PreCalculus

Name Tutor

More Double and Half Angle Identities WS

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1. Use a double angle identity to find the exact value of $cos450^o$.

✓: $\cos 450^\circ = \cos 90^\circ$ ← $450 - 360 = 90$

$\cos 450^\circ = \cos(2\cdot 225^\circ) = 2\cos^2(225^\circ) - 1 = 2\left(-\frac{\sqrt{2}}{2}\right)^2 - 1 = 0$

2. Use a half angle identity to find the exact value of $sin\frac{11\pi}{12}$.

$\sin\frac{11\pi}{12} = \sin\frac{\frac{11\pi}{6}}{2} = +\sqrt{\frac{1-\cos\frac{11\pi}{6}}{2}} = \sqrt{\frac{1-\frac{\sqrt{3}}{2}}{2}} = \sqrt{\frac{2-\sqrt{3}}{2}\cdot\frac{1}{2}} = \frac{\sqrt{2-\sqrt{3}}}{2}$

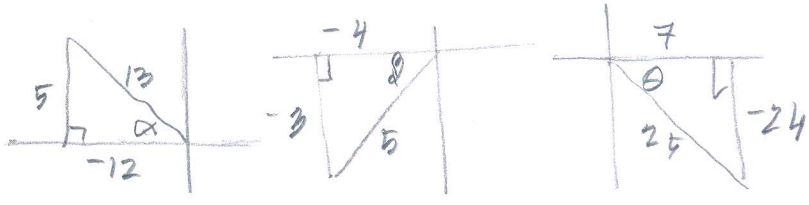
QII

Use the given information to find the exact values of each trig function below:

α is in quadrant II and $\csc\alpha = \frac{13}{5}$

β is in quadrant III and $\cot\beta = \frac{4}{3}$

θ is in quadrant IV and $\sec\theta = \frac{25}{7}$



* Show expansion, substitution, simplified answer.

3. $\sin 2\alpha = 2\sin\alpha\cos\alpha = 2\left(\frac{5}{13}\right)\left(-\frac{12}{13}\right) = \boxed{\frac{-120}{169}}$

4. $\tan 2\beta = \frac{2\tan\beta}{1-\tan^2\beta} = \frac{2\left(\frac{3}{4}\right)}{1-\frac{9}{16}} = \frac{\frac{3}{2}}{\frac{7}{16}} = \frac{3}{2}\cdot\frac{16}{7} = \boxed{\frac{24}{7}}$

5. $\cos 2\theta = \cos^2\theta - \sin^2\theta = \left(\frac{7}{25}\right)^2 - \left(\frac{-24}{25}\right)^2 = \frac{49}{625} - \frac{576}{625} = \boxed{\frac{-527}{625}}$

6. $\sin\frac{\beta}{2} = +\sqrt{\frac{1-\cos\beta}{2}} = \sqrt{\frac{1+\frac{4}{5}}{2}} = \sqrt{\frac{9}{5}\cdot\frac{1}{2}} = \frac{3}{\sqrt{10}} = \boxed{\frac{3\sqrt{10}}{10}}$

QII

7. $\cos\frac{\alpha}{2} = +\sqrt{\frac{1+\cos\alpha}{2}} = \sqrt{\frac{1+\frac{-12}{13}}{2}} = \sqrt{\frac{1}{13}\cdot\frac{1}{2}} = \frac{1}{\sqrt{26}} = \boxed{\frac{\sqrt{26}}{26}}$

QI

8. $\tan\frac{\theta}{2} = \frac{1-\cos\theta}{\sin\theta} = \frac{1-\frac{7}{25}}{\frac{-24}{25}} = \frac{18}{25}\cdot\left(\frac{25}{-24}\right) = \boxed{-\frac{3}{4}}$