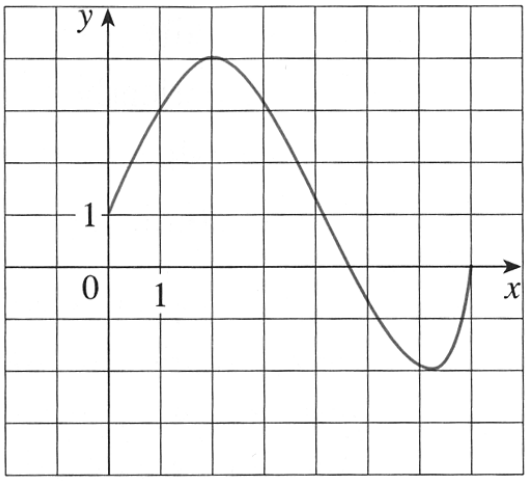
1. The graph of a function f is shown below. Find the following:



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

3 -1.7 (ish)

b) the domain of f

[0, 7]

c) the range of f

[-2, 4]

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

2

e) Where is f increasing?

[0, 1] ∪ [6.2, 7]

2. Let $f(x) = 3x^2 - x + 2$. Find and simplify the following expressions.

(a) $f(2)$ = 12

(b) $f(a^2)$ $3a^4 - a^2 + 2$

(c) $[f(a)]^2$ $(3a^2 - a + 2)^2 = 9a^4 + a^2 + 4 - 3a^3 + 6a^2 - a$

$= 9a^4 - 3a^3 + 7a^2 - a + 4$

(d) $\dfrac{f(2+h) - f(2)}{h}$

$3h + 11$

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

$6a - 1 + 3h$

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

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

$(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

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

$[0, 11]$

3. $g(x) = \ln(x - 4)$

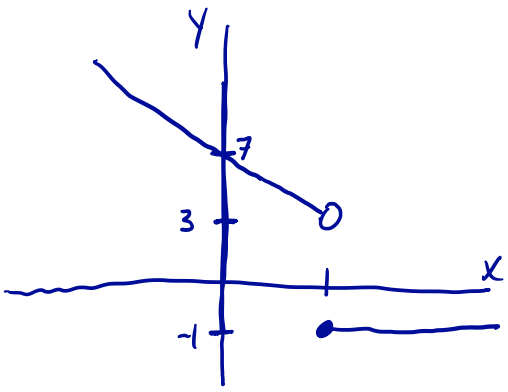
$(4, \infty)$

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

$(-\infty, -1) \cup (6, \infty)$

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