

$$\begin{aligned}
 a) \quad \int_0^1 \int_0^1 \frac{12}{7} (xy + y^2) dx dy &= \frac{12}{7} \int_0^1 \int_0^1 xy + y^2 dx dy \\
 &= \frac{12}{7} \int_0^1 \left[\frac{x^2 y}{2} + xy^2 \right]_0^1 dy = \frac{12}{7} \int_0^1 \frac{y}{2} + y^2 dy \\
 &= \frac{12}{7} \left[\frac{y^2}{4} + \frac{y^3}{3} \right]_0^1 = \frac{12}{7} \left[\frac{1}{4} + \frac{1}{3} \right] = \boxed{1}
 \end{aligned}$$

Answer

$$\begin{aligned}
 b) \quad f_x(x) &= \int_0^1 \frac{12}{7} (xy + y^2) dy = \frac{12}{7} \int_0^1 xy + y^2 dy \\
 &= \frac{12}{7} \left[\frac{xy^2}{2} + \frac{y^3}{3} \right]_0^1 = \frac{12}{7} \left(\frac{x}{2} + \frac{1}{3} \right) \\
 &= \frac{12x}{14} + \frac{12}{21} = \boxed{\frac{6x}{7} + \frac{4}{7}} \quad \text{answer}
 \end{aligned}$$

$$\begin{aligned}
 f_y(y) &= \int_0^1 \frac{12}{7} (xy + y^2) dx = \frac{12}{7} \int_0^1 xy + y^2 dx \\
 &= \frac{12}{7} \left[\frac{x^2 y}{2} + xy^2 \right]_0^1 = \boxed{\frac{12}{7} (y + y^2)} \quad \text{answer}
 \end{aligned}$$