

Math S-Xab Summer 2004
Worksheet: Properties and Graphs of Functions
June 30, 2004

You will need access to a graphing calculator to complete problems 1–3. Make sure someone in your group has a graphing calculator. Also, all intervals you give as answers should be expressed in interval notation.

- Let $f(x) = x^3 - 400x$.
 - Find the x -intercepts of f , if it has any, by hand.
 - Use your answer to part (a) to graph f on your calculator in a window that shows its important features.
 - On what exact interval(s) is f positive? Use your graph to assist you in answering this question.
 - Use your calculator's trace feature to estimate the interval(s) on which f is increasing.
 - Use your calculator's trace feature to estimate the interval(s) on which f is concave up.
- Let $f(x) = |2x - 1|$.
 - Find the x -intercepts of f , if it has any, by hand.
 - Graph f on your calculator in a window that shows its important features.
 - Find by hand the interval(s) on which $f(x) > 2$. Check your answer using your calculator's trace feature.
- Determine *algebraically* whether each of the following functions is even, odd, or neither.
 - $f(x) = x + x^3 + x^5$
 - $f(x) = x^2 + x^4$
 - $f(x) = x + x^2$
 - $f(x) = |x| + 4$
- Suppose that $f(t)$ gives a camel's *position* (in miles) at time t , measured in hours. Karnak Temple is used as a benchmark for position. That is, $f = 0$ when the camel is at Karnak Temple. Positions north and south of the temple are assigned positive and negative numbers, respectively. Translate the following mathematical questions into questions about the camel's trip. Then answer the questions using the graph on page 90.
 - For what value of t between 0 and 5 is $f(t)$ the largest?
 - How many solutions are there to the equation $f(t) = 0$? Approximate these solutions.
 - How many solutions are there to the equation $f(t) = 3$? Approximate these solutions.
 - Approximate $f(0)$.
 - For what values of t is $|f(t)| < 1$?
 - What are the values of k between -3 and 5 for which $f(t) = k$ has exactly one solution?
- Suppose that $f(t)$ gives a camel's *velocity* (in miles per hour) at time t , measured in hours. When the camel is traveling north the velocity is positive. The velocity is negative when the camel is traveling south. Translate the following mathematical questions into questions about the camel's trip. Then answer the questions using the graph on page 90.
 - For what value of t between 0 and 5 is $f(t)$ the largest?
 - How many solutions are there to the equation $f(t) = 0$? Approximate these solutions.
 - How many solutions are there to the equation $f(t) = 3$? Approximate these solutions.
 - Approximate $f(0)$.
 - For what values of t is $|f(t)| < 1$?
 - What are the values of k between -3 and 5 for which $f(t) = k$ has exactly one solution?