College Trigonometry (Spring 2020)   6.3, 6.4, and 6.6   **Practice Test #4**

**Show work to support all answers.**

1. If $\sin\alpha = -\frac{12}{13}$ and $\cos\beta = \frac{1}{6}$, $\alpha$ in $Q_4$ and $\beta$ in $Q_1$, find exact values (rationalize, if needed) for each of the following.
(Hint: You will need to find $\cos(\alpha)$ and $\sin(\beta)$. Use space below)

a. $\tan(\alpha + \beta)$

b. $\sin(2\alpha)$

c. $\cos(\frac{1}{2}\beta)$

d. $\tan(3\alpha)$

2. Find the exact value of each expression.

a. $sin\,(165°)$

b. $cos(-15°)$

c. $tan(75°)$.

3. Rewrite each as a function of $\beta$

a. $\mathbf{tan}(\pi - \beta)$

b. $\mathbf{cos}(\pi - \beta)$

c. $\sin(\beta - \pi)$

4. Find $\mathbf{sin}\,\boldsymbol{\theta}, \mathbf{cos}\,\boldsymbol{\theta}$ *and* $\mathbf{tan}\,\boldsymbol{\theta}$ for each.

a. $\cos(2\theta) = \frac{12}{13}$ when $2\theta$ is in Q4.

b. $\sin\left(\frac{\theta}{2}\right) = \frac{3}{5}$ when $\theta$ is in Q2.

5. Verify each of the following is an identity. (This is just a sample of verifying)

a. $\frac{\sin(2x-y)}{\sin(2x+y)} = \frac{tan2x-\tan y}{tan2x+\tan y}$

b. $\frac{\cos(2x)}{cos^2(x)} = sec^2(x) - tan^2(x)$

c. $sin^2\left(\frac{x}{2}\right) = \frac{sin^2(x)}{2+\sin(2x)\csc(x)}$

d. $\sin(\beta - \pi) = -\sin(\beta)$

6. Solve each of the following.

a. $2\,cos^3(\theta) = \cos(\theta)$ , where $0° \le \theta \le 360°$

b. $\cos(3\alpha) = -\frac{\sqrt{3}}{2}$ , where $0 \le \theta \le \pi$

c. $\cos(2x) = \frac{\sqrt{2}}{2}$ , all possible solutions

d. $2sin^2\beta + sin\beta - 1 = 0,$ all possible solutions

7. Given: $\sin\left(\frac{\theta}{2}\right)= -\frac{1}{2}$ and $\theta$ *is in* Q3, Find the exact values of the following:

Sin $(2\theta) =$ ___________

$\cos\left(\frac{\theta}{2}\right) =$ ______________

Cos $(2\theta) =$ ___________

Tan $(2\theta) =$ __________