1. (6 points) Shown below is the graph of the function $f(x) = -x^2 + 4$:

(a) Compute the following values of $f$ (show your calculations), and label the corresponding points on the graph above:

**Solution:**

- $f(0) = -0^2 + 4 = 0 + 4 = 4$ (which means the point $(0, 4)$ is on the graph)
- $f(1) = -(1^2) + 4 = -1 + 4 = 3$ (so the point $(1, 3)$ is on the graph)
- $f(-3) = -(3^2) + 4 = -9 + 4 = -5$ (so the point $(-3, -5)$ is on the graph)

(b) What is the domain of $f$? What is the range of $f$? For full credit, write the solutions in interval notation.

**Solution:**

- The domain of $f$ is $\mathbb{R}$, i.e., all real numbers; in interval notation: $(-\infty, \infty)$
- Since the max value of $f(x)$ is $f(0) = 4$ the range of $f$ is $(-\infty, 4]$  

2. (4 points) Find the domain of each of the following functions. For full credit, write the solutions in interval notation.

(a)  

$g(x) = \frac{1}{x - 2}$

**Solution:** The domain consists of all real numbers except $x = 2$, i.e., in interval notation: $(-\infty, 2) \cup (2, \infty)$

(b)  

$h(x) = \sqrt{x + 1}$

**Solution:** The domain consists of real numbers $x$ such that $x + 1 \geq 0$, i.e., in $x \geq -1$. In interval notation: $[-1, \infty)$