# Mathematics 1613: Trigonometry Quiz #8

**Problem 24:** Use the given table to graph the functions $y = \cos x$ and $y = \sec x$ *on the same coordinate plane.* Use increments of .4 on the $y$-axis and $\dfrac{\pi}{6}$ on the $x$-axis. You may need to use the decimal approximations $\dfrac{\sqrt{3}}{2} \approx .87$ and $\dfrac{2}{\sqrt{3}} \approx 1.15$. If desired, you may use any relevant properties of these functions (though please mention and explain your work).

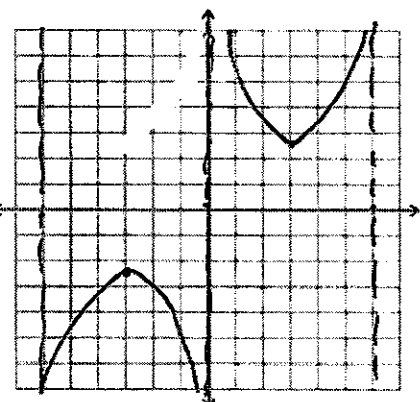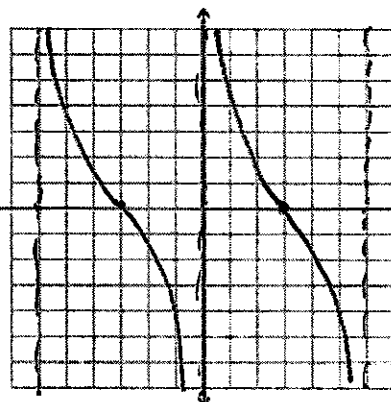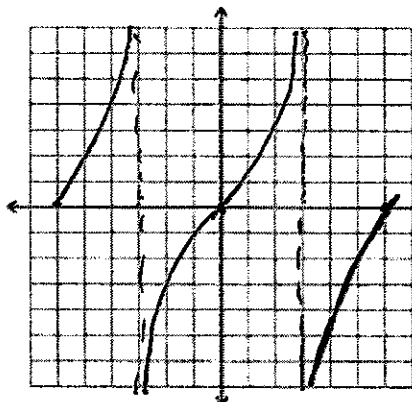| $x$ | $y = \cos x$ | $y = \sec x$ |
|---|---|---|
| $-\pi$ | $-1$ | $-1$ |
| $-5\pi/6$ | $-\sqrt{3}/2$ | $-2/\sqrt{3}$ |
| $-2\pi/3$ | $-1/2$ | $-2$ |
| $-\pi/2$ | $0$ | undefined |
| $-\pi/3$ | $1/2$ | $2$ |
| $-\pi/6$ | $\sqrt{3}/2$ | $2/\sqrt{3}$ |
| $0$ | $1$ | $1$ |
| $\pi/6$ | $\sqrt{3}/2$ | $2/\sqrt{3}$ |
| $\pi/3$ | $1/2$ | $2$ |
| $\pi/2$ | $0$ | undefined |
| $2\pi/3$ | $-1/2$ | $-2$ |
| $5\pi/6$ | $-\sqrt{3}/2$ | $-2/\sqrt{3}$ |
| $\pi$ | $-1$ | $-1$ |
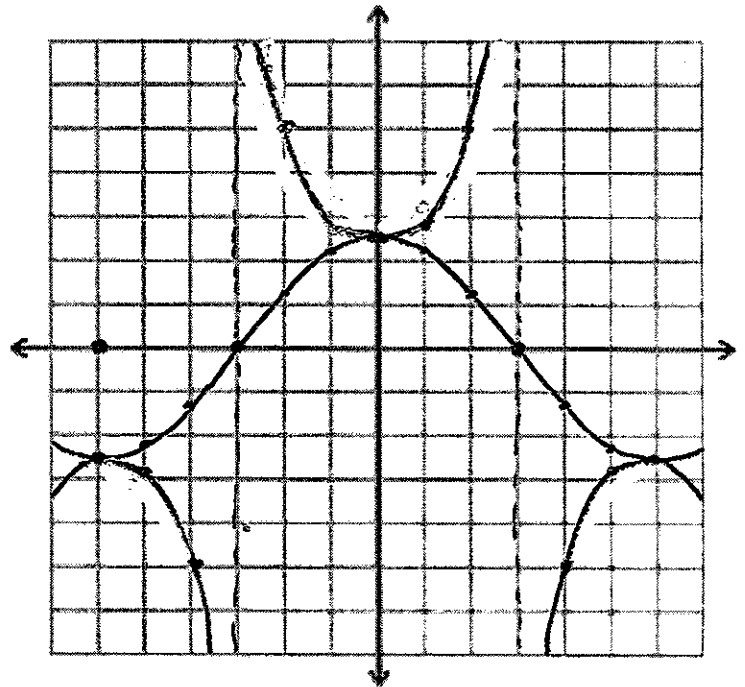


**Problem 25:** Provide *quick, accurate sketches* of the graphs for the given trigonometric functions. You may use any scale you wish, so long as it is consistent and clearly indicated.

| $y = \tan x$ | $y = \cot x$ | $y = \csc x$ |
|---|---|---|

**Problem 26:** Is $\dfrac{5\pi}{9}$ a solution to the equation $\tan 3\beta = -\sqrt{3}$ ? Justify your assertion without actually solving the equation.

Plug in $\beta = \dfrac{5\pi}{9}$

$$\tan\left(3\left(\dfrac{5\pi}{9}\right)\right) = \tan\left(\dfrac{5\pi}{3}\right) = -\sqrt{3}$$

yes, $\dfrac{5\pi}{9}$ is a solution

**Problem 27:** Solve the following trigonometric equations:

(1) $\sin 4x = 0$

$$\sin\theta = 0$$

$$\theta = \quad 0 + 2\pi k \qquad \pi + 2\pi k$$

$$4x = 2\pi k \qquad\qquad 4x = \pi + 2\pi k$$

$$\boxed{x = \dfrac{\pi}{2}k} \qquad \boxed{x = \dfrac{\pi}{4} + \dfrac{\pi}{2}k}$$

(2) $3\tan^2 x - 1 = 0$

$$3\tan^2 x = 1$$

$$\tan^2 x = \dfrac{1}{3}$$

$$\tan x = +\dfrac{\sqrt{3}}{3} \qquad\qquad \tan x = -\dfrac{\sqrt{3}}{3}$$

$$\boxed{x = \dfrac{\pi}{6} + \pi k \qquad\qquad \dfrac{5\pi}{6} + \pi k}$$
$$\boxed{\dfrac{7\pi}{6} + \pi k \qquad\qquad \dfrac{11\pi}{6} + \pi k}$$