The following is a general practice test for the algebra placement exam. This pre-test is not necessarily complete or comprehensive of all exam topics. Unlike this practice test, the placement exam is multiple-choice. Students are encouraged to work through these examples before consulting the solutions.

1. Solve for $x$: \(\log_4 \left( \frac{8}{x} \right) = 2\)

2. Find $f^{-1}(x)$, the inverse function of $y = f(x) = 3x + 4$.

3. Solve the following equation for $x$. \(\sqrt{x + 14} - x = 2\)

4. Write the following complex number in the standard form $a + bi$. \(\frac{6 - i}{1 + i}\)

5. Solve the following equation for $x$, in the complex number system: \(10x^2 + 6x + 1 = 0\)

6. Let $z = 3 - 4i$. Find $\overline{z}$, where $\overline{z}$ refers to the complex conjugate of $z$.

7. If $y = f(x) = x^2 - 4x + 2$, find the cartesian coordinates of the vertex of the parabola defined by the graph of $f(x)$.

8. Find all real zeros of the following function: \(f(x) = x^3 + 2x^2 - 5x - 6\) (all real solutions $x$ to the equation $f(x) = 0$).

9. Solve the following equation for $x$. \(5^{1+3x} = \frac{1}{5}\)

10. Solve for $x$ in the following equation. \(\log_x(3) = \log_6(36)\)