

$$(29) \quad y = 4 - x^2 - 4z^2 \quad y = 0$$

$$z = \pm \sqrt{1 - \frac{x^2}{4} - \frac{y}{4}}$$

Type I

$$x = \pm \sqrt{4 - y - 4z^2}$$

$dz \, dy \, dx$

$$E = \{ (x, y, z) \mid x \in [-2, 2] \wedge y \in [0, 4 - x^2] \wedge z \in \left[-\sqrt{1 - \frac{x^2}{4} - \frac{y}{4}}, \sqrt{1 - \frac{x^2}{4} - \frac{y}{4}} \right] \}$$

$$(a) \int_{-2}^2 \int_0^{4-x^2} \int_{-\sqrt{1-\frac{x^2}{4}-\frac{y}{4}}}^{\sqrt{1-\frac{x^2}{4}-\frac{y}{4}}} f(x, y, z) \, dz \, dy \, dx$$

$dz \, dx \, dy$

$$E = \{ (x, y, z) \mid y \in [0, 4] \wedge x \in [-\sqrt{4-y}, \sqrt{4-y}] \wedge z \in \left[-\sqrt{1 - \frac{x^2}{4} - \frac{y}{4}}, \sqrt{1 - \frac{x^2}{4} - \frac{y}{4}} \right] \}$$

$$(b) \int_0^4 \int_{-\sqrt{4-y}}^{\sqrt{4-y}} \int_{-\sqrt{1-\frac{x^2}{4}-\frac{y}{4}}}^{\sqrt{1-\frac{x^2}{4}-\frac{y}{4}}} f(x, y, z) \, dz \, dx \, dy$$

Type II

$dx \, dy \, dz$

$$E = \{ (x, y, z) \mid z \in [-1, 1] \wedge y \in [0, 4 - 4z^2] \wedge x \in [-\sqrt{4-y-4z^2}, \sqrt{4-y-4z^2}] \}$$

$$(c) \int_{-1}^1 \int_0^{4-4z^2} \int_{-\sqrt{4-y-4z^2}}^{\sqrt{4-y-4z^2}} f(x, y, z) \, dx \, dy \, dz$$

$dx \, dz \, dy$

$$E = \{ (x, y, z) \mid y \in [0, 4] \wedge z \in \left[-\sqrt{1 - \frac{y}{4}}, \sqrt{1 - \frac{y}{4}} \right] \wedge x \in [-\sqrt{4-y-4z^2}, \sqrt{4-y-4z^2}] \}$$

$$(d) \int_0^4 \int_{-\sqrt{1-\frac{y}{4}}}^{\sqrt{1-\frac{y}{4}}} \int_{-\sqrt{4-y-4z^2}}^{\sqrt{4-y-4z^2}} f(x, y, z) \, dx \, dz \, dy$$