

高一年级数学《三角函数的概念》拓展作业答案

1. $-\frac{3}{5}, -\frac{7}{25}$ 2. $-\frac{3}{5}$ 3. $\frac{4}{3}, \frac{3}{5}$

4. $\because \sin(2k\pi + \alpha) = -\frac{3}{5}, \therefore \sin \alpha = -\frac{3}{5}$, 又角 α 的终边过点 $P(3, -4t)$, 故 $\sin \alpha = \frac{-4t}{\sqrt{9+16t^2}} = -$

$\frac{3}{5}$, 解得 $t = \frac{9}{16}$ (负值舍去).

5. 解: 由题知 $\cos \alpha = \frac{3}{5}, \sin \beta = \frac{12}{13}$, 因为锐角 α 和钝角 β

所以 $\sin \alpha = \frac{4}{5}, \cos \beta = -\frac{5}{13}$

所以 $\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta = \frac{33}{65}$

6. (1) 解: 由三角函数定义, 得 $x_1 = \cos \alpha, x_2 = \cos(\alpha + \frac{\pi}{3})$

因为 $\alpha \in (\frac{\pi}{6}, \frac{\pi}{2}), \cos \alpha = \frac{1}{3}$,

所以 $\sin \alpha = \sqrt{1 - \cos^2 \alpha} = \frac{2\sqrt{2}}{3}$

所以 $x_2 = \cos(\alpha + \frac{\pi}{3}) = \frac{1}{2} \cos \alpha - \frac{\sqrt{3}}{2} \sin \alpha = \frac{1 - 2\sqrt{6}}{6}$

(2) 解: 依题意得 $y_1 = \sin \alpha, y_2 = \sin(\alpha + \frac{\pi}{3})$.

所以 $S_1 = \frac{1}{2} x_1 y_1 = \frac{1}{2} \cos \alpha \cdot \sin \alpha = \frac{1}{4} \sin 2\alpha$,

$S_2 = \frac{1}{2} |x_2| |y_2| = \frac{1}{2} [-\cos(\alpha + \frac{\pi}{3})] \cdot \sin(\alpha + \frac{\pi}{3}) = -\frac{1}{4} \sin(2\alpha + \frac{2\pi}{3})$

依题意得 $\sin 2\alpha = -2 \sin(2\alpha + \frac{2\pi}{3})$, 整理得 $\cos 2\alpha = 0$

因为 $\frac{\pi}{6} < \alpha < \frac{\pi}{2}$, 所以 $\frac{\pi}{3} < 2\alpha < \pi$, 所以 $2\alpha = \frac{\pi}{2}$, 即 $\alpha = \frac{\pi}{4}$