Loa in 2010?

F. 362  
G. 381  
H. 385  
J. 389
9. A researcher used a linear model of the data in this table to determine the relationship between a city’s distance from the equator and its average maximum temperature in January.

<table>
<thead>
<tr>
<th>City</th>
<th>Distance from Equator (miles)</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madrid, Spain</td>
<td>2,781</td>
<td>9</td>
</tr>
<tr>
<td>Tokyo, Japan</td>
<td>2,454</td>
<td>8</td>
</tr>
<tr>
<td>Guatemala City, Guatemala</td>
<td>1,005</td>
<td>23</td>
</tr>
<tr>
<td>New Delhi, India</td>
<td>1,965</td>
<td>21</td>
</tr>
<tr>
<td>Oslo, Norway</td>
<td>4,130</td>
<td>-2</td>
</tr>
<tr>
<td>Mexico City, Mexico</td>
<td>1,333</td>
<td>19</td>
</tr>
</tbody>
</table>

Which best describes the linear correlation between a city’s distance from the equator and its average maximum temperature in January?

A. strong negative correlation  
B. strong positive correlation  
C. weak negative correlation  
D. weak positive correlation

10. This table displays the results of an experiment on exponential growth.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>9.6</td>
</tr>
<tr>
<td>2</td>
<td>15.4</td>
</tr>
<tr>
<td>3</td>
<td>24.6</td>
</tr>
<tr>
<td>4</td>
<td>39.3</td>
</tr>
<tr>
<td>5</td>
<td>62.9</td>
</tr>
</tbody>
</table>

Based on the results, which is the closest to the value of y when x = -2?

F. -23  
G. 0.04  
H. 2.34  
J. 19
Algebra 2: RC 1

2A.4A (S)

For each graph in #1-6, answer the following:

a). Identify the function graphed by name.

b). Write the equation of the parent function for each graph.

1.

2.

3.
Algebra 2: RC 1

2A.4A (S)

4.

5.

6.
Algebra 2: RC 1

2A.4A (S)

For #7-9:

a). Sketch the parent function.

b). Write the equation of the parent function.

7. Logarithmic Function

8. Linear Function

9. Reciprocal Function
1. The graph of the function $g$ was obtained from the graph of the function $f$ using a transformation as shown above. Based on the graph, which equation can be used to describe $g(x)$ in terms of $f(x)$?

A. $g(x) = f(x) + 6$  
B. $g(x) = f(x+6)$  
C. $g(x) = f(x) - 6$  
D. $g(x) = f(x-6)$
Algebra 2: RC 1

2A.4B (R)

For #2-18,

a). describe the transformation of f(x) that results in g(x) and

b). write an equation for g(x) in terms of f(x).

2.

3.
Algebra 2: RC 1

2A.4B (R)

4.

5.

6.
Algebra 2: RC 1

2A.4B (R)

7.

8.

9.
Algebra 2: RC 1

2A.4B (R)

10.

11.

12.
Algebra 2: RC 1

2A.4B (R)

13.

[Graph of two functions, f and g, on a coordinate plane.]

14.

[Graph of a parabola labeled f on a coordinate plane.]

15.
Algebra 2: RC 1

2A.4B (R)

16.

17.

18.
Algebra 2: RC 1

2A.4C (S)

1. The graph of the function \( f \) is shown below.

Which grid shows the graph of \( f^{-1} \)?

[Grid A, Grid B, Grid C, Grid D]
Algebra 2: RC 1

2A.4C (S)

2. Which is the inverse of the function \( f(x) = x - 9 \)?

- F. \( f^{-1}(x) = \frac{1}{x+9} \)
- H. \( f^{-1}(x) = 9 - x \)
- G. \( f^{-1}(x) = x + 9 \)
- J. \( f^{-1}(x) = \frac{1}{x-9} \)

3. Which function does not have an inverse function?

- A. \( f(x) = 2x + 7 \)
- B. \( f(x) = \sqrt{x} + 12 \)
- C. \( f(x) = \sqrt{-6x + 9} \)
- D. \( f(x) = 8 - 3x^2 \)

4. Which graph represents the inverse of \( h(x) = -3x + 6 \)?

- F.
- H.
- G.
- J.
5. What is the inverse of $g(x) = \sqrt{5x - 2} + 1$, for all $x \geq \frac{2}{5}$?

A. $g^{-1}(x) = \frac{(x-1)^2 + 2}{5}$

B. $g^{-1}(x) = \frac{(x+1)^2 - 2}{5}$

C. $g^{-1}(x) = \frac{(x-1)^2}{5} + 2$

D. $g^{-1}(x) = \frac{(x+1)^2}{5} - 2$