

$$\int_0^1 f(x) + g(x) dx$$

$$\int_0^1 f(x) dx = -2$$

$$-2 - \frac{\pi}{4} \approx -2.785$$

$$(a) \int_0^1 g(x) dx = -\frac{\pi}{4}$$

$$(b) \int_1^4 2f(x) - 3g(x) dx$$

$$2 \int_1^4 f(x) dx - 3 \int_1^4 g(x) dx$$

$$2 \cdot \frac{-2(2)}{2} - 3 \left(\frac{1}{2}(-2) \left(\frac{1}{2} \right) + \frac{1}{2} \left(\frac{3}{2} \right) 2 + \pi \right)$$

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

$$-4 - 3(1 + \pi)$$

$$-4 - 3 - 3\pi$$

$$\boxed{-7 - 3\pi} \approx -16.425$$

$$\frac{1}{4} \cdot -16.425 \approx -4.106$$

① Skipped

$$\textcircled{2} \int_4^0 F(x) - g(x) dx$$
$$= \int_0^4 F(x) dx + \int_0^4 g(x) dx$$

$$= (-2 + -2 + 2)$$

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

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

$$2 + 1 + \frac{7\pi}{4} \rightarrow \boxed{3 + \frac{7\pi}{4}} \text{ or } 8.498$$

$$\frac{1}{4} \left(3 + \frac{7\pi}{4} \right) \text{ or } \left(\frac{3}{4} + \frac{7\pi}{16} \right) \text{ Average value}$$