Q8_Ans:

$$w_1 f(x_1) + w_2 f(x_2) = \int_{-1}^{1} f(x)dx$$

To get the nodes and weight according to the conditions imposed:

$$w_1 + w_2 = \int_{-1}^{1} f(1)dx = 2$$

$$w_1 x_1 + w_2 x_2 = \int_{-1}^{1} xdx = 0$$

$$w_1 x_1^2 + w_2 x_2^2 = \int_{-1}^{1} x^2 dx = \frac{2}{3}$$

$$w_1 x_1^3 + w_2 x_2^3 = \int_{-1}^{1} x^3 dx = 0$$

Therefore, solving the above equation we can easily get the following values:

$$w_1 = w_2 = 1 \ \& \ x_1 = \frac{-1}{\sqrt{3}}, \ x_2 = \frac{1}{\sqrt{3}}$$

We can say that this yield:

$$\int_{-1}^{1} f(x)dx = f\left(\frac{-1}{\sqrt{3}}\right) + f\left(\frac{1}{\sqrt{3}}\right)$$

Therefore we can infer that it has degree of precision equal to 3 since it integrates exactly all polynomials of degree ≤ 3.