Directions: You may attach more sheets if necessary. SHOW ALL WORK and CLEARLY mark your solutions.

1) (3 points) Find all solutions for x in the equation

$$\sqrt{3}\csc x - 2 = 0$$

$$\frac{\sqrt{3}}{\sin x} = 2 \longrightarrow \frac{\sqrt{3}}{2} = \sin x$$

$x = \pi/3$
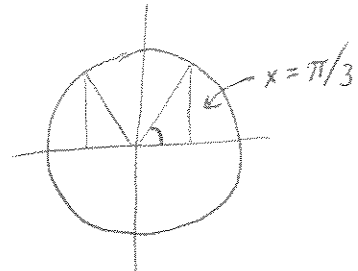
$$x = \frac{\pi}{3} + 2\pi n$$

or $\frac{2\pi}{3} + 2\pi n$

2) (3 points) Find all solutions for x in the equation

$$\cos^3 x = \cos x$$

First suppose $\cos x = 0$. Then

$$x = \frac{\pi}{2} + 2\pi n$$

or $\frac{3\pi}{2} + 2\pi n$

Now if $\cos x \neq 0$ then we can divide by $\cos x$, giving

$$\cos^2 x = 1$$

so $\cos x = 1$ or $\cos x = -1$

so $x = 0 + 2\pi n$ or $x = \pi + 2\pi n$

all of these are solutions

3) (6 points) Find all solutions for x in the equation

$$\sec^2 x + \tan x - 3 = 0$$

recall Pythag. thm: $\tan^2 x + 1 = \sec^2 x$

substituting:

$$\tan^2 x + 1 + \tan x - 3 = 0$$

$$\Rightarrow \tan^2 x + \tan x - 2 = 0$$

$\underset{\sim}{\text{low}}$ Factoring: $(\tan x + 2)(\tan x - 1) = 0$

so either $\tan x + 2 = 0$ or $\tan x - 1 = 0$

i.e. $\tan x = -2$ or $\tan x = 1$

so

$$x = \arctan(-2) + \pi n \quad \text{or} \quad x = \frac{\pi}{4} + \pi n$$

$$\Rightarrow \boxed{x = -1.107 + \pi n \quad \text{or} \quad x = \frac{\pi}{4} + \pi n}$$