Name: _____

You have 20 minutes to complete the quiz.

1. Consider the following inner product on the vector space $\mathbb{P}_2$ of quadratic polynomials. We define:

$$\langle f(t), g(t) \rangle = \int_0^1 f(t)g(t)dt$$

Find a basis of $\mathbb{P}_2$ which is orthogonal with respect to this inner product.

2. Find the least squares solutions to the system:

$$\begin{aligned} x + y + z &= 2 \\ x + y + z &= 4 \\ x - y + z &= 6 \end{aligned}$$