Section 02-04 Sample Quiz - Composition of Functions

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. Consider the functions:

\[ f(x) = 2^x \]
\[ g(x) = 2x - 5 \]

What is the value of \( (f \cdot g)(3) \)?

a. 6  
   c. 2  
b. 8  
   d. 11

2. Consider the partial set of values for the functions \( f(x) \) and \( g(x) \):

\[
\begin{array}{|c|c|c|c|c|}
\hline
x & -1 & 0 & 1 & 2 & 3 \\
\hline
f(x) & 1 & 2 & 4 & 8 & 16 \\
\hline
g(x) & -5 & -3 & -1 & 1 & 3 \\
\hline
\end{array}
\]

What is the value of \( f(1) + 2 \cdot g(3) \)?

a. 10  
   c. 18  
b. 7  
   d. 36

3. Consider the graphs of the functions \( f(x) \) and \( g(x) \):

What is the value of \( (f + g)(2) \)?

a. 2  
   c. 6  
b. 4  
   d. 6.5
4. If \( f(x) = 2x + 1 \) and \( g(x) = x^2 \), Find \( g(f(3)) \)
   a. 49  c. 7
   b. 19  d. 13

5. If \( f(x) = 2x - 1 \) and \( g(x) = x^2 \), Find \( f \circ g \)
   a. \( 4x^2 + 1 \)  c. \( 4x^2 - 4x + 1 \)
   b. \( 2x^2 - 1 \)  d. \( 4x^3 - x^2 \)

6. Consider the partial set of values for the functions \( f(x) \) and \( g(x) \):

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f(x) )</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>( g(x) )</td>
<td>-5</td>
<td>-3</td>
<td>-1</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

What is the value of \( (f \circ g)(1) \)?
   a. -1  c. 5
   b. 1  d. 16

7. Consider the graphs of the functions \( f(x) \) and \( g(x) \):

What is the value of \( (g \circ f)(1) \)?
   a. -1  c. -2
   b. 0.25  d. 4
8. The volume of a cone with a radius of 3 cm can be measured with the function \( V(h) = 3\pi h \) where \( h \) is the height.

The function to calculate the height of a cone with a slant height of 12 cm and a radius \( r \) could be \( H(r) = \sqrt{144 - r^2} \).

Which composition would find the volume of a cone with a radius of 3 \( (i.e. r = 3) \) and a slant height of 12?

- a. \( V(H(3)) \)
- b. \( H(V(3)) \)
- c. \( V(H(12)) \)
- d. \( H(V(12)) \)

9. \( T(h) \) is the temperature (\( ^\circ F \)) in the atmosphere as a function of height, \( h \) in miles can be determined by the following function:

\[
T(h) = -16h + 68
\]

The height in miles of a weather balloon as a function of time, \( t \), in minutes can be determined by the following function:

\[
h(t) = 0.189t
\]

Find the temperature when the balloon has traveled for \( t = 8 \) minutes.

- a. 92.2
- b. 64.9
- c. 50.2
- d. 43.8