Quiz # 1   Sample Solution

Select an answer for problem # 1, no justification required.

1. (1 point) Calculate the composite functions $f \circ g$ and $g \circ f$ for $f(x) = 7^x$ and $g(x) = x^{10}$.

(a) $f \circ g = 7^{10}$ and $g \circ f = 10^7$

$$f \circ g = 7^{(x^{10})} \qquad g \circ f = (7^x)^{10} = 7^{10x}$$

(b) $f \circ g = 7^x x^{10}$ and $g \circ f = x^{10} 7^x$

(c) $f \circ g = 7^{x^{10}}$ and $g \circ f = 7^{10x}$

(d) $f \circ g = 7^{10x}$ and $g \circ f = 7^{x^{10}}$

(e)   None of the above

Your answer to problem # 2 should be written in complete sentences in a clear and concise manner. An answer without explanation or that is poorly presented may not receive full credit.

2. (2 points) Let $f(x) = \sqrt{3 + 5x}$. Find $f^{-1}(x)$ and specify the domain and range of f^{-1}. **Hint:** Consider the domain and range of f.

The domain of f will be all x so that $3 + 5x \geq 0$.

so $5x \geq -3$

$x \geq -\frac{3}{5}$

Its range is $[0, \infty)$.

Now, to swap x and y: $x = \sqrt{3 + 5y}$

solve for y: $x^2 = 3 + 5y$

$x^2 - 3 = 5y$

$y = \dfrac{x^2 - 3}{5} = f^{-1}(x)$

So $f^{-1}(x) = \frac{x^2 - 3}{5}$. The domain of f^{-1} is the range of f, and vice versa,

So the domain of f^{-1} is $[0, \infty)$ and its range is $[-\frac{3}{5}, \infty)$.