

Worksheet 6

Name:

1. Let $f(x) = \ln(\cos(\pi x))$.

(a) Show that $f'(x) = -\pi \tan(\pi x)$.

(b) Explain why $y = f(x)$ has a horizontal tangent line at the x -values $x = \pm 1, \pm 2, \pm 3, \dots$

2. Suppose $R(p) = \arctan(3p)$. Find the second derivative of $R(p)$.

3. Suppose $x(t) = \arcsin(t^2)$. Compute $\frac{dx}{dt} \Big|_{t=\frac{1}{\sqrt[3]{2}}}$

4. The number of years, T , it takes an investment of \$1000 to grow to $\$F$ in an account which pays 5% interest is given by

$$T = g(F) = 20 \ln \left(\frac{F}{1000} \right).$$

Find $g(5000)$ and $g'(5000)$. Give units with your answers and interpret them in terms of money in the account.