Q3. (b)

| $x$ | 0 | $1/2$ | 1 |
|---|---|---|---|
| $y$ | 0 | $1/4$ | 1 |

lagrange interpolating polynomial,

$$l_0(x) = \frac{(x-1/2)(x-1)}{(-1/2)\cdot(-1)} = (2x-1)(x-1)$$

$$l_1(x) = \frac{(x-0)(x-1)}{1/2\cdot(1/2-1)} = -4x(x-1)$$

$$l_2(x) = \frac{(x-0)(x-1/2)}{1\cdot(1-1/2)} = x(2x-1)$$

$$\therefore P(x) = 0\cdot l_0(x) + 1/4\cdot l_1(x) + 1\cdot l_2(x)$$

$$= 0 + \frac{1}{4}(-4x)(x-1) + x(2x-1)$$

$$= -x^2 + x + 2x^2 - x$$

$$= x^2$$

$\therefore$ Expected answer $P(x) = x^2$