§6.4　三角比の性質

問題 6.4.1　$\sin\theta = \dfrac{4}{5}$　なので，　$(\cos\theta)^2 = 1-(\sin\theta)^2 = 1-\left(\dfrac{4}{5}\right)^2 = 1-\dfrac{16}{25} = \dfrac{9}{25}$ ，
$\cos\theta = \pm\sqrt{\dfrac{9}{25}} = \pm\dfrac{3}{5}$ ．　$\cos\theta \leq 0$ なので $\cos\theta = -\dfrac{3}{5}$ ．更に，$\tan\theta = \dfrac{\sin\theta}{\cos\theta} = \dfrac{4}{5}\Big/\left(-\dfrac{3}{5}\right) = -\dfrac{4}{3}$ ．

問題 6.4.2　$\cos\theta = \dfrac{1}{3}$　なので，　$(\sin\theta)^2 = 1-(\cos\theta)^2 = 1-\left(\dfrac{1}{3}\right)^2 = 1-\dfrac{1}{9} = \dfrac{8}{9}$ ，
$\sin\theta = \pm\sqrt{\dfrac{8}{9}} = \pm\dfrac{\sqrt{8}}{3}$ ．　$\sin\theta \geq 0$ なので $\sin\theta = \dfrac{\sqrt{8}}{3}$ ．更に，$\tan\theta = \dfrac{\sin\theta}{\cos\theta} = \dfrac{\sqrt{8}}{3}\Big/\dfrac{1}{3} = \sqrt{8}$ ．

問題 6.4.3　$1+(\tan\theta)^2 = \dfrac{1}{(\cos\theta)^2}$　なので,

$$\frac{1}{(\cos\theta)^2} = 1+(\tan\theta)^2 = 1+\left(\frac{3}{2}\right) = \frac{13}{4} \ ,$$

$$(\cos\theta)^2 = \frac{4}{13} \ ,$$

$$\cos\theta = \pm\sqrt{\frac{4}{13}} = \pm\frac{2}{\sqrt{13}} \ ,$$

$\cos\theta \leq 0$ なので $\cos\theta = -\dfrac{2}{\sqrt{13}}$ ．　更に，　$\tan\theta = \dfrac{\sin\theta}{\cos\theta}$　なので,

$$\sin\theta = \tan\theta\cos\theta = \frac{3}{2}\cdot\left(-\frac{2}{\sqrt{13}}\right) = -\frac{3}{\sqrt{13}} \ .$$

問題 6.4.4

$$\mathrm{P} = \left(\frac{4}{3}\cos 60^\circ, \frac{4}{3}\sin 60^\circ\right) = \left(\frac{4}{3}\frac{1}{2}, \frac{4}{3}\frac{\sqrt{3}}{2}\right) = \left(\frac{2}{3}, \frac{2\sqrt{3}}{3}\right) \ .$$