

Homework 4
(due Friday, October 24)

1. Assume k is a constant. Find the derivative of the function $r(t) = \ln\left(\sin\left(\frac{t}{k}\right)\right) + \arcsin(\sqrt{t}) + \tan(k)$.
2. Suppose $T = \arctan(3\theta) + \cos^2(\theta^3 - 3)$. Find $\frac{dT}{d\theta}$.

3. Use implicit differentiation to find the slope of the tangent line to the curve

$$x^3 + 2xy + y^2 = 4$$

at the point $(1, 1)$.

4. Do exercise 66 from section 3.6
5. Find $\frac{d}{dc}\left(3f(c)\cosh(2c)\right)$, where $f(c)$ is some differentiable function of c .
6. The speed of sound in dry air is

$$S(T) = 331.3\sqrt{1 + \frac{T}{273.15}} \quad \frac{\text{m}}{\text{sec}},$$

where T is the temperature of the air in degrees Celsius. Find a linear function that approximates the speed of sound in air temperatures near 20° C.