ACMAT117 Fall 2024
Professor Manguba-Glover
Sections 4,1 Classwork (CW 11) Name: _____

Complete as many of the following problems as you can with your group. You do not have to go in order. Each group will be given a specific problem that they must complete and present to either Professor MG or to Stefanie before they leave.

(1) Determine if the following are polynomials. If they are, state its degree, leading term, and leading coefficient:

(a) $\dfrac{5x+3}{x}$

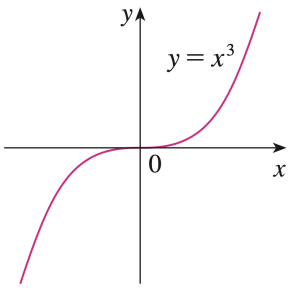
(b) $x^2 + 7x^4 + 4x + 9x^3 - 4$

(c) $2x + 3x^{-1} - 5$

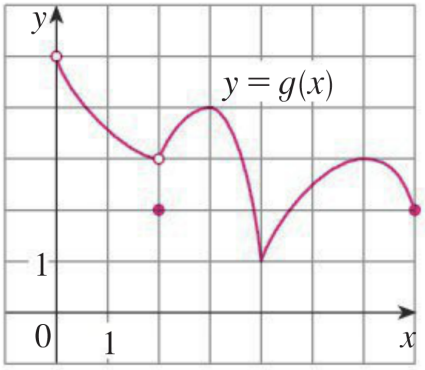
(d) $x^2 - x^3 + x^4 - 5$

(2) Find the relative and absolute extrema of the following graphs. **If there is no solid dot at the end of a graph, assume there is an arrow.**

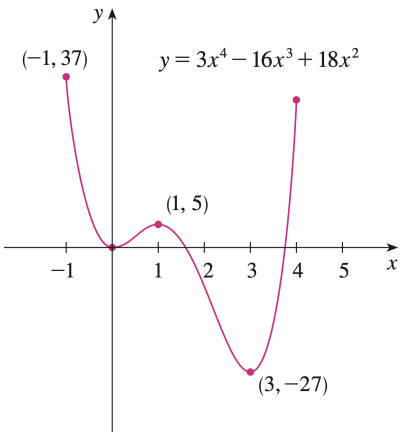
(a)



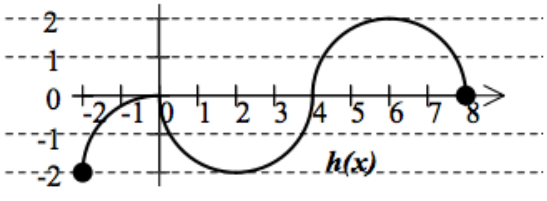
(b)



(c)



(d)



(3) Determine if the function is odd, even, or neither.

(a) $f(x) = 3x^2 + 8$

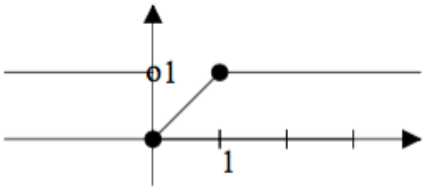
(b) $f(x) = x^5 - 4x$

(c) $f(x) = 2x^2 - x - 1$

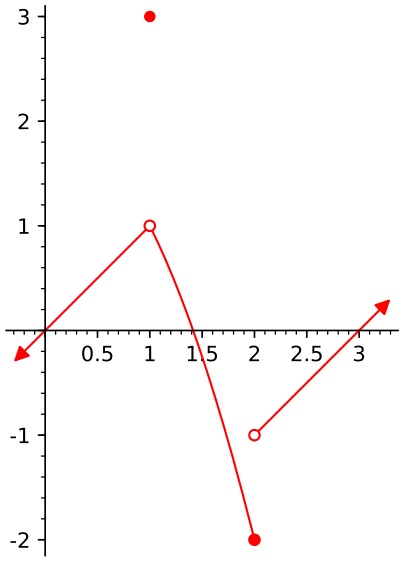
(d) $f(x) = \frac{2x}{x^4+x^2+7}$

(4) Find the domain and range of the following functions. **If there is no solid dot at the end of a graph, assume there is an arrow.**

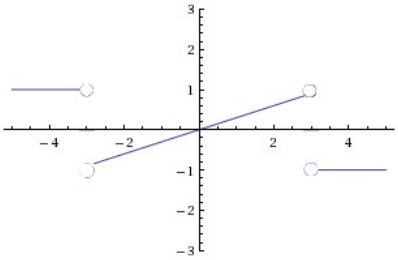
(a)



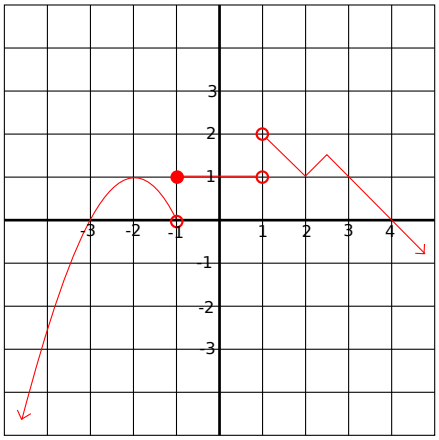
(b)



(c)



(d)



(5) Graph the following piecewise functions by hand **and** find $f(-1)$, $f(0)$, and $f(1)$:

(a) $f(x) = \begin{cases} 1 & \text{if } x < 0 \\ x & \text{if } 0 \le x \le 1 \\ 1 & \text{if } 1 < x \end{cases}$

(b) $f(x) = \begin{cases} x - 1 & \text{if } x < 0 \\ \sqrt{x} & \text{if } x \ge 0 \end{cases}$

Key:

(1) (a) Not a polynomial
(b) Yes, degree 4, lead term $7x^4$, lead coeff. 7
(c) Not a polynomial
(d) Yes, degree 4, lead term x^4, lead coeff. 1

(2) (a) No relative nor absolute extrema
(b) Rel min and abs min at $(4,1)$
rel max at $(3,4)$ and $(6,3)$
(c) Rel and abs min at $(3,-27)$
rel min at $(0,0)$, rel max at $(1,5)$
and abs max $(-1,37)$
(d) Rel min at $(2,-2)$, abs min at $(-2,-2)$,
rel max at $(0,0)$ rel and abs max at $(6,2)$

(3) (a) Even
(b) Odd
(c) Neither
(d) Odd

(4) (a) D: $(-\infty,\infty)$, R: $[0,1]$
(b) D: $(-\infty,\infty)$, R: $[-2,1]\cup\{3\}$
(c) D: $(-\infty,-3)\cup(-3,3)\cup(3,\infty)$, R: $[-1,1]$
(d) D: $(-\infty,1)\cup(1,\infty)$, R: $(-\infty,2]$

(5) Use a graphing utility to check