Math 121 – Quiz 2 Solution

1. Find the vertex and axis of symmetry for the function:

$$f(x) = 2x^2 + 8x + 10$$

2. Solve the inequality:

$$x(x-1) \leq 2$$

Solution:

1. Complete the square:

$$\begin{aligned} f(x) &= 2x^2 + 8x + 10 \\ &= 2(x^2 + 4x) + 10 \\ &= 2(x^2 + 4x + 4) + 10 - 2(4) \\ &= 2(x+2)^2 + 2 \end{aligned}$$

The vertex is $\boxed{(-2, 2)}$ and the axis of symmetry is $\boxed{x = -2}$.

2. Solving, we have:

$$\begin{aligned} x(x-1) &\leq 2 \\ x^2 - x - 2 &\leq 0 \\ f(x) = (x-2)(x+1) &\leq 0 \end{aligned}$$

The graph of $y = f(x)$ opens up and has x-intercepts at $x = -1$ and $x = 2$. Since $f(x) \leq 0$, the solution is $\boxed{-1 \leq x \leq 2}$.