

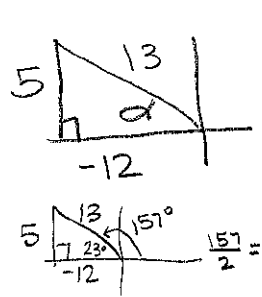
1. Use a double angle identity to find the exact value of $\cos 450^\circ = \cos(2 \cdot 225^\circ)$
 $\cos^2 \theta - \sin^2 \theta = \cos^2(225^\circ) - \sin^2(225^\circ) = \left(-\frac{\sqrt{2}}{2}\right)^2 - \left(-\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} - \frac{2}{4} = \boxed{0}$

* S/A
T/C

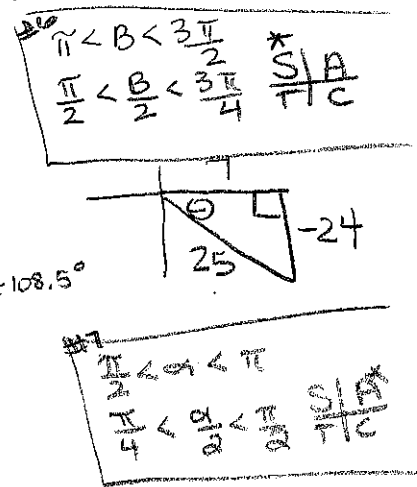
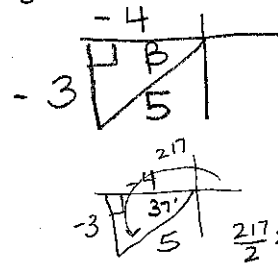
2. Use a half angle identity to find the exact value of $\sin \frac{11\pi}{12} = \sin\left(\frac{11\pi}{12} \cdot 2 \cdot \frac{11\pi}{6}\right) \sin\left(\frac{11\pi}{6}\right)$
 $\sqrt{\frac{1 - \cos \frac{11\pi}{6}}{2}} = \sqrt{\frac{1 - \sqrt{3}/2}{2}} = \sqrt{\frac{2 - \sqrt{3}}{2}} = \sqrt{\frac{2 - \sqrt{3}}{2} \cdot \frac{1}{2}} = \sqrt{\frac{2 - \sqrt{3}}{4}} = \boxed{\frac{\sqrt{2 - \sqrt{3}}}{2}}$

** Show the expansion, substitution, and simplified answer as separate steps! **

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 $\sec \theta = \frac{25}{7}$



3. $\sin 2\alpha = 2 \sin \alpha \cos \alpha = 2 \cdot \frac{5}{13} \cdot \frac{-12}{13} = \boxed{\frac{-120}{169}}$

4. $\tan 2\beta = \frac{2 \tan \beta}{1 - \tan^2 \beta} = \frac{2 \cdot \frac{3}{4}}{1 - \left(\frac{3}{4}\right)^2} = \frac{\frac{6}{4}}{\frac{16}{16} - \frac{9}{16}} = \frac{\frac{3}{2}}{\frac{7}{16}} = \frac{3}{2} \cdot \frac{16}{7} = \boxed{\frac{24}{7}}$

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

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

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

- Answers: 1) 0 2) $\frac{\sqrt{2 - \sqrt{3}}}{2}$ 3) $-\frac{120}{169}$ 4) $\frac{24}{7}$ 5) $-\frac{527}{625}$ 6) $\frac{3\sqrt{10}}{10}$ 7) $\frac{\sqrt{26}}{26}$ 8) $-\frac{3}{4}$