Instructions. Please justify your answers to each of the following problems. Answers without any explanation (or work shown) will not receive credit.

1) Find an equation of a line which has slope $-2$ and passes through the point $(3, 4)$. Please express the answer in the form $y = mx + b$.

2) Solve the equation $x^2 - 5x - 14 = 0$ for $x$. In other words, your goal is to find all the value(s) of $x$ such that if you substitute that value into the expression $x^2 - 5x - 14$, the resulting number is zero.

3) Solve the equation $x^4 - 5x^2 - 14 = 0$ for $x$.

4) The absolute value function is defined by

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

(a) Plot the graph of the function $f(x) = 2|x|$.

(b) Plot the graph of the function $g(x) = |x| + 2$.

(c) Plot the graph of the function $h(x) = |x + 2|$.

5) Plot the graph of the following piecewise defined function

$$f(x) = \begin{cases} x + 3 & \text{if } x \leq -1 \\ 2 & \text{if } -1 < x < 3 \\ |x| & \text{if } x \geq 3 \end{cases}$$

What are the domain and range of this function $f$?

6) Find the domain and range of the following function:

$$h(x) = \frac{1}{1 + x^2}$$

7) Let $f(x) = \sqrt{x + 1}$ and $g(x) = 3x^2$. Compute the following composition functions:

(a) $f(g(x))$

(b) $g(f(x))$

(c) $f(f(x))$

(d) $g(g(x))$

(e) $f(f(f(x)))$