H7

A

[Ex 3.8]

In Exercises find the linearization of f at $x = a$. Then graph the linearization and f together.

11. $f(x) = \sin x$ at (a) $x = 0$, (b) $x = \pi$

12. $f(x) = \cos x$ at (a) $x = 0$, (b) $x = -\pi/2$

B

15. Show that the linearization of $f(x) = (1 + x)^k$ at $x = 0$ is $L(x) = 1 + kx$.

17. Faster than a calculator Use the approximation $(1 + x)^k \approx 1 + kx$ to estimate the following.

a. $(1.0002)^{50}$ **b.** $\sqrt[3]{1.009}$

C

[Ex 4.1]

In Exercises find the absolute maximum and minimum values of each function on the given interval. Then graph the function. Identify the points on the graph where the absolute extrema occur, and include their coordinates.

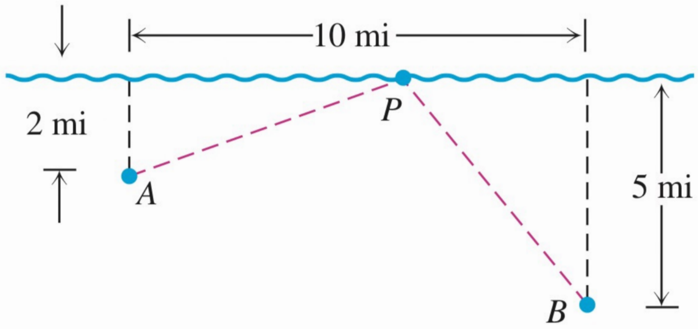
16. $f(x) = -x - 4, \quad -4 \le x \le 1$

17. $f(x) = x^2 - 1, \quad -1 \le x \le 2$

25. $f(\theta) = \sin \theta, \quad -\frac{\pi}{2} \le \theta \le \frac{5\pi}{6}$

D

57. Locating a pumping station Two towns lie on the south side of a river. A pumping station is to be located to serve the two towns. A pipeline will be constructed from the pumping station to each of the towns along the line connecting the town and the pumping station. Locate the pumping station to minimize the amount of pipeline that must be constructed.



E

In Exercises find all possible functions with the given derivative.

27. **a.** $y' = x$ **b.** $y' = x^2$ **c.** $y' = x^3$

29. **a.** $y' = -\dfrac{1}{x^2}$ **b.** $y' = 1 - \dfrac{1}{x^2}$ **c.** $y' = 5 + \dfrac{1}{x^2}$

31. **a.** $y' = \sin 2t$ **b.** $y' = \cos \dfrac{t}{2}$ **c.** $y' = \sin 2t + \cos \dfrac{t}{2}$

[Ex 4.2]