Math 121 – Quiz 2 Solution

1. Suppose the vertex of a quadratic function $f(x)$ is the point $(-3, 5)$ and that $f(0) = 2$. What is $f(x)$?

2. Solve the inequality:
$$x^2 + 2x \geq 0$$

Solution:

1. Since the vertex is at $(-3, 5)$, we have:
$$f(x) = a(x+3)^2 + 5$$
Now, since $f(0) = 2$ we have:
$$\begin{aligned} f(0) = a(0+3)^2 + 5 &= 2 \\ 9a + 5 &= 2 \\ 9a &= -3 \\ a &= -\frac{1}{3} \end{aligned}$$
Therefore, $\boxed{f(x) = -\frac{1}{3}(x+3)^2 + 5}$.

2. The graph of $y = f(x) = x^2 + 2x = x(x+2)$ opens up and has x-intercepts at $x = -2$ and $x = 0$. Since $f(x) \geq 0$, the solution is $\boxed{x \leq -2 \text{ or } x \geq 0}$.