

LAS Calculus
The Tangent Approximation
Homework 3

1. For the next $1/2$ hour, a car travels at an average velocity of 40 miles/hour. If it is currently 100 miles away and moving away, how far away will it be in $1/2$ hour?
2. A car currently has an instantaneous velocity of 40 miles per hour.
 - (a) If it is currently 10 miles away and moving away, about how far will it be in 5 minutes?
 - (b) Why can't we get a good estimate of how far it travels in the next hour?
3. A function $y = f(x)$ satisfies $f'(5) = 3$. If $f(5) = 10$, what is the approximate values of $f(5.2)$?
4. A function $y = f(x)$ satisfies $f(3) = 10$ and $f'(3) = 4$. Approximately what is $f(3.25)$?
5. A function $f(x)$ satisfies $f(10) = 50$ and $f'(10) = 2$. Approximate:
 - (a) $f(11)$
 - (b) $f(10.5)$
 - (c) $f(9.5)$
6. A function $f(x)$ satisfies $f(7) = 10$ and $f'(7) = -2$. Approximate:
 - (a) $f(8)$
 - (b) $f(7.5)$
 - (c) $f(6.8)$
7. A function $f(x)$ satisfies $f(2) = 10$.
 - (a) If $f'(2) = 3$, use the tangent approximation to approximate $f(2.5)$.
 - (b) If $f'(2.5) = 3.5$, use your answer to (a) and the tangent approximation centered at 2.5 to approximate $f(3)$.
8. A function $f(x)$ satisfies $f(5) = 12$.

- (a) If $f'(5) = 2$, use the tangent approximation to approximate $f(5.1)$.
- (b) If $f'(5.1) = 1.5$, use your answer to (a) and the tangent approximation centered at 5.1 to approximate $f(5.2)$.