Precalculus
Homework Lecture 10

1. Evaluate the difference quotient and simplify your answer.

   (a) $\dfrac{f(2+h)-f(2)}{h}$, where $f(x)=x^2-x-1$.

   (b) $\dfrac{f(a+h)-f(a)}{h}$, where $f(x)=x^2$.

   (c) $\dfrac{f(a+h)-f(a)}{h}$, where $f(x)=x^3$.

   (d) $\dfrac{f(a+h)-f(a)}{h}$, where $f(x)=x^4$.

   (e) $\dfrac{f(x)-f(a)}{x-a}$, where $f(x)=\frac{1}{x}$.

   (f) $\dfrac{f(x)-f(1)}{x-1}$, where $f(x)=\frac{x-1}{x+1}$.

2. Find the implied domain of the function.

   (a) $f(x)=\dfrac{x+4}{x^2-4}$.

   (b) $f(x)=\dfrac{2x^3-5}{x^2+5x+6}$.

   (c) $f(t)=\sqrt[3]{3t-1}$.

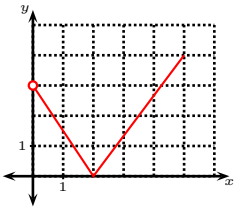
   (d) $g(t)=\sqrt{5-t}-\sqrt{1+t}$.

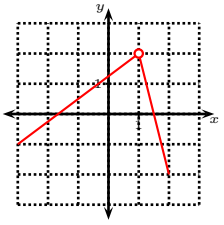
   (e) $h(x)=\dfrac{1}{\sqrt[6]{x^2-7x}}$.

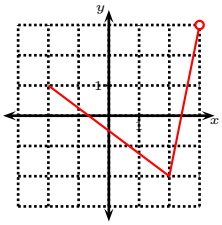
   (f) $f(u)=\dfrac{u+1}{1+\frac{1}{u+1}}$.

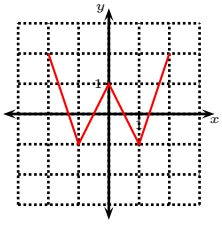
   (g) $F(x)=\sqrt{10-\sqrt{x}}$.

3. Write down a formula for a function whose graphs is given below. The graphs are up to scale. Please note that there is more than one way to write down a correct answer.

   (a)
   

   (b)
   

   (c)
   

   (d)
   

4. Decide whether the function f is even, odd, neither or both. Give a detailed explanation. The answer key has not been fully proofread, use with caution.

   (a) $f(x)=x+3x^3$

   (b) $f(x)=x^2+3$

   (c) $f(x)=x^2+x+1$.

   (d) $f(x)=0$.

   (e) $f(x)=\dfrac{1}{x}$.

   (f) $f(x)=\begin{cases} 5x+4 & \text{if } x>0 \\ 5x-4 & \text{if } x<0 \end{cases}$.

   (g) $f(x)=\dfrac{1-x}{1+x}+\dfrac{1+x}{1-x}$.

   (h) $f(x)=\dfrac{1-x}{1+x}-\dfrac{1+x}{1-x}$.

   (i) $f(x)=\dfrac{x-1}{x}$.

(j) $f(x) = x - \dfrac{1}{x}$.

(k) $f(x) = |x|$.

(l) $f(x) = \sqrt{|x|}$.