

## Problem Set 19

1. Graph the function  $f(x) = -\frac{1}{2}\cos x + 2$  on the interval  $[-2\pi, 2\pi]$ .
2. Graph the function  $f(x) = 3\cos x + 1$  on the interval  $[-2\pi, 2\pi]$ .
3. A rectangle is 48 cm long and 34 cm wide. What is the angle the diagonal makes with the longer side?
4. Find the exact value for each of the following expressions.
  - (a)  $\cos 255^\circ =$
  - (b)  $\frac{\tan 78^\circ - \tan 18^\circ}{1 + \tan 78^\circ \tan 18^\circ} =$
5. Prove each of the following identities.
  - (a)  $\frac{1 - \sin 2x}{\cos 2x} = \frac{1 - \tan x}{1 + \tan x}$
  - (b)  $\sec^4 x - \sec^2 x = \tan^4 x + \tan^2 x$
  - (c)  $\frac{1 - \tan \frac{1}{2}x}{1 + \tan \frac{1}{2}x} = \frac{1 - \sin x}{\cos x}$
6. Solve each of the following equations. Present exact values, in radians.
  - (a)  $\sin 4x = -1$
  - (b)  $2\sin x - \csc x = 1$
7. Prove that if  $\alpha$ ,  $\beta$ , and  $\gamma$  are angles in a triangle, then  $\tan \alpha + \tan \beta + \tan \gamma = \tan \alpha \tan \beta \tan \gamma$ .
8. Find  $\tan y$  if we know that  $\tan x = 3$  and  $\tan(x + y) = 33$ .
9. Let  $\underline{u} = 2\underline{i} - 3\underline{j}$  and  $\underline{v} = 2\underline{i} + 3\underline{j}$ . Find each of the following.
  - (a)  $\underline{u} + \underline{v}$
  - (b)  $\underline{u} + 2\underline{v}$
  - (c)  $3\underline{u} - \underline{v}$