

TRIGONOMETRY RULES (3.5)

1. Find the first derivative for each and simplify your answers.

A. $f(\theta) = \frac{1}{\sin(3\theta)}$

B. $h(t) = \sec^3(t)$

C. $p(z) = z^3 \cos(z^2)$

D. $g(x) = \tan(\sin(x))$

E. $p(v) = 3^{\cos(v)}$

F. $r(y) = \sqrt[3]{y + \cot^2(3y)}$

G. $p(\theta) = \frac{\cos(\theta)}{1 + \sin(\theta)}$

2. Determine if the graph of $f(x) = \sin(x^4)$ is increasing or decreasing at $x = 10$. Concave up or down at $x = 10$.

INVERSE FUNCTIONS (3.6)

1. Find the first derivative for each and simplify your answers.

A. $f(p) = p^3 \ln(p^2 + 1)$

B. $h(t) = \frac{1}{\ln(t)}$

C. $p(z) = \ln\left(\frac{e^{3z} z^5}{(5z+3)^2}\right)$

D. $g(x) = \arcsin(x^3)$

E. $p(v) = \tan(\arctan(3v))$

F. $r(t) = \frac{1}{\tan^{-1}(t)}$

2. Determine where $f'(x) = 0$ for $f(x) = \begin{cases} \sin(\pi x) & -\infty < x < 1 \\ \ln(5x) & 1 \leq x < \infty \end{cases}$.

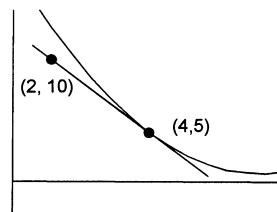
3. A graph of $f(x)$ and its tangent line are shown at the right. Find the following values.

A. $h'(2)$ for $h(x) = f(x^2)$.

B. $k'(4)$ for $k(x) = (f(x))^2$.

C. $g'(5)$ for $g(x) = f^{-1}(x)$.

D. $p'(4)$ for $p(x) = \ln(f(x))$.



4. Suppose $f(t)$ models the number of motor vehicles (millions) registered in the world since 1980. Give a practical interpretation for each.

A. $f(20)$

B. $f^{-1}(400)$

C. $f'(20)$

D. $(f^{-1})'(400)$