

3. Suppose that the price of a product increases by 1%.
- If the demand for the produce decreases by MORE than 1%, the demand for the product is called _____. An example of a product like this is _____.
 - If the demand for the product decreases by LESS than 1%, the demand for the product is called _____. An example of a product like this is _____.
4. Sketch a nice BIG graph of a function with all the properties listed below. Make sure your graph is clearly labeled.
- $f'(x) < 0$ for $2 < x < 4$, but $f'(x) \geq 0$ otherwise
 - $f''(x) < 0$ for $x < 0$ and also for $x > 6$, but $f''(x) \geq 0$ otherwise
 - $f(x)$ is undefined when $x = 2$
 - $\lim_{x \rightarrow \infty} f(x) = 3$.

5. Find $f'(x)$ for the following functions. DO NOT simplify!

(a) $f(x) = \left(x + \frac{1}{x}\right)^2 - \frac{5}{\sqrt{3x}}$

(b) $f(x) = \sqrt{\frac{1-2x}{3x^5+2}}$

6. Find the equation of the line tangent to $(3xy^2 + 1)^4 = 2x - 3y$ at the point $\left(\frac{1}{2}, 0\right)$.

7. Suppose that the speed of traffic on Highway 63 near the Pine Street intersection has been measured and the data suggest that between 1:00 pm and 6:00 pm on a normal weekday, the traffic speed is given by $s(t) = t^3 - 10.5t^2 + 30t + 20$ miles per hour, where t is the number of hours past noon. At what time between 1:00 pm and 6:00 pm is the traffic moving the fastest, and how fast is it moving at that time?
8. A bus company will charter a bus that holds at most 50 people to groups of 35 or more. If a group contains exactly 35 people, each person pays \$60. In larger groups, everyone's fare is reduced \$1 for each person in excess of 35. For which size group will the bus company's revenue be the greatest? What will this total revenue be? (Make sure your answer is PRACTICAL, and use calculus – if you “plug & chug” you might get the right answer, but for no credit).