Accelerated Precalculus Name_____

4.13 Practice- Evaluating with Double Angle Identity

Use the figure to find the exact value of the trigonometric function.

1. $\tan 2\theta$

$\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$

$\tan 2\theta = \frac{2(3/4)}{1-(3/4)^2}$

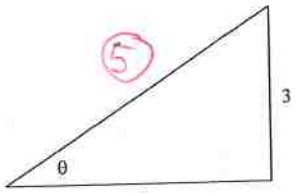
$\frac{3/2}{1-9/16}$

$= \boxed{\frac{24}{7}}$

2. $\csc 2\theta \rightarrow \frac{1}{\sin 2\theta}$

$\frac{1}{2\sin\theta\cos\theta}$

$\frac{1}{2(3/5)(4/5)} = \boxed{\frac{25}{24}}$



$\sin\theta = 3/5$

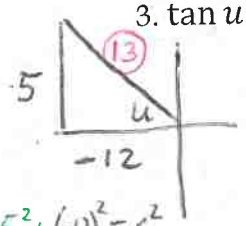
$\cos\theta = 4/5$

$\tan\theta = 3/4$

Find the exact values of **sin 2*u***, **cos 2*u***, and **tan 2*u*** using the double-angle formulas. In what quadrant does the angle **2*u*** have its terminal side?

3. $\tan u = -\frac{5}{12}, \frac{\pi}{2} < u < \pi$

Q2



$5^2 + (-12)^2 = c^2$

$c = 13$

$\sin 2u = 2\sin u\cos u$

$= 2\left(\frac{5}{13}\right)\left(\frac{-12}{13}\right)$

$= \frac{-120}{169}$

$\cos 2u = 2\cos^2 u - 1$

$\cos 2u = 2(\cos u)^2 - 1$

$\cos 2u = 2\left(\frac{-12}{13}\right)^2 - 1$

$= \frac{119}{169}$

$\tan 2u = \frac{2\tan\theta}{1-\tan^2\theta} \rightarrow \frac{2\left(\frac{-5}{12}\right)}{1-\left(\frac{-5}{12}\right)^2}$

sin 2*u* = $\frac{-120}{169}$

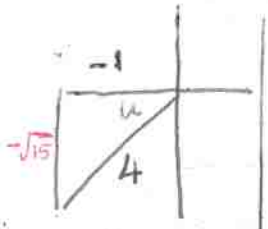
cos 2*u* = $\frac{119}{169}$

tan 2*u* = $\frac{-120}{119}$

Quadrant of 2*u* Q4

4. $\cos u = -\frac{1}{4}, \pi < u < \frac{3\pi}{2}$

Q3



$(-1)^2 + b^2 = 4^2$

$b = \sqrt{15}$

$\sin 2u = 2\sin u\cos u$

$= 2\left(\frac{-\sqrt{15}}{4}\right)\left(\frac{-1}{4}\right)$

$= \boxed{\frac{+2\sqrt{15}}{16}}$

$\cos 2u = 2\cos^2 u - 1$

$= 2\left(\frac{-1}{4}\right)^2 - 1 = \boxed{\frac{-7}{8}}$

$\tan 2u = \frac{2\tan u}{1-\tan^2 u} \rightarrow \frac{2(\sqrt{15})}{1-(\sqrt{15})^2}$

$= \frac{2\sqrt{15}}{1-15} = \frac{2\sqrt{15}}{-14} = \boxed{\frac{\sqrt{15}}{-7}}$

sin 2*u* = $\frac{+2\sqrt{15}}{16} = \boxed{\frac{\sqrt{15}}{8}}$

cos 2*u* = $\frac{-7/8}{}$

tan 2*u* = $\frac{\sqrt{15}/-7}{}$

Quadrant of 2*u* Q2

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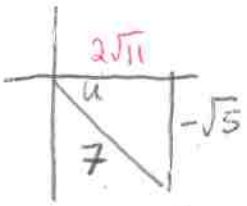
5. $\sin u = -\frac{\sqrt{5}}{7}$ and $\cos u > 0$ (~~QI~~ or Q4)



$(-\sqrt{5})^2 + b^2 = 7^2$

$b = \sqrt{44}$

$b = 2\sqrt{11}$

$\sin 2u = 2\sin u\cos u$

$= 2\left(\frac{-\sqrt{5}}{7}\right)\left(\frac{2\sqrt{11}}{7}\right)$

$= \boxed{\frac{-4\sqrt{55}}{49}}$

$\cos 2u = 2\cos^2 u - 1$

$= 2\left(\frac{2\sqrt{11}}{7}\right)^2 - 1 = \boxed{\frac{39}{49}}$

$\tan 2u = \frac{2\tan u}{1-\tan^2 u}$

$= 2\left(\frac{-\sqrt{5}}{2\sqrt{11}}\right) \Big/ 1-\left(\frac{-\sqrt{5}}{2\sqrt{11}}\right)^2 = \boxed{\frac{-4\sqrt{55}}{39}}$

sin 2*u* = $\frac{-4\sqrt{55}}{49}$

cos 2*u* = $\frac{39/49}{}$

tan 2*u* = $\frac{-4\sqrt{55}}{39}$

Quadrant of 2*u* Q4