

1. Simplify the following expressions.

(1)  $\frac{\cos \theta + 1}{\sin \theta} + \frac{\sin \theta}{\cos \theta + 1}$

1. \_\_\_\_\_  
(1) \_\_\_\_\_

(2)  $\frac{\sin 2x}{1 + \cos 2x}$

(2) \_\_\_\_\_

(3)  $\sin\left(\frac{\pi}{3} + \theta\right) - \sin\left(\frac{\pi}{3} - \theta\right)$

(3) \_\_\_\_\_

2. Find the value.

(1)  $\sin(\arctan \frac{1}{3})$

2. \_\_\_\_\_  
(1) \_\_\_\_\_

(2) Given  $\sin \theta + \cos \theta = \frac{1}{2}$ ,  $\tan \theta + \frac{1}{\tan \theta}$

(2) \_\_\_\_\_

(3) In a triangle  $\triangle ABC$ , the ratio of the sides is  $AB : BC : CA = 2 : \sqrt{2} : (1 + \sqrt{3})$ . Find  $\angle A$ .

(3) \_\_\_\_\_

3. Solve the equations and the inequalities for  $0 \leq x < 2\pi$ :

(1)  $\sin 2x > \cos x$

3. \_\_\_\_\_  
(1) \_\_\_\_\_

(2)  $\tan^2 x + (\sqrt{3} - 1)\tan x - \sqrt{3} = 0$

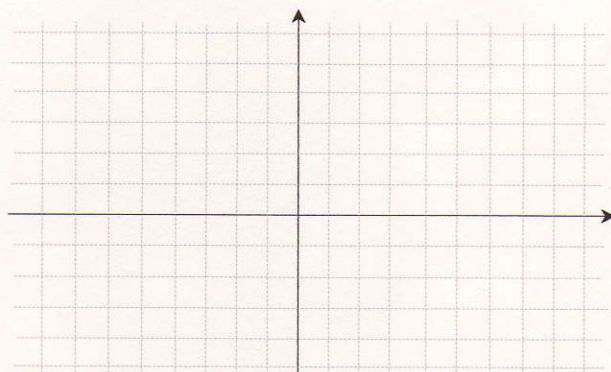
(2) \_\_\_\_\_

(3)  $\sqrt{3} \sin x + \cos x = \sqrt{2}$

(3) \_\_\_\_\_

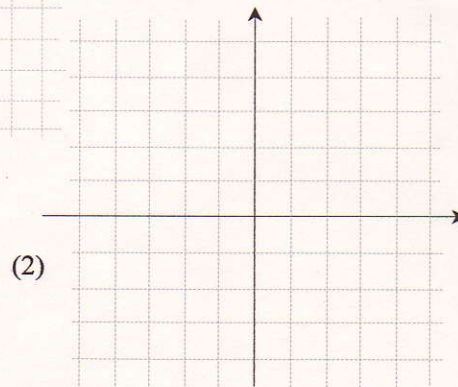
4. Draw the graph.

(1)  $y = 2|\sin(2x - \frac{\pi}{3})| + 1$



4. \_\_\_\_\_  
(1) \_\_\_\_\_

(2)  $y = \tan\left(\frac{x}{2} - \frac{\pi}{3}\right)$



(2) \_\_\_\_\_

5. Determine the range of a real constant  $a$  in order for  $\theta$  to exist in the following equation  $\cos \theta - \sin^2 \theta = a$ .

5. \_\_\_\_\_