1. (6 points) Consider the triangle with vertices at the points (0, 0), (1, 1) and (0, 2).

1. Draw the triangle in the Cartesian plane. (2 points)
2. Find the perimeter (sum of length of the sides) of this triangle. (4 points)

2. Let \( d_1 \) be the length of the line from \((0, 0)\) to \((0, 2)\)
   Let \( d_2 \) be the length of the line from \((0, 2)\) to \((1, 1)\)
   Let \( d_3 \) be the length of the line from \((1, 1)\) to \((0, 0)\)

The perimeter is \( d_1 + d_2 + d_3 \). Using the distance formula, we find
\[
\begin{align*}
   d_1 &= \text{dist}((0,0),(0,2)) = \sqrt{(2-0)^2 + 2^2} = 2. \\
   d_2 &= \text{dist}((0,2),(1,1)) = \sqrt{(1-2)^2 + (1-0)^2} = \sqrt{2} \quad \text{(1 pt)} \\
   d_3 &= \text{dist}((1,1),(0,0)) = \sqrt{(0-1)^2 + (0-1)^2} = \sqrt{2} \quad \text{(1 pt)}
\end{align*}
\]
Therefore, the perimeter of the triangle is \( 2\sqrt{2} + 2 \)

2. (4 points) 1. Find the equation of the line that passes through \((3, 3)\) and is perpendicular to the line given by \( y = 3x + 1 \). (2 points)
2. Write the equation of a line of your choice that is parallel to the line \( y = 3x + 1 \). (2 points)

1. The slope of the line \( y = 3x + 1 \) is \( m_1 = 3 \).
   A line perpendicular to \( y = 3x + 1 \) has slope \( m_2 = -\frac{1}{m_1} = -\frac{1}{3} \). Moreover, the line passes through \((3, 3)\). Therefore, the point-slope formula of the line gives
   \[
   y - 3 = -\frac{1}{3} \cdot (x - 3)
   \]
   or
   \[
   y = -\frac{1}{3} \cdot x + 4
   \]
2. Parallel lines have the same slope. The slope of line \( y = 3x + 1 \) is 3. Another line with slope 3, that is parallel to \( L \), is \( y = 3x/1 \).

3. (3 points) Consider the function \( f(y) = y^2 + 2 \).

1. Find \( f(\sqrt{2}) \). (1 point)

2. Is the point \((0,3)\) on the graph of this function? (2 points)

\[
1. \quad f(\sqrt{2}) = (\sqrt{2})^2 + 2 = 2 + 2 = 4. \\
2. \quad \text{If the point } (0,3) \text{ is on the graph of } f \text{, we would have } f(0) = 3. \\
\text{But } f(0) = 2 \neq 3. \quad \text{1 pt to calculate } f(0) \\
\text{Hence } (0,3) \text{ is not on the graph of } f.
\]

Alternatively, now we know how to draw quadratics. We can see that \((0,3)\) is not in the graph of \( f \).