**WORKSHEET IX**

**Linear approximations**



1. Find the linearization of the function $f\left(x\right)=\sqrt{x+3}$ at the point x = 1 and use it to approximate$ \sqrt{3.98} and \sqrt{4.05}$ . For each approximation, is it an underestimate or an overestimate? Explain. (Here you may use the power rule short cut.)
2. Find the linearization of the function f(x) = sin x at the point x =/6.
3. Find the linearization of the function $f\left(x\right)=(1+x)^{-3}$at the point x =  and use it to approximate the value of $\frac{1}{1.003^{3}} . Is your $approximation an underestimate or an overestimate? Explain.
4. *(U. Michigan)* Given below is the graph of a function h(t). Suppose j(t) is the local linearization of h(t) at t = 7/8.



1. Given that $h^{'}\left(\frac{7}{8}\right)=\frac{2}{3},find an expression $for *j*(t).
2. Use your answer from (a) to approximate h(1).
3. Is the approximation from (b) an over- or under-estimate? Explain.
4. Using j(t) to estimate values of h(t), will the estimate be more accurate at t=1 or t = ¾? Explain.
5. *(U. Michigan)*









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