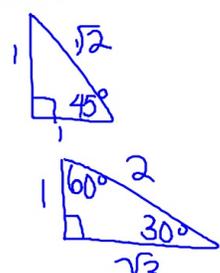trig. std. 10.0

⭐ identities 4-9 on trig identities list

NO CALCULATORS

Examples: find _exact_ values in simplest form.

1️⃣ $\sin 15° = \sin(\underset{\alpha}{45°} - \underset{\beta}{30°})$

$= \sin 45° \cos 30° - \cos 45° \sin 30°$

$\dfrac{\sqrt{2}}{2} \cdot \dfrac{\sqrt{3}}{2} - \dfrac{\sqrt{2}}{2} \cdot \dfrac{1}{2} = \dfrac{\sqrt{6} - \sqrt{2}}{4}$

2️⃣ $\cos 105° = \cos(\overset{\alpha}{45°} + \overset{\beta}{60°})$

$= \cos 45° \cos 60° - \sin 45° \sin 60°$

$\dfrac{\sqrt{2}}{2} \cdot \dfrac{1}{2} - \dfrac{\sqrt{2}}{2} \cdot \dfrac{\sqrt{3}}{2} = \dfrac{\sqrt{2} - \sqrt{6}}{4}$

3 $\tan 285° \overset{Q4\ -}{=} \overset{Q1\ +}{-\tan 75°} = -\left(\dfrac{\tan 30° + \tan 45°}{1 - \tan 30° \tan 45°}\right)$

$-\tan(30°+45°)$

$\boxed{-2-\sqrt{3}}$

$\tan(240°+45°)$

$= -\left(\dfrac{\frac{\sqrt{3}}{3} + 1}{1 - \left(\frac{\sqrt{3}}{3}\cdot 1\right)}\right) \begin{smallmatrix}3\\[2pt]3\end{smallmatrix}$
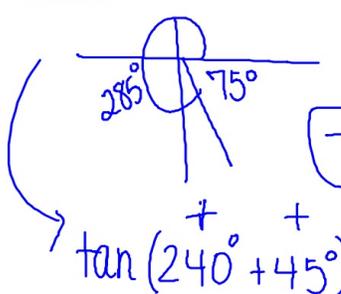
$= \dfrac{-\left(\sqrt{3} + 3\right)}{\left(3 - \sqrt{3}\right)} \cdot \dfrac{\left(\sqrt{3}+3\right)}{\left(3+\sqrt{3}\right)}$
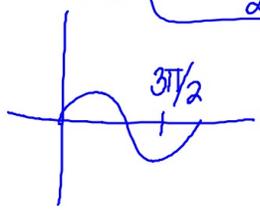
$= \dfrac{-(3 + 6\sqrt{3} + 9)}{9 - 3} = \dfrac{-12 - 6\sqrt{3}}{6}$

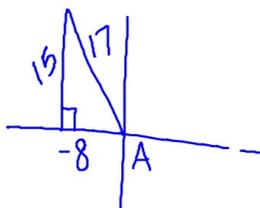**Examples: simplify to a trig function of a single angle and find the exact value.**

4 $\underset{\alpha}{\overset{\alpha}{\dfrac{\tan 80°}{1+\tan 80°}}} \underset{\beta}{\overset{\beta}{\dfrac{-\tan 20°}{\tan 20°}}} = \tan(80° - 20°) = \boxed{\tan 60° = \sqrt{3}}$

5 $\sin \overset{\alpha}{\pi} \cos \overset{\beta}{\dfrac{\pi}{2}} + \cos \overset{\alpha}{\pi} \sin \overset{\beta}{\dfrac{\pi}{2}} = \sin\left(\pi + \dfrac{\pi}{2}\right) = \boxed{\sin \dfrac{3\pi}{2} = -1}$

$3\pi/2$

6 Given: $\cos A = \dfrac{-8}{17}$, $\dfrac{\pi}{2} < A \le \pi$ *and* $\tan B = \dfrac{4}{3}$, $0 \le B < \dfrac{\pi}{2}$

Q2 ⌢ · · Q1

Find exact value of $\tan(A - B)$. $= \dfrac{77}{36}$

$$= \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$= \dfrac{\left[-\dfrac{15}{8} - \dfrac{4}{3}\right] 24}{\left[1 + \left(\dfrac{-15}{8} \cdot \dfrac{4}{3}\right)\right] 24}$$

$$\dfrac{-45 - 32}{24}$$