WORKSHEET 4
CALCULUS I
LIMITS OF INTERESTING EXPRESSIONS
DR. M. P. M. M. MCLOUGHLIN

Reduce numerical results. If an answer *does not exist*, write **DNE** in the corresponding answer blank!

1. Find $\lim_{h\to 0}\left(\frac{f(x+h)-f(x)}{h}\right)$ if it exists

A. where $f(x)=x^3$ $\quad f:\mathbb{R}\longrightarrow\mathbb{R}$

B. where $f(x)=\sqrt{3x-7}$ $\quad f:[{}^7/_3\,,\infty)\longrightarrow\mathbb{R}$

C. where $f(x)=\frac{x^3}{x+1}$ $\quad f:(-\infty,-1)\cup(-1,\ \infty)\longrightarrow\mathbb{R}$

D. where $f(x)=\frac{3x+5}{5x-3}$ $\quad f:(-\infty,{}^3/_5)\cup({}^3/_5,\ \infty)\longrightarrow\mathbb{R}$

E. where $f(x)=4x^2-5x+8$ $\quad f:\mathbb{R}\longrightarrow\mathbb{R}$

2. Find $\lim_{x\to 3}\left(\frac{f(x)-f(3)}{x-3}\right)$ if it exists

A. where $f(x)=x^3$ $\quad f:\mathbb{R}\longrightarrow\mathbb{R}$

B. where $f(x)=\sqrt{3x-7}$ $\quad f:[{}^7/_3\,,\infty)\longrightarrow\mathbb{R}$

C. where $f(x)=\frac{x^3}{x+1}$ $\quad f:(-\infty,-1)\cup(-1,\ \infty)\longrightarrow\mathbb{R}$

D. where $f(x)=\frac{3x+5}{5x-3}$ $\quad f:(-\infty,{}^3/_5)\cup({}^3/_5,\ \infty)\longrightarrow\mathbb{R}$

E. where $f(x)=4x^2-5x+8$ $\quad f:\mathbb{R}\longrightarrow\mathbb{R}$

F. where $f(x)=\ |x-3|$ $\quad f:\mathbb{R}\longrightarrow\mathbb{R}$