



$$(i) y = 6 - \frac{x}{6}$$

$$P\text{-おしり接線の方程式は } y - 3\sqrt{3} = \frac{1}{2}(x - 2\pi)$$

$$R\text{-おしり接線の方程式は } y = -(x - 6\pi)$$

$$-x + 6\pi - 3\sqrt{3} = \frac{1}{2}x - \pi, \quad \frac{3}{2}x = 7\pi - 3\sqrt{3}, \quad x = \frac{14}{3}\pi - 2\sqrt{3}$$

$$y = -\frac{14}{3}\pi + 2\sqrt{3} + 6\pi = \frac{4}{3}\pi + 2\sqrt{3} \neq 1$$

$$R\text{の座標は } \left(\frac{14}{3}\pi - 2\sqrt{3}, \frac{4}{3}\pi + 2\sqrt{3}\right)$$

$$(ii) \int_{2\pi}^{6\pi} 6 - \frac{x}{6} dx = 6 \left[-\frac{x}{6} \cdot 6 \right]_{2\pi}^{6\pi} = -36 \left(-1 - \frac{1}{2} \right) = 54$$

$$\text{上図の①の面積は } \frac{1}{2} \left(\frac{4}{3}\pi + 5\sqrt{3} \right) \left(\frac{14}{3}\pi - 2\sqrt{3} \right) = \frac{16}{9}\pi^2 - \frac{4\sqrt{3}}{3}\pi + \frac{20\sqrt{3}}{3}\pi - 15 = \frac{16}{9}\pi^2 + \frac{16\sqrt{3}}{3}\pi - 15$$

$$\text{②の面積は } \frac{1}{2} \left(\frac{14}{3}\pi + 2\sqrt{3} \right) \left(\frac{4}{3}\pi + 2\sqrt{3} \right) = \frac{8}{9}\pi^2 + \frac{4\sqrt{3}}{3}\pi + \frac{4\sqrt{3}}{3}\pi + 6 = \frac{8}{9}\pi^2 + \frac{8\sqrt{3}}{3}\pi + 6$$

$$\text{よって求める面積は } \frac{24}{9}\pi^2 + \frac{24\sqrt{3}}{3}\pi - 6 = \frac{8}{3}\pi^2 + 8\sqrt{3}\pi - 6$$