(10.) a) $\displaystyle\int_{-4}\sqrt{2x+17}\,dx = \int_{-4}(2x+17)^{\frac{1}{2}}\,dx$ $\quad\left\{ u(x) = x^{\frac{1}{2}} \quad s(x) = 2x+17 \quad s'(x) = 2\right.$

$$= \frac{1}{2}\int_{-4}^{4} 2(2x+17)^{\frac{1}{2}}\,dx = \frac{1}{2}\Big/_{-4}^{4}\left[\frac{2}{3}(2x+17)^{\frac{3}{2}}\right]$$

$$= \frac{1}{2}\cdot\frac{2}{3}\left[(2\cdot 4+17)^{\frac{3}{2}} - (2\cdot(-4)+17)^{\frac{3}{2}}\right] = \frac{1}{3}\left(25^{\frac{3}{2}} - 9^{\frac{3}{2}}\right) = \frac{1}{3}(125-27) = 32\frac{2}{3}$$

b) Jatkuvan funktion itseisarvofunktio on jatkuva

$$|8-4x| = \begin{cases} 8-4x & \text{, kun } x \le 2 \\ -(8+4x) & \text{, kun } x > 2 \end{cases} \qquad \begin{aligned} 8-4x &= 0 \\ x &= 2 \end{aligned}$$

$$\int_0^3 |8-4x|\,dx = \int_0^2 (8-4x)\,dx + \int_2^3 (-8+4x)\,dx = \Big/_0^2 (8x-2x^2) + \Big/_2^3 (-8x+2x^2)$$

$$= 8\cdot 2 - 2\cdot 2^2 - 0 + (-8\cdot 3 + 2\cdot 3^2) - (-8\cdot 2 + 2\cdot 2^2) = 10$$

(11.) $\displaystyle\int_2^a (x-3)\,dx = \Big/_2^a \left(\frac{1}{2}x^2 - 3x\right) = \frac{1}{2}a^2 - 3\cdot a - \left(\frac{1}{2}\cdot 2^2 - 3\cdot 2\right) = \frac{1}{2}a^2 - 3a + 4$

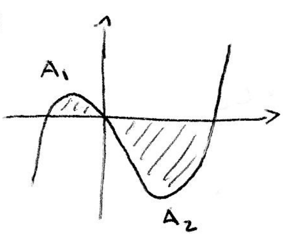
$\displaystyle\int_2^a (x-3)\,dx = 7\frac{1}{2}$

$\frac{1}{2}a^2 - 3a + 4 = 7\frac{1}{2}$

$\frac{1}{2}a^2 - 3a - 3\frac{1}{2} = 0$ (CAS-laskin)

$a = -1$ tai $a = 7$

(12.)



Integroimisrajat:

$$\begin{cases} y = x^3 - x^2 - 2x \\ y = 0 \end{cases}$$

$x^3 - x^2 - 2x = 0$

$x(x^2 - x - 2) = 0$

$x = 0$ TAI $x^2 - x - 2 = 0$ (CAS-laskin)

$x = -1$ tai $x = 2$

$$A_1 = \int_{-1}^{0} (x^3 - x^2 - 2x)\,dx = \Big/_{-1}^{0}\left(\frac{1}{4}x^4 - \frac{1}{3}x^3 - x^2\right) = 0 - \left(\frac{1}{4}(-1)^4 - \frac{1}{3}\cdot(-1)^3 - (-1)^2\right) = \frac{5}{12}$$

$$A_2 = \int_0^2 -(x^3 - x^2 - 2x)\,dx = \int_0^2 (-x^3 + x^2 + 2x)\,dx = \Big/_0^2\left(-\frac{1}{4}x^4 + \frac{1}{3}x^3 + x^2\right)$$

$$= -\frac{1}{4}\cdot 2^4 + \frac{1}{3}\cdot 2^3 + 2^2 - 0 = 2\frac{2}{3}$$

Kaksiosaisen alueen ala:

$$A = A_1 + A_2 = \frac{5}{12} + 2\frac{2}{3} = 3\frac{1}{12}$$