(17) $y_1 = x,\ y_2 = 2 - x,\ y_3 = 0$

$x = 2 - x \Rightarrow x = 1$ (This is the intersection of $y_1$ and $y_2$)

$x = 0$ (intersection of $y_1$ and $y_3$); $2 - x = 0 \Rightarrow x = 2$ (intersection of $y_2$ and $y_3$)

$$\int_0^1 x\,dx + \int_1^2 (2-x)\,dx = \left[\frac{1}{2}x^2\right]_0^1 + \left[2x - \frac{1}{2}x^2\right]_1^2 = 1$$

(19) $f(x) = \sqrt{3x} + 1,\qquad g(x) = x + 1$

$$f(x) = g(x) \Leftrightarrow \sqrt{3x} + 1 = x + 1 \Leftrightarrow \sqrt{3x} = x \Leftrightarrow 3x = x^2 \Leftrightarrow -\left(x^2 - 3x + \frac{9}{4}\right) = \frac{9}{4}$$

$$\Leftrightarrow \left(\frac{3}{2} - x\right)^2 = \frac{9}{4} \Leftrightarrow \frac{3}{2} - x = \pm\frac{3}{2} \Leftrightarrow x = -\frac{3}{2} \pm \frac{3}{2}$$

$\therefore\ x = 0,\ x = 3$

$$\int_0^3 \left((\sqrt{3x} + 1) - (x+1)\right)dx = \int_0^3 \left(\sqrt{3x} - x\right)dx = \left[\frac{2\sqrt{3}}{3}x^{(3/2)} - \frac{1}{2}x^2\right]_0^3 = \frac{3}{2}$$

(21) $f(y) = y^2,\qquad g(y) = y + 2$

$f(y) = g(y) \Leftrightarrow y^2 = y + 2 \Leftrightarrow= y^2 - y - 2 = 0 \Leftrightarrow (y-2)(y+1) = 0$

$\therefore\ y = -1,\ y = 2$

$$\int_{-1}^2 \left((y+2) - y^2\right)dy = \int_{-1}^2 \left(-y^2 + y + 2\right)dy = \left[-\frac{1}{3}y^3 + \frac{1}{2}y^2 + 2y\right]_{-1}^2 = \frac{9}{2}$$

(23) $f(y) = y^2 + 1,\ g(y) = 0,\ y = -1,\ y = 2$

$f(-1) = 2$ and $f(2) = 5 \Rightarrow x = 2$ and $x = 5$ as points of intersection

$\therefore\ y^2 + 1 = 2 \Rightarrow y = \pm 1 \Rightarrow y = -1$

$\therefore\ y^2 + 1 = 5 \Rightarrow y = 2$

$$\therefore \int_{-1}^2 (y^2 + 1)\,dx = \left[\frac{1}{3}y^3 + y\right]_{-1}^2 = 6$$

(25) $f(x) = \dfrac{4}{x},\ x = 0,\ y = 1,\ y = 4$

$\dfrac{4}{x} = 1 \Rightarrow 4 = x;$ $\dfrac{4}{x} = 4 \Rightarrow x = 1$

$$4\int_1^4 \left(\frac{1}{x}\right)dx = 4\left[\ln|x|\right]_1^4 = 4\left[\ln 4 - \ln 1\right] = 4\ln 4 = 8\ln 2$$