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

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

   $f(1)=3$, $f(5)\approx -0.6$

   b) the domain of f

   $[0,7]$

   c) the range of f

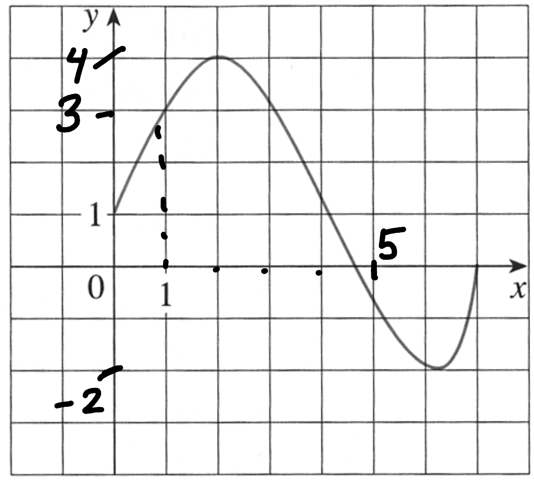
   $[2,4]$

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

   $x=2$

   e) Where if f increasing?

   when x is in $(0,2)\cup(6.1,7)$



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

   (a) $f(2) = 3(2)^2-2+2=12$

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

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

   $= 9a^4-6a^3+13a^2-4a+4$

   (d) $\dfrac{f(a+h)-f(a)}{h} = \dfrac{3(a+h)^2-(a+h)+2-[3a^2-a+2]}{h}$

   $= \dfrac{3a^2+6ah+3h^2-a-h+2-3a^2+a-2}{h} = \dfrac{6ah+3h^2-h}{h}$

   $=6a+3h-1$

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

Circle: $(x-2)^2 + y^2 = 9$

top half: $y = \sqrt{9-(x-2)^2}$

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

(a) $f(x) = \dfrac{1}{x^2 - 16}$

answer: $(-\infty,-4) \cup (-4,4) \cup (4,\infty)$

or

all real numbers except $x=4$ or $x=-4$

want to avoid: $x^2-16=0$

$(x-4)(x+4)=0$

$x=\pm 4$

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

answer: $[0,11]$

want $x \geq 0$ and $11-x \geq 0$

or $x \geq 0$ and $11 \geq x$

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

answer: $(-\infty, 4)$

want $x-4>0$

so $x>4$

(d) $h(x) = e^{-x} = \dfrac{1}{e^x}$

answer: $(-\infty,\infty)$

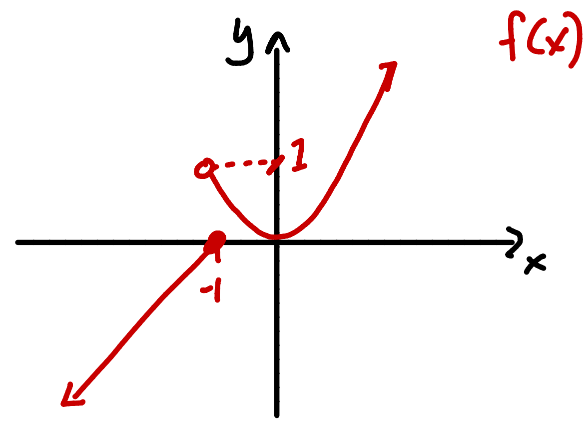
but $e^x \neq 0$.

So all x's are fine!

5. Graph the piecewise defined function.

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

answer



work