In Exercises 77–88, find the derivative of the function.

77. $y = \sin 5\pi x$

78. $y = \tan(4x - \pi)$

79. $y = -x \tan x$

80. $y = \csc 3x + \cot 3x$

81. $y = \dfrac{\cos x}{x^2}$

82. $y = \dfrac{\cos(x - 1)}{x - 1}$

83. $y = 3 \sin^2 4x + x$

84. $y = x \cos x - \sin x$

85. $y = 2 \csc^3 x$

86. $y = \sec^2 2x$

87. $y = e^x \cot x$

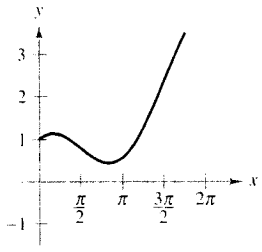
88. $y = \frac{1}{2}e^{\sin 2x}$

In Exercises 89–94, find an equation of the tangent line to the graph of the function at the given point.

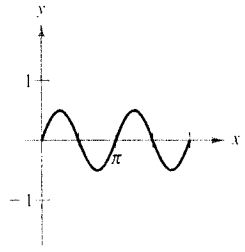
Function	*Point*
89. $y = 4 \sin 2x$	$(\pi, 0)$
90. $y = -x \cos x$	$(0, 0)$
91. $y = \dfrac{1}{4} \sin^2 2x$	$\left(\dfrac{\pi}{4}, \dfrac{1}{4}\right)$
92. $y = \dfrac{2x}{\cos x}$	$(0, 0)$
93. $y = e^x \tan 2x$	$(0, 0)$
94. $y = x^2 \cot x$	$\left(\dfrac{\pi}{4}, \dfrac{\pi^2}{16}\right)$

In Exercises 95–98, find the relative extrema of the function on the interval $(0, 2\pi)$.

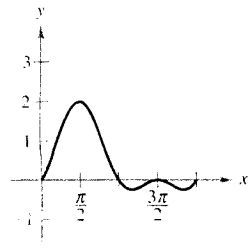
95. $f(x) = \dfrac{x}{2} + \cos x$



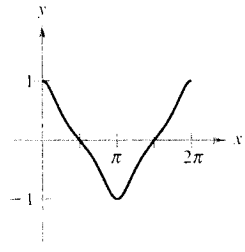
96. $f(x) = \sin x \cos x$



97. $f(x) = \sin^2 x + \sin x$



98. $f(x) = \dfrac{\cos x}{1 + \sin^2 x}$



99. ***Seasonal Sales*** Refer to the model given in Exercise 75.

(a) Use a graphing utility to find the maximum daily sales of jet skis. On what day of the year does the maximum daily revenue occur?

(b) Use a graphing utility to find the minimum daily sales of jet skis. On what day of the year does the minimum daily revenue occur?

100. ***Seasonal Sales*** Refer to the model given in Exercise 76.

(a) Use a graphing utility to find the maximum daily sales of gas stoves. On what day of the year do the maximum daily sales occur?

(b) Use a graphing utility to find the minimum daily sales of gas stoves. On what day of the year do the minimum daily sales occur?

In Exercises 101–112, evaluate the integral.

101. $\displaystyle\int (3 \sin x - 2 \cos x)\, dx$

102. $\displaystyle\int \csc 2x \cot 2x\, dx$

103. $\displaystyle\int \sin^3 x \cos x\, dx$

104. $\displaystyle\int x \cos x^2\, dx$

105. $\displaystyle\int_0^{\pi} (1 + \sin x)\, dx$

106. $\displaystyle\int_{-\pi}^{\pi} (x - \cos^2 x)\, dx$

107. $\displaystyle\int_{-\pi/6}^{\pi/6} \sec^2 x\, dx$

108. $\displaystyle\int_{\pi/6}^{\pi/2} \csc^2 x\, dx$

109. $\displaystyle\int_{-\pi/3}^{\pi/3} 4 \sec x \tan x\, dx$

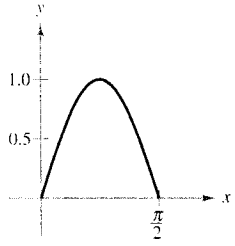
110. $\displaystyle\int -2 \csc \frac{x}{2} \cot \frac{x}{2}\, dx$

111. $\displaystyle\int_{-\pi/2}^{\pi/2} (2x + \cos x)\, dx$

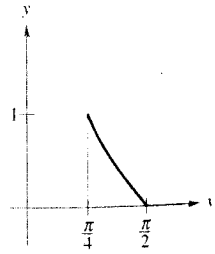
112. $\displaystyle\int_0^{\pi} 2x \sin x^2\, dx$

In Exercises 113–116, find the area of the region.

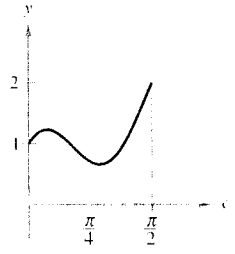
113. $y = \sin 2x$



114. $y = \cot x$



115. $y = 2 \sin x + \cos 3x$



116. $y = 2 \cos x + \cos 2x$