AP Precalculus - M3Y & M3Z
Functions - Homework 1

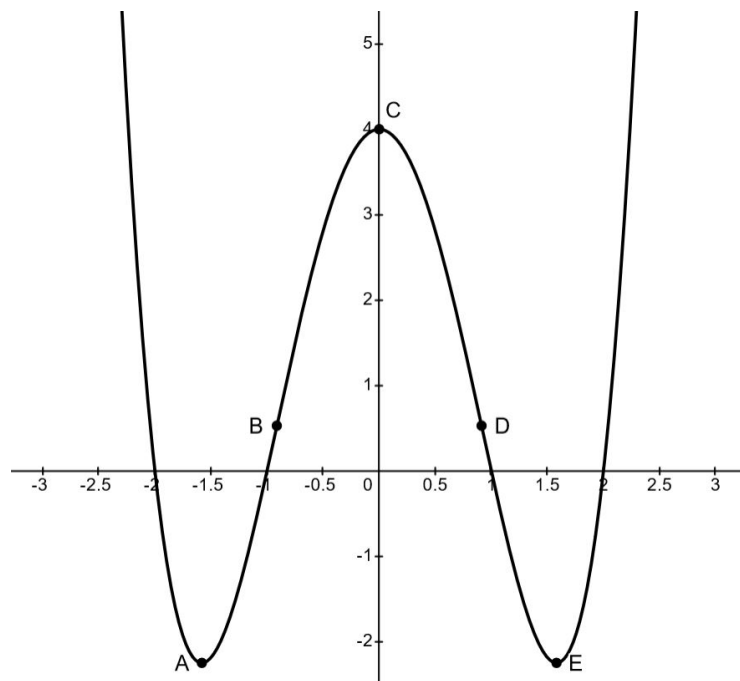1. For each of the following functions, find:

   - the domain
   - the zero(es) of the function or state that it does not have any
   - the x-intercept(s) or state that it does not have any
   - the y-intercept of the function, or state that it does not have any

   (i) $f(x) = 3x^2 - 6x - 24$

   (ii) $g(x) = \dfrac{\sqrt{5(3x-2) + 7}}{x^2 + 1}$

   (iii) $h(x) = \dfrac{x^2 + x + 1}{x^2 - 9x + 18}$

   (iv) $s(x) = \dfrac{-x^3 + 7x^2 - 6x}{x^2 - x + 1}$

2. The graph of function f is given above.

A. Identify:

(i) the zeros of the function

(ii) the x-intercepts of the function

(iii) the y-intercept of the function

(iv) the locations of the extrema (minima or maxima) of the function

B. Place each of the points A, B, C, D, and E in the correct category (categories may be empty and points could belong in more than one category):

• local maximum:

• global maximum:

• local minimum:

• global minimum:

• inflection point:

C. State the intervals where the function is increasing and where the function is decreasing

D. State the intervals (approximately) where the function is convex (concave up) and where the function is concave (concave down)