

(b) (6 pts)

$$y = (\tan(\sin(x)))^3$$

3. (5 pts) Solve the equation for all values of θ in the interval $[0, 2\pi]$:

$$\cos(\theta/2) - \cos(\theta) = 1.$$

~~Final~~
so
 $\theta = \pi, 3\pi$
OR
 $\theta = \frac{2\pi}{3}, \frac{10\pi}{3}$
only π
 $+ 2\pi$
 $\frac{3}$
in $[0, 2\pi]$
so final answer
 $\theta = \pi, \frac{2\pi}{3}$

else identity that ~~$\cos \theta = 2\cos^2 \frac{\theta}{2} - 1$~~
 $\cos^2\left(\frac{\theta}{2}\right) = \frac{1 + \cos \theta}{2}$, so $2\cos^2 \frac{\theta}{2} - 1 = \cos \theta$

$$\therefore \cos\left(\frac{\theta}{2}\right) - \cos \theta = 1$$

Replacing $\cos \theta = 2\cos^2 \frac{\theta}{2} - 1$

$$\Rightarrow \cos\left(\frac{\theta}{2}\right) - \left(2\cos^2 \frac{\theta}{2} - 1\right) = 1$$

$$\Rightarrow \cos \frac{\theta}{2} - 2\cos^2 \frac{\theta}{2} + 1 = 1$$

$$\Rightarrow \cos \frac{\theta}{2} \left(1 - 2\cos \frac{\theta}{2}\right) = 0 \Rightarrow \cos \frac{\theta}{2} = 0$$

OR $\cos \frac{\theta}{2} = \frac{1}{2}$

using unit circle

$$\left\{ \frac{\theta}{2} = \frac{\pi}{2}, \frac{3\pi}{2} \quad \text{OR} \quad \frac{\theta}{2} = \frac{\pi}{3}, \frac{5\pi}{3} \right\}$$