MATH 156: Precalculus
Fall 2015
Worksheet §2.3: Getting Information from the Graph of a Function

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Introduction

Definition: A function is **increasing** on an interval I if

$\boxed{}$ whenever $x_1 < x_2$ in I.

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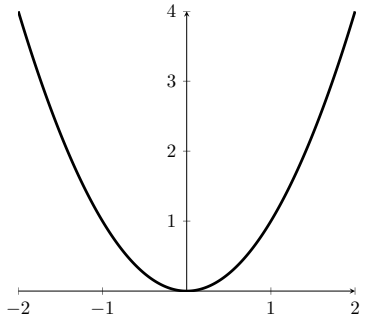
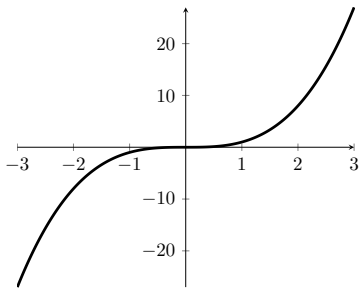
$\boxed{}$ whenever $x_1 < x_2$ in I.

Examples:

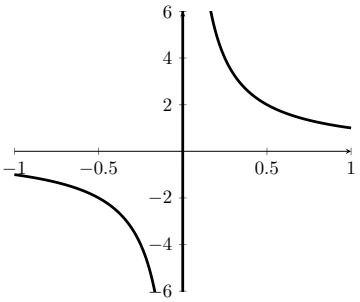
$y = x^2$



$y = x^3$



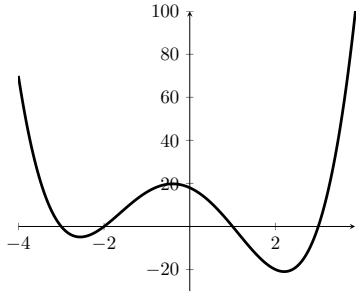
$y = 1/x$



Definition: A function f has a **local maximum** at $x = c$ if $\boxed{}$ when x is near c.

A function f has a **local minimum** at $x = c$ if $\boxed{}$ when x is near c.

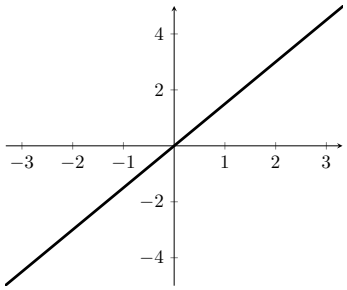
Example: $f(x) = x^4 + x^3 - 11x^2 - 9x + 18$



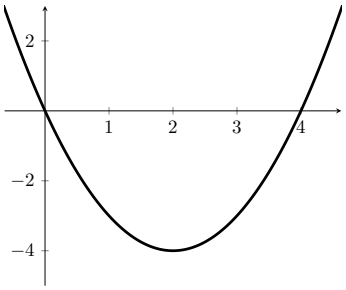
TRY YOURSELF For each graph, (i) determine the domain, range, (ii) identify the open intervals where the function is increasing, decreasing or constant, and (iii) estimate the x-values of any local maximums or minimums.

NOTE: These are all graphed by a COMPUTER! You need to use your own judgement about the correctness of the computer's image.

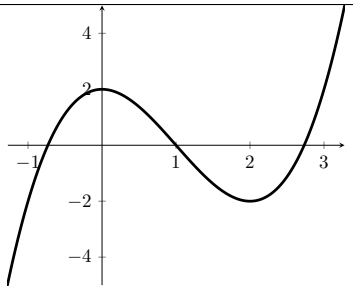
$f(x) = \frac{3}{2}x$



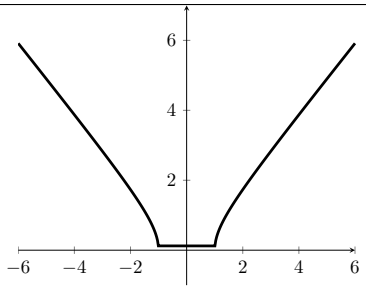
$f(x) = x^2 - 4x$



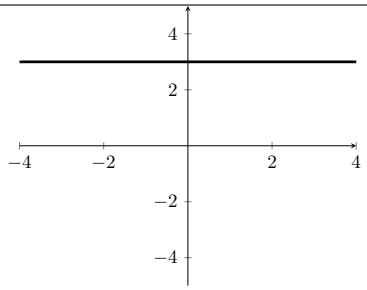
$f(x) = x^3 - 3x^2 + 2$



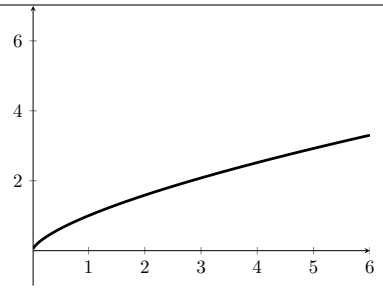
$f(x) = \sqrt{x^2 - 1}$



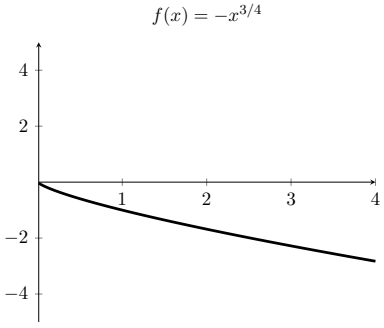
$f(x) = 3$



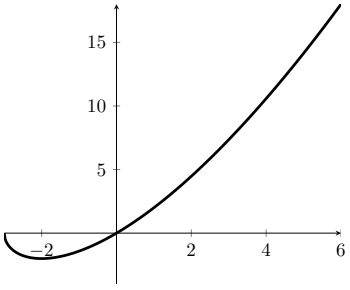
$f(x) = x^{2/3}$



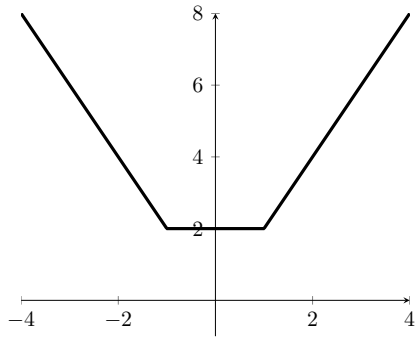
$f(x) = -x^{3/4}$



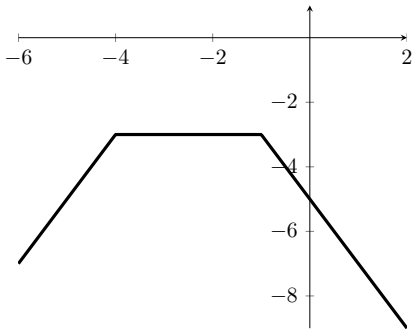
$f(x) = x\sqrt{x+3}$



$f(x) = |x+1| + |x-1|$



$f(x) = -|x+4| - |x+1|$



WORD PROBLEM: During a 14-year period from 1990 to 2004, the population P (in thousands) of Weest Virginia fluctuated according to the model

$$P = 0.0108t^4 - .211t^3 + 0.40t^2 + 7.9t + 1791,\ 1 \leq t \leq 14$$

where t represents t he year. (So, $t = 0$ corresponds to 1990.)
(i) Use the graph below to determine the years during which the population was increasing. Ask the same question for decreasing population. (ii) Approximate the maximum population between 1990 and 2004.