Quiz 4

Problem 1. What are your thoughts on the meaning of life?

There probably is no meaning, but the search for a meaning is perhaps what is most important.

Problem 2. Find the inverse of the function \( f(x) = \sqrt{2x + 3} \).

If \( y = \sqrt{2x + 3} \), then the inverse is \( x = \sqrt{2y + 3} \), i.e., \( x^2 = 2y + 3 \), so \( y = \frac{x^2 - 3}{2} \), with the restriction \( x > 0 \) so that the domain of \( f^{-1} \) matches the range of \( f \).

Problem 3. Let \( f(x) = x^2 \). Write the equation of the function obtained by shifting \( f \) two units to the right, reflecting over the \( y \)-axis, and then shifting 5 units up. You do not need to simplify your answer.

![Diagrams of functions]

Problem 4. Let \( f(x) = |x - 4| \) and let \( g(x) = 3 - x \). Find \( f \cdot g, f + g, \) and \( f \circ g \). You do not need to simplify your answers.

\[
(f \cdot g)(x) = f(x)g(x) = (|x - 4|)(3 - x)
\]

\[
(f + g)(x) = f(x) + g(x) = |x - 4| + (3 - x)
\]

\[
(f \circ g)(x) = f(g(x)) = |(3 - x) - 4|
\]