

Question#29145

Use the given information to calculate the exact value of the expression
please help trig?

$$5. \cos x = -\frac{\sqrt{429}}{25} \quad \cos y = \frac{3}{5} \quad \sin x = \frac{14}{25} \quad \sin y = \frac{4}{5}$$

a. find $\cos(x+y)$ b. find $\tan(x-y)$ c. find $\sin(x-y)$

$$6. \cos a = -\frac{12}{16} \quad \frac{\pi}{2} \leq a \leq \pi \quad \text{and} \quad \sin b = \frac{6}{8} \quad \frac{\pi}{6} \leq b \leq \frac{3\pi}{2}$$

a. find $\sin(a-b)$ b. find $\cot(a+b)$ c. find $\cos(a-b)$

Solution:

5.

$$a. \cos(x+y) = \cos x \cos y - \sin x \sin y = -\frac{\sqrt{429}}{25} * \frac{3}{5} - \frac{14}{25} * \frac{4}{5} = -\frac{3\sqrt{429}+56}{125}$$

$$b. \tan x = \frac{\sin x}{\cos x} = \frac{\frac{14}{25}}{-\frac{\sqrt{429}}{25}} = -\frac{14 * 25}{25 * \sqrt{429}} = -\frac{14}{\sqrt{429}}$$

$$\tan y = \frac{\sin y}{\cos y} = \frac{\frac{4}{5}}{\frac{3}{5}} = \frac{4 * 5}{5 * 3} = \frac{4}{3}$$

$$\tan(x-y) = \frac{\tan x - \tan y}{1 + \tan x * \tan y} = \frac{-\frac{14}{\sqrt{429}} - \frac{4}{3}}{1 + \left(-\frac{14}{\sqrt{429}}\right) * \frac{4}{3}} = \frac{\frac{-42 - 4\sqrt{429}}{3\sqrt{429}}}{\frac{3\sqrt{429} - 56}{3\sqrt{429}}} = \frac{42 + 4\sqrt{429}}{56 - 3\sqrt{429}}$$

$$c. \sin(x-y) = \sin x \cos y - \cos x \sin y = \frac{14}{25} * \frac{3}{5} - \left(-\frac{\sqrt{429}}{25}\right) * \frac{4}{5} = \frac{42 + 4\sqrt{429}}{125}$$

$$6. \sin a = +\sqrt{1 - \cos^2 a} = \sqrt{1 - \left(-\frac{12}{16}\right)^2} = \sqrt{1 - \frac{144}{256}} = \sqrt{\frac{112}{256}} = \sqrt{\frac{7}{16}} = \frac{\sqrt{7}}{4}$$

$$\cos b = -\sqrt{1 - \sin^2 b} = -\sqrt{1 - \left(\frac{6}{8}\right)^2} = -\sqrt{1 - \frac{36}{64}} = -\sqrt{\frac{28}{64}} = -\frac{\sqrt{7}}{4}$$

6.a

$$\sin(a-b) = \sin a \cos b - \cos a \sin b = \frac{\sqrt{7}}{4} * \left(-\frac{\sqrt{7}}{4}\right) - \left(-\frac{12}{16}\right) * \frac{6}{8} = \frac{-56 + 72}{16 * 8} = \frac{16}{16 * 8} = \frac{1}{8}$$

6.b

$$\cot a = \frac{\cos a}{\sin a} = \frac{-\frac{12}{16}}{\frac{\sqrt{7}}{4}} = -\frac{3}{\sqrt{7}}$$

$$\cot b = \frac{\cos b}{\sin b} = \frac{-\frac{\sqrt{7}}{4}}{\frac{6}{8}} = -\frac{\sqrt{7}}{3}$$

$$\cot(a + b) = \frac{\cot a \cot b - 1}{\cot a + \cot b} = \frac{-\frac{3}{\sqrt{7}} * \left(-\frac{\sqrt{7}}{3}\right) - 1}{-\frac{3}{\sqrt{7}} + \left(-\frac{\sqrt{7}}{3}\right)} = 0$$

6.c

$$\cos(a - b) = \cos a \cos b + \sin a \sin b = -\frac{12}{16} * \left(-\frac{\sqrt{7}}{4}\right) + \frac{\sqrt{7}}{4} * \frac{6}{8} = \frac{24\sqrt{7}}{16*4} = \frac{3\sqrt{7}}{8}$$