2.1.9

(a) Find the slope of the curve $y = x^2 - 2x - 4$ at the point $P(2, -4)$ by finding the limiting value of the slope of the secant lines through point P.

(b) Find an equation of the tangent line to the curve at $P(2, -4)$.

(a) The slope of the curve at $P(2, -4)$ is 2. (Simplify your answer.)

(b) The equation of the tangent line to the curve at $P(2, -4)$ is $y = 2x - 8$.

2.1.15

Find (a) the slope of the curve at the given point P, and (b) an equation of the tangent line at P.

$$y = \frac{2}{x};\ P\left(-5, -\frac{2}{5}\right)$$

a. The slope of the curve at P is $-\frac{2}{25}$.

(Simplify your answer.)

b. The equation for the tangent line at P is $y = -\frac{2}{25}x - \frac{4}{5}$.

2.1.15

Find (a) the slope of the curve at the given point P, and (b) an equation of the tangent line at P.

$$y = \frac{2}{x};\ P\left(4, \frac{1}{2}\right)$$

a. The slope of the curve at P is $-\frac{1}{8}$.

(Simplify your answer.)

b. The equation for the tangent line at P is $y = -\frac{1}{8}x + 1$.

2.2.39

Find the limit.

$$\lim_{x\to 1} \frac{\sqrt{x^2+24}-5}{x-1}$$

$$\lim_{x\to 1} \frac{\sqrt{x^2+24}-5}{x-1} = \frac{1}{5}$$ (Type an integer or a simplified fraction.)

2.2.61

Because of their connection with secant lines, tangents, and instantaneous rates, limits of the form $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$ occur frequently in calculus.

Evaluate this limit for the given value of x and function f.

$f(x) = \sqrt{x}$, $x = 10$

The value of the limit is $\frac{\sqrt{10}}{20}$. (Type an exact answer, using radicals as needed.)