

## Agenda/Objective/Notes PAPP Section 1.5

### Starter Problem

Find  $f \circ h$  and  $g \circ f$ . Determine the domain of each function and each composite function.

$$f(x) = \sqrt{x+4}$$

$$g(x) = x^2$$

### Today's Agenda

1. Starter problem
2. Review assignment due
3. Today's objectives
4. Today's assignment: Read section 1.5 pages 54 – 60 and complete 62/14, 21, 24, 29, 36, 37, 46, 50, 61, 68, 79, 82, 90, 92, 97, 98

Today's Objectives: You will be able to

1. Find the zeros of a function.
2. Determine intervals on which functions are increasing or decreasing.
3. Determine relative maximum and minimum of functions.
4. Identify even and odd functions.

### Notes

**Zeros of a Function:** The zeros of a function  $f$  of  $x$  are the  $x$ -values for which  $f(x) = 0$ .

### Increasing, Decreasing, and Constant Functions

A function  $f$  is increasing on an interval if, for any  $x_1$  and  $x_2$  in the interval,  $x_1 < x_2$  implies  $f(x_1) < f(x_2)$ .

A function  $f$  is decreasing on an interval if, for any  $x_1$  and  $x_2$  in the interval,  $x_1 < x_2$  implies  $f(x_1) > f(x_2)$ .

A function  $f$  is constant on an interval if, for any  $x_1$  and  $x_2$  in the interval,  $x_1 < x_2$  implies  $f(x_1) = f(x_2)$ .

### Definition of Relative Minimum and Relative Maximum

A function value  $f(a)$  is called a **relative minimum** of  $f$  if there exists an interval  $(x_1, x_2)$  that contains  $a$  such that  $x_1 < x < x_2$  implies  $f(a) \leq f(x)$ .

A function value  $f(a)$  is called a **relative maximum** of  $f$  if there exists an interval  $(x_1, x_2)$  that contains  $a$  such that  $x_1 < x < x_2$  implies  $f(a) \geq f(x)$ .

$$\text{Average Rate of Change of } f \text{ from } x_1 \text{ to } x_2 = \frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{change in } y}{\text{change in } x} = m_{\text{sec}}$$

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### Examples

1. Find the zeros of  $f(x) = 4x^3 - 24x^2 - x + 6$ .
2. Determine the intervals on which the function is increasing, decreasing or constant

$$f(x) = \begin{cases} x+3, & x \leq 0 \\ 3 & 0 < x \leq 2 \\ 2x+1 & x > 2 \end{cases}$$