

1. Suppose $\tan(\theta) = -\frac{7}{9}$ and $\frac{\pi}{2} < \theta < \pi$.

A. Sketch θ in standard position and label the reference triangle.

B. Use your work in part A to find the exact value of each of the following. If you use an identity, be sure to show it clearly.

$$\cos(2\theta) \quad \sin(2\theta) \quad \tan(2\theta) \quad \cos(2\pi + \theta) \quad \sin(-\theta)$$

$$\cos\left(\frac{\theta}{2}\right) \quad \sin\left(\frac{\theta}{2}\right) \quad \cos\left(\frac{\pi}{2} - \theta\right)$$

2. Simplify completely: $\frac{\sin(2\beta)}{\sin(\beta)} - \frac{\cos(2\beta)}{\cos(\beta)}$

3. A. Solve for t : $\cos^2(t)\sin(t) + \sin(t) = 0$ $0 \leq t \leq 2\pi$

B. Solve for x : $\frac{\cos\left(\frac{x}{2}\right)}{2 - \sin\left(\frac{x}{2}\right)} = 0$ $0 \leq x \leq \pi$

C. Solve for α : $\tan(3\alpha) = -1$ $0 \leq \alpha \leq \pi$

4. Find the exact value of each, if possible. If not possible, give a reason.

A. $\arcsin\left(-\frac{1}{2}\right)$

B. $\cos^{-1}(2\pi)$

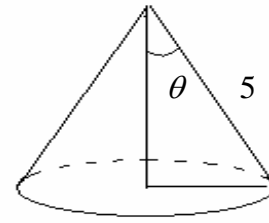
C. $\tan\left(\tan^{-1}\left(\frac{3}{4}\right)\right)$

D. $\arccos\left(\cos\left(\frac{5\pi}{4}\right)\right)$

E. $\tan\left(\arcsin\left(\frac{20}{29}\right)\right)$

F. $\sin\left(2\cos^{-1}\left(\frac{3}{8}\right)\right)$

5. If a cone has a slant height of 5 cm , express the volume of the cone as a function of θ .



6. An off shore oil rig is located at point A which is 10 miles from the coast. A pipeline is to be constructed from A to a point C on the shore and then to the oil refinery at point D . The distance between points B and D is 8 miles. If it costs \$8000 per mile to lay pipeline in the sea and \$2000 per mile on land, express the total cost of laying the pipeline as a function of θ .

