

1. Suppose demand is given by $q = 600 - 15p$. Is demand elastic or inelastic at $p = \$25$? Use elasticity to determine how you should change the price if you want to increase revenue.
2. Suppose y has $y' < 0$ for $x < -5$ and $y' = 0$ at $x = -5$, $y' > 0$ for $-5 < x < -3$ and $y' = 0$ at $x = -3$ and $y' > 0$ for $-3 < x < 2$, $y' = 0$ at $x = 2$ and $y' < 0$ for $2 < x$. Classify its critical points.
3. Suppose at a production level of $q = 100$, marginal cost is $MC = 18$ and total cost is $C = 2300$. How should the production level be changed if one wants a lower average cost ? Explain why your approach works (don't just say "because the book says so").
4. Suppose the ecosystem of an island has carrying capacity of 1900 rabbits. If 400 rabbits are introduced, sketch a possible logistic model for the population as a function of time. Why is using a logistic model better than using an exponential model ?
5. Find the derivative of $f(x) = \frac{\sqrt{\pi} + \sin(x)}{5x^2 \cdot \ln(x)}$.
6. You sell tickets for an exciting math lecture (wow!!). If you charge \$20 you sell 1000 tickets. Each dollar increase in price results in 100 fewer sales. What price results in maximum revenue ? (Use techniques from class. Do not just make up a table of values.)
7. Using our approach (with faces) to the second derivative test, classify the critical points of $y = 2x^3 - 3x^2$
8. Sketch the graph of the derivative of a function that is defined everywhere and has exactly two critical points, one a local maximum and the other neither a max nor a min.