

4) Area Between $g(y) = 3 - y^2$
and $f(y) = y + 1$

$$x = 3 - y^2 \rightarrow y^2 = -x + 3$$

$$x = y + 1 \rightarrow y = x - 1$$

$$3 - y^2 = y + 1$$

$$y^2 + y - 2 = 0$$

$$(y + 2)(y - 1) = 0$$

$$y = -2, 1$$

$$y = 1$$

$$\int_{y=-2}^{y=1} (3 - y^2 - y - 1) dy$$

$$y = -2$$

$$= \int_{-2}^1 (-y^2 - y + 2) dy = -\frac{y^3}{3} - \frac{y^2}{2} + 2y \Big|_{-2}^1$$

$$= -\frac{1}{3} - \frac{1}{2} + 2 - \left(\frac{8}{3} - 2 - 4 \right)$$

$$= -\frac{2}{6} - \frac{3}{6} + \frac{12}{6} - \frac{16}{6} + \frac{12}{6} + \frac{24}{6}$$

$$\frac{27}{6} = \boxed{\frac{9}{2} \text{ units}^2}$$

