1. Consider the following functions.

\[
\begin{array}{cccc}
  f(x) = 6x - 2 & g(x) = 3x & h(x) = 2^x + 3 & p(x) = 2
\end{array}
\]

a. Determine \((f + g)(x)\)

\[
(f(x) + g(x)) = (6x - 2) + (3x) = 9x - 2
\]

d. Determine \((p \cdot g)(x)\)

\[
(p(x) \cdot g(x)) = (2 \cdot 3x) = 6x
\]

e. Determine \((f \cdot g)(2)\)

\[
\frac{f(2) \cdot g(2)}{g(2)} = \frac{6 \cdot 2}{3} = 4 - 2 = 2
\]

2. Given the following partial set of values of function evaluate the following.

<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>6</td>
<td>9</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>

a. Determine \(\frac{f(1) - 2 \cdot g(2)}{f(2)}\)

\[
f(1) = 4 \quad g(2) = 1
\]

\[
4 - 2 \cdot 1 = 4 - 2 = 2
\]

d. Determine \((f + g)(2)\)

\[
\frac{f(2) + g(2)}{f(2)} = \frac{8 + 1}{8} = 1 + 1 = 9
\]

3. Given the following partial set of values of function evaluate the following.

a. Determine \(f(4) + 2 \cdot g(1)\)

\[
f(4) = -3 \quad g(1) = 3
\]

\[
-3 + 2 \cdot 3 = 3
\]
4. Consider the following functions.

\[ f(x) = 6x - 2 \quad g(x) = 3x \quad h(x) = 2^x + 3 \quad p(x) = 2 \]

a. Determine \((f \circ h)(1)\)

\[
\begin{align*}
(f(h(1))) &= f(5) = (5) - 2 \\
h(1) &= 2^1 + 3 = 5 \\
&= 30 - 2 = 28 \\
\end{align*}
\]

b. Determine \((g \circ f)(2)\)

\[
\begin{align*}
(g(f(2))) &= g(10) = 3(10) \\
f(2) &= 6(2) - 2 = 12 - 2 \\
&= 10 \\
\end{align*}
\]

\[ = 30 \]

\[ = 3 \cdot 2^x + 9 \]

5. Given the following partial set of values of function evaluate the following.

<table>
<thead>
<tr>
<th>(x)</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
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<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>

a. Determine \((f \circ g)(2)\)

\[
\begin{align*}
(f(g(2))) &= f(1) = 4 \\
g(2) &= 1 \\
\end{align*}
\]

b. Determine \((g \circ f)(0)\)

\[
\begin{align*}
(g(f(0))) &= g(2) = 1 \\
f(0) &= 2 \\
\end{align*}
\]

6. Given the following partial set of values of function evaluate the following.

a. Determine \((f \circ g)(0)\)

\[
\begin{align*}
(f(g(0))) &= f(4) = -3 \\
g(0) &= 4 \\
\end{align*}
\]

\[(4, -5)\]

\[(5, 4)\]
7. Given the length of a rectangle can be described by the function \( f(x) = 6x - 2 \) and the width of the same rectangle can be described by \( g(x) = 2x + 1 \)

\[ f(x) \cdot g(x) = (6x-2) \cdot (2x+1) \]

\[ 12x^2 + 12x - 4x - 2 \]

\[ 12x^2 + 2x - 2 \text{ sq units} \]

8. A pyramid is created from a square base where each side is 6 cm. The volume of the pyramid can be given by the function, \( V(h) = 12h \).

The function to calculate the height of the same square based pyramid given the slant height could be described by \( H(s) = \sqrt{s^2 - 9} \) where 's' is the slant height in cm.

\[ \text{a. Evaluate } V(H(5)) = \sqrt{4} = 12(4) \]

\[ H(5) = \sqrt{5^2 - 9} = \sqrt{25 - 9} = \sqrt{16} = 4 \]

\[ = 48 \text{ cm}^3 \]

\[ \text{b. Explain what } V(H(5)) \text{ represents.} \]

\[ \text{IT REPRESENTS THE VOLUME OF THE PYRAMID WHEN THE SLANT HEIGHT IS 5 CM.} \]

9. After being filled a party balloon’s volume is dependent of the temperature in the room. The volume of the balloon can be modeled by \( V(c) = 4100 + 15c \) where the volume, \( V \), is measured in cubic centimeters and the temperature, \( c \), is measured in degrees Celsius.

A function that enables you to change from degrees Celsius (\( ^\circ C \)) to degrees Fahrenheit (\( ^\circ F \)) is \( C(f) = \frac{5}{9}(f - 32) \).

Show the composition of function required to determine the volume of the balloon when the temperature is 98\(^\circ\)F.

\[ \sqrt{C(98)} = \sqrt{36.666} = 4100 + 15(36.666) \]

\[ = 4650 \text{ cm}^3 \]

10. A square is increased by doubling one side and decreasing the other sided by 3 units. Let \( x \) be the length of a side of the square.

Create a function that would represent a change in the area of the rectangle after the transformation.

\[ \text{CHANGE IN AREA} = \text{TRANSFORMED AREA} - \text{ORIGINAL AREA} \]

\[ = (2x)(x-3) - (x)(x) \]

\[ = 2x^2 - 6x - x^2 = x^2 - 6x \]