

Γ ΛΥΚΕΙΟΥ ΜΕΡΟΣ Β

32.3 1)

$$\begin{aligned} E &= \int_2^7 |f(x) - g(x)| dx = \int_2^7 |(3x+2) - (x-1)| dx = \int_2^7 |3x+2-x+1| dx = \\ &= \int_2^7 |2x+3| dx \stackrel{2 < x < 7 \Rightarrow 2x+3 > 0}{=} \int_2^7 (2x+3) dx = \left[x^2 + 3x \right]_2^7 = 7^2 + 3 \cdot 7 - (2^2 + 3 \cdot 2) = \\ &= 49 + 21 - 4 - 6 = \boxed{60} \end{aligned}$$

32.3 2)

$$\begin{aligned} E &= \int_2^6 |f(x) - g(x)| dx = \int_2^6 |(4x+3) - (3x-5)| dx = \int_2^6 |4x+3-3x+5| dx = \\ &= \int_2^6 |x+8| dx \stackrel{2 < x < 8 \Rightarrow x+8 > 0}{=} \int_2^6 (x+8) dx = \left[\frac{x^2}{2} + 8x \right]_2^6 = \frac{6^2}{2} + 8 \cdot 6 - \left(\frac{2^2}{2} + 8 \cdot 2 \right) = \\ &= 18 + 48 - 18 = 48 \end{aligned}$$

32.3 3)

$$\begin{aligned} E &= \int_{-4}^0 |f(x) - g(x)| dx = \int_{-4}^0 |(5x+1) - (2x-5)| dx = \int_{-4}^0 |5x+1-2x+5| dx = \\ &= \int_{-4}^0 |3x+6| dx \stackrel{\substack{3x+6 > 0 \Leftrightarrow x > -2 \\ 3x+6 < 0 \Leftrightarrow x < -2}}{=} \int_{-4}^{-2} |3x+6| dx + \int_{-2}^0 |3x+6| dx = \\ &= \int_{-4}^{-2} (-3x-6) dx + \int_{-2}^0 (3x+6) dx = \left[-\frac{3x^2}{2} - 6x \right]_{-4}^{-2} + \left[\frac{3x^2}{2} + 6x \right]_{-2}^0 = \\ &= -\frac{3(-2)^2}{2} - 6(-2) - \left(-\frac{3(-4)^2}{2} - 6(-4) \right) + \frac{3 \cdot 0^2}{2} + 6 \cdot 0 - \left(\frac{3(-2)^2}{2} + 6(-2) \right) = \\ &= -6 + 12 - (-24 + 24) - (6 - 12) = 12 \end{aligned}$$

32.3 4)

$$\begin{aligned} E &= \int_0^3 |f(x) - g(x)| dx = \int_0^3 |(x^2+4) - 3| dx = \int_0^3 |x^2+1| dx \stackrel{x^2+1 > 0}{=} \int_0^3 (x^2+1) dx = \\ &= \left[\frac{x^3}{3} + x \right]_0^3 = \frac{3^3}{3} + 3 - \left(\frac{0^3}{3} + 0 \right) = 12 \end{aligned}$$