11am class

Quiz 1

Fall 2012 **Your name:** Answer key

Math 0220 **Your TA's name:** _____

No calculators, no notes, no books. Show all your work (no work = no credit). Write neatly. Simplify your answers.

---

1. Solve inequalities

(a) [5 points] $\tan t \geq \sqrt{3}$ on the interval $t \in (0, \pi/2)$.

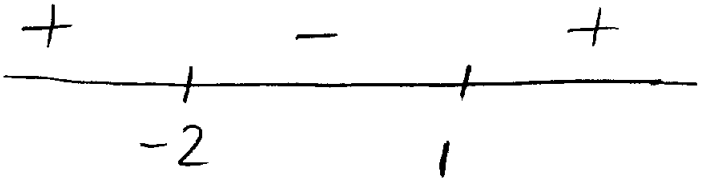
$\tan \frac{\pi}{3} = \sqrt{3}$. Hence the answer is

$t \in \left[\frac{\pi}{3}, \frac{\pi}{2}\right)$.

(b) [5 points] $\frac{x-1}{x+2} \leq 0$

Use the method of intervals.

All roots are $X=1$ and $X=-2$



Obviously $X \neq -2$ or else $X+2=0$ and there will be division by 0.

Hence, the answer is

$X \in (-2, 1]$

2. [5 points] Find the surface area A of the cylinder with the radius $r = 2$ cm and the hight $h = 5$ cm.

$$A = 2\pi r h + 2\pi r^2$$

$$A = 2\pi \cdot 2 \cdot 5 + 2\pi \cdot 4 = \boxed{28\pi \text{ cm}^3}.$$

3. Calculate

(a) [3 points] $101^2 - 99^2$ $= (101-99)(101+99)$

$= 2 \cdot 200$

$= 400$

(b) [2 points] $\sin\left(\frac{5\pi}{6}\right) = \frac{1}{2}$

bonus problem [5 points extra] Calculate $\cos\left(\frac{\pi}{12}\right)$. Write the answer in a form of radicals. Hint: $\frac{\pi}{12} = \frac{\pi}{3} - \frac{\pi}{4} = \frac{\pi}{4} - \frac{\pi}{6}$.

$$\cos\frac{\pi}{12} = \cos\left(\frac{\pi}{3} - \frac{\pi}{4}\right)$$

$$= \cos\frac{\pi}{3}\cos\frac{\pi}{4} + \sin\frac{\pi}{3}\sin\frac{\pi}{4}$$

$$= \frac{1}{2}\cdot\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{4}(1+\sqrt{3})$$