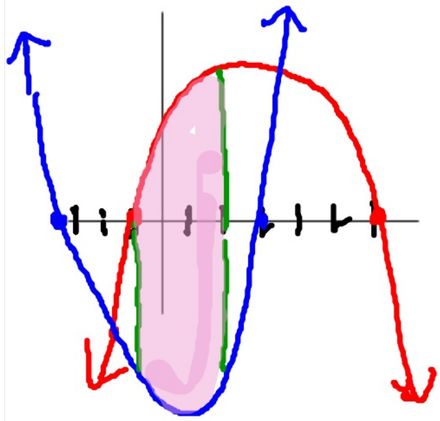
Sketch the graphs, shade the bounded region and find the area bounded by the given expressions.

1) $f(x) = -x^2 + 5x + 6$, $g(x) = x^2 + x - 12$, and x = -1 and x = 2



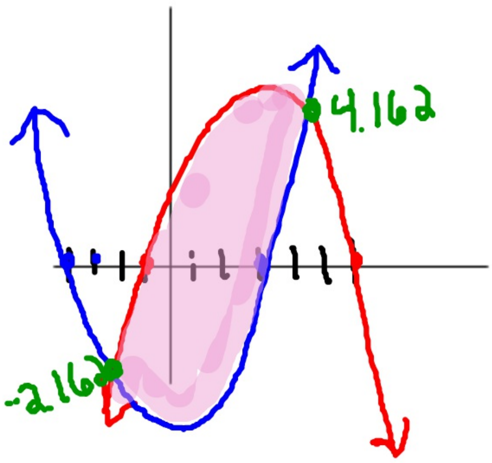
$$\int_{-1}^{2} (-x^2+5x+6)-(x^2+x-12)\,dx$$

$$\int_{-1}^{2} (-x^2+5x+6-x^2-x+12)\,dx$$

$$\int_{-1}^{2} (-2x^2+4x+18)\,dx$$

$$\boxed{=54u^2}$$

2) $f(x) = -x^2 + 5x + 6$, $g(x) = x^2 + x - 12$

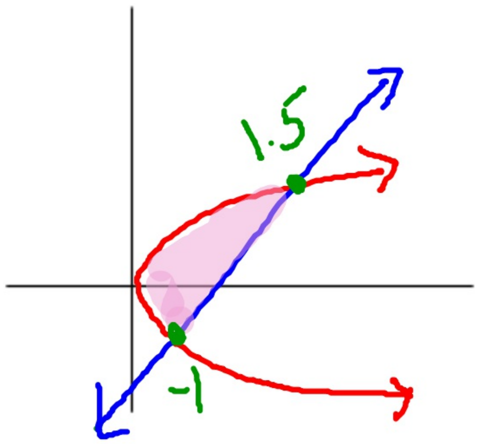


$$\int_{-2.162}^{4.162} (-x^2+5x+6)-(x^2+x-12)\,dx$$

$$\int_{-2.162}^{4.162} (-2x^2+4x+18)\,dx$$

$$= \boxed{84.327u^2}$$

3) $y^2 = x$, $y = 2x - 3$



$y = \pm\sqrt{x}$

$y = 2x - 3$

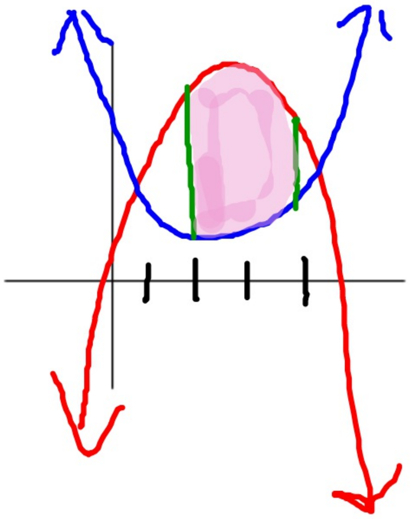
$y + 3 = 2x$

$\frac{1}{2}y + \frac{3}{2} = x$

$$\int_{-1}^{1.5} \left(\frac{1}{2}y + \frac{3}{2}\right) - y^2 \, dy$$

$$\boxed{2.604u^2}$$

4) $y = -x^2 + 6x - 3, \quad y = x^2 - 6x + 10, \quad x = 2, \quad and \quad x = 4$

