

§ 7.9 関数の平均変化率

問題 7.9.1

$$\frac{f(b) - f(a)}{b - a} = \frac{-4b + 7 - (-4a + 7)}{b - a} = \frac{-4(b - a)}{b - a} = -4 .$$

問題 7.9.2

$$\begin{aligned} \frac{f(b) - f(a)}{b - a} &= \frac{-3b^2 + 4b + 5 - (-3a^2 + 4a + 5)}{b - a} = \frac{-3(b^2 - a^2) + 4(b - a)}{b - a} \\ &= \frac{-3(b + a)(b - a) + 4(b - a)}{b - a} \\ &= -3(a + b) + 4 . \end{aligned}$$

問題 7.9.3

$$\begin{aligned} \frac{f(b) - f(a)}{b - a} &= \frac{4b^3 - 4a^3}{b - a} = \frac{4(b^3 - a^3)}{b - a} = \frac{4(b - a)(b^2 + ba + a^2)}{b - a} \\ &= 4(a^2 + ab + b^2) . \end{aligned}$$