

HW – Curvature; Osculating Circles in \mathbb{R}^2
Multivariable Analysis – Mr. Oberle

FROM THE BOOK: p 837/21, 23, 40, 41, 43, 45

1. Prove that the curvature of the function $y = f(x)$ is given by $\kappa = \frac{|f''(x)|}{(1+(f'(x))^2)^{3/2}}$. [Hint: use today's curvature formula with the function $\mathbf{r}(t) = \langle x, f(x), 0 \rangle$.]

2. Consider the curve $y = \sin x$.
 - a. Find the osculating circle to this curve at the point $x = \frac{\pi}{6}$.
 - b. Sketch the graphs of the curve and the circle on a common set of axes. (You may use technology and print your answer.)