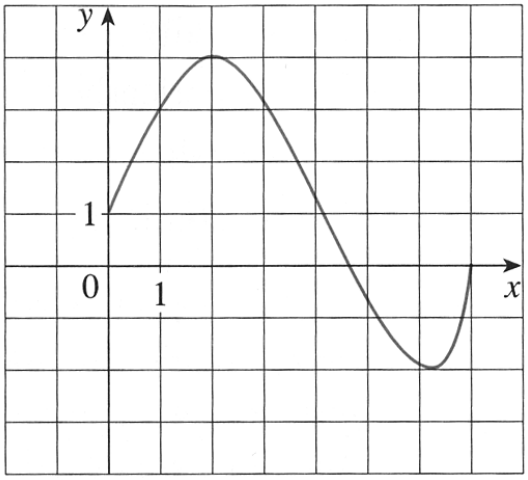
LECTURE NOTES: §1.1

1. The graph of a function f is shown below. Find the following:



a) $f(1)$ and $f(5)$

b) the domain of f

c) the range of f

d) For which value of x is $f(x) = 4$?

e) Where if f increasing?

2. Let $f(x) = 3x^2 - x + 2$. Find and simplify the following expressions. Are (b) and (c) different?

(a) $f(2)$

(d) $\dfrac{f(a+h) - f(a)}{h}$

(b) $f(a^2)$

(c) $[f(a)]^2$

3. Write a formula for the top half of the circle with center $(2, 0)$ and radius 3.

4. Find the domain of each of the following functions. Use interval notation.

(a) $f(x) = \dfrac{1}{x^4 - 16}$

(b) $f(x) = \sqrt{x} + \sqrt{11 - x}$

(c) $g(x) = \ln(x - 4)$

(d) $h(x) = \frac{1}{\sqrt{x^2 - 5x - 6}}$

5. Graph each of the following piecewise defined functions.

a) $f(x) = \begin{cases} -1 & \text{if } x \geq 2 \\ 7 - 2x & \text{if } x < 2 \end{cases}$

b) $f(x) = \begin{cases} x + 1 & \text{if } x \leq -1 \\ x^2 & \text{if } x > -1 \end{cases}$