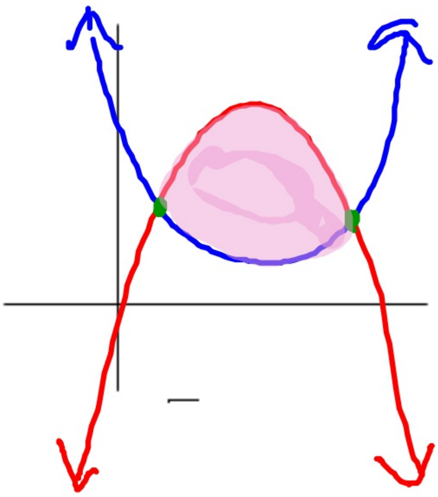


$$\int_2^4 (-x^2+6x-3)-(x^2-6x+10)\,dx$$

$$\int_2^4 (-2x^2+12x-13)\,dx$$

$8.667u^2$

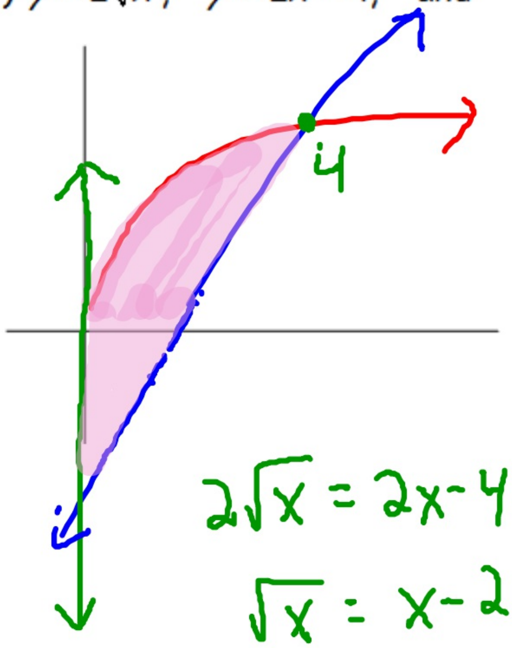
5) $y=-x^2+6x-3$ *and* $y=x^2-6x+10$



$$\int_{1.419}^{4.582}\left(-2x^2+12x-13\right)dx$$

$$\boxed{10.541\,u^2}$$

6) $y = 2\sqrt{x}, \quad y = 2x - 4, \quad and \quad x = 0$



$$\int_0^4 2\sqrt{x} - (2x-4)\,dx$$

$$\boxed{10.667\,u^2}$$

$$2\sqrt{x} = 2x - 4$$

$$\sqrt{x} = x - 2$$

$$x = x^2 - 4x + 4$$

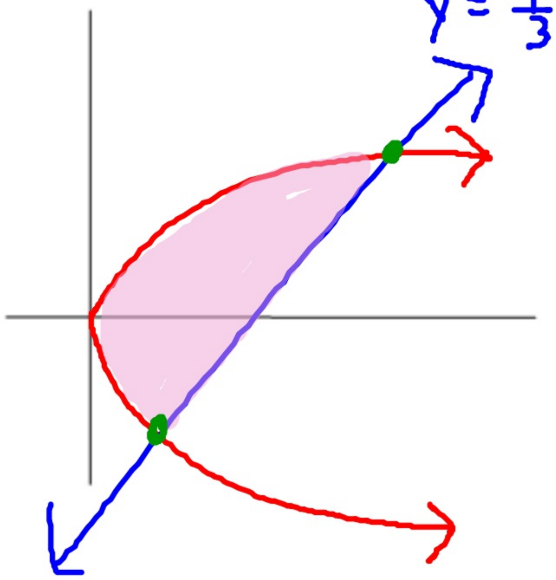
$$x^2 - 5x + 4 = 0$$

$$(x-4)(x-1) = 0$$

$$x = 4, \cancel{1}$$

7) $y^2 = 4x$ and $4x - 3y = 16$

$y = \frac{4}{3}x - \frac{16}{3}$



$$\int_{-2.772}^{5.772} \left((.75y + 4) - \frac{1}{4}y^2 \right) dy$$

$25.988u^2$

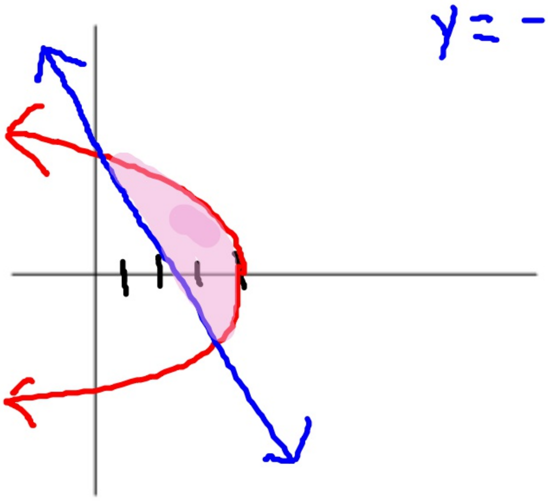
$\frac{y^2}{4} = x$

$4x = 3y + 16$

$x = \frac{3}{4}y + 4$

8) $x = 4 - y^2$ *and* $x + y - 2 = 0$

$y = -x + 2$



$$\int_{-1}^{2} (4 - y^2) - (-y + 2)\, dy$$

$$\boxed{4.5\,u^2}$$

$-x + 4 = y^2$

$y = \pm\sqrt{-x+4}$