SECTION 3.4

3.4.1 Find $f'(x)$ if $f(x) = x\tan x$.

3.4.2 Find $f''(x)$ if $f(x) = x\sin x$.

3.4.3 Find $\dfrac{dy}{dx}$ if $y = \dfrac{\sin x}{x^2}$.

3.4.4 Find $\dfrac{dy}{dx}$ if $y = \sec x\tan x$.

3.4.5 Find $f'(x)$ if $f(x) = \dfrac{\cot x}{1+\csc x}$.

3.4.6 Find $f'(x)$ if $f(x) = (5x^2+7)\cos x$.

3.4.7 Differentiate $y = \dfrac{\csc x}{\sqrt{x}}$.

3.4.8 Find $\dfrac{dy}{dx}$ if $y = \dfrac{\cos x}{1-\sin x}$.

3.4.9 Find $\dfrac{dy}{dx}$ if $y = (x^3+7x)\tan x$.

3.4.10 Find $y''(x)$ if $y = 12\sin x + 5\cos x + \dfrac{x^4}{4}$.

3.4.11 Find $f'(\theta)$ if $f(\theta) = \dfrac{1}{1-2\cos\theta}$.

3.4.12 Find $\dfrac{dy}{dx}$ if $y = 2x\sin x - 2\cos x + x^2\cos x$.

3.4.13 Find $f'(\theta)$ if $f(\theta) = \dfrac{1+\sin\theta}{1-\sin\theta}$.

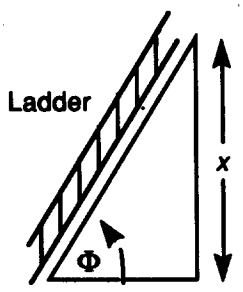
3.4.14 Find $\dfrac{dy}{dt}$ if $y = \dfrac{1+\tan t}{1-\tan t}$.

3.4.15 Show by use of a trigonometric identity that $\dfrac{d}{dx}[\tan x - x] = \tan^2 x$.

3.4.16 Show by use of a trigonometric identity that

$$\frac{d}{dx}[x+\cot x] = -\cot^2 x$$

3.4.17 A 12 foot long ladder leans against a wall at an angle θ with the horizontal as shown in the figure. The top of the ladder is x feet above the ground. If the bottom of the ladder is pushed toward the wall, find the rate at which x changes with θ when $\theta = 60°$. Express the answer in units of feet/degree.



3.4.18 An airplane is flying on a horizontal path at a height of 4500 ft, as shown in the figure. At what rate is the distance s between the airplane and the fixed point P changing with θ when $\theta = 30°$. Express the answer in units of feet/degree.