Trig 7.3

Use sum and difference identities for sin, cos, tan

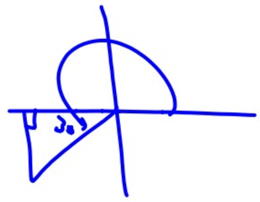
sum $+$

difference $-$

verify (an identity)

exact values 30-60-45-0-90-180-220

reference triangles (if not in Quadrant-1)



Sum and Difference Identities for the Cosine Function

If α and β represent the measures of two angles, then the following identities hold for all values of α and β.

$$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$$

Sum and Difference Identities for the Sine Function	If α and β represent the measures of two angles, then the following identities hold for all values of α and β. $$\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$$

Use sum or difference identities to find the exact value of each trigonometric function.

5. $\cos 165°$

6. $\tan \frac{\pi}{12}$

7. $\sec 795°$

cos

$\frac{1}{}$

Find the 1st quad. reference angle
Determine whether pos or neg answer

Sum and Difference Identities for the Tangent Function	If α and β represent the measures of two angles, then the following identities hold for all values of α and β. $\boxed{\tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}}$

You will be asked to derive these identities in Exercise 47.

Don't copy this all down, just watch

Will use but not derive the formula

$$\boxed{\tan x = \frac{\sin x}{\cos x}}$$

$$\tan(A+B) = \frac{\sin(A+B)}{\cos(A+B)}$$

$$= \frac{\dfrac{\sin A \cancel{\cos B}}{\cos A \cancel{\cos B}} + \dfrac{\cancel{\cos A} \sin B}{\cancel{\cos A} \cos B}}{\dfrac{\cancel{\cos A}\cancel{\cos B}}{\cancel{\cos A}\cancel{\cos B}} + \dfrac{\sin A \sin B}{\cos A \cos B}}$$

$$\tan(A+B) = \frac{\dfrac{\sin A}{\cos A} + \dfrac{\sin B}{\cos B}}{1 - \left(\dfrac{\sin A}{\cos A}\right)\left(\dfrac{\sin B}{\cos B}\right)} = \frac{\tan A + \tan B}{1 + \tan A \tan B}$$

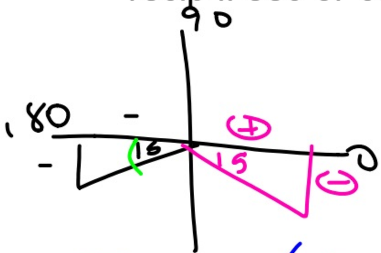
pos or neg if outside Q1
recip if sec or csc

14. cos 105°

15. sin 165°

17. sin $\frac{\pi}{12}$

18. tan 195°



$$\tan 15 = + \tan(\overset{A}{45} - \overset{B}{30})$$

$$= \frac{\tan 45 - \tan 30}{1 + \tan 45 \cdot \tan 30} = \frac{\left(1 - \frac{1}{\sqrt{3}}\right)}{\left(1 + 1 \cdot \frac{1}{\sqrt{3}}\right)} = \frac{\frac{\sqrt{3}-1}{\sqrt{3}}}{\frac{\sqrt{3}+1}{\sqrt{3}}} \qquad \frac{\sqrt{3}}{(\sqrt{3}+1)}$$

$$= \frac{(\sqrt{3}-1)}{(\sqrt{3}+1)} \cdot \frac{(\sqrt{3}-1)}{(\sqrt{3}-1)} = \frac{4 - 2\sqrt{3}}{2}$$

$$= \frac{4}{2} - \frac{2\sqrt{3}}{2}$$

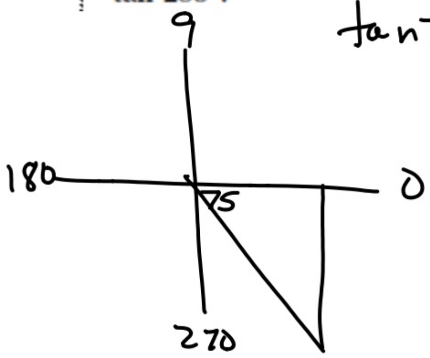
$$= \boxed{2 - \sqrt{3}}$$

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

$$\begin{array}{r} \sqrt{3}+1 \\ \sqrt{3}-1 \\ \hline -\sqrt{3} - 1 \\ 3 + \sqrt{3} \\ \hline 2 \end{array} \qquad \begin{array}{r} \sqrt{3}-1 \\ \sqrt{3}-1 \\ \hline -\sqrt{3} + 1 \\ 3 - \sqrt{3} \\ \hline 4 - 2\sqrt{3} \end{array}$$

5 **Use the sum or difference identity for tangent to find the exact value of tan 285°.**

tan 75 = tan(45+30)



WB 7.3

get both sides =
use appropriate + or - ident

Verify that each equation is an identity.

10. $\sin (90^\circ + A) = \cos A$

6 **Verify that $\csc\left(\frac{3\pi}{2} + A\right) = -\sec A$ is an identity.**