PRACTICE

AB.Q102.EXAMINATION – FORM A

CH 2 – Limits and Continuity at $x = a$

(100 points)

NO CALCULATORS

[60 minutes]

NAME:

DATE:

BLOCK:

1[19]. Formally **prove** that $f(x)=\begin{cases}-x^4+3, & x\le 2\\ x^2-17, & x>2\end{cases}$ is or is not continuous at $x=2$.

2[19]. Formally **prove** that $f(x)=\begin{cases}3-x, & x\ge -1\\ x^2+1, & x<-1\end{cases}$ is or is not continuous at $x=-1$.

3[19]. Formally **prove** that $f(x)=\begin{cases} x\sin\dfrac{1}{x^2}; & x\neq 0 \\ 0; & x=0 \end{cases}$ is or is not continuous at $x = 0$.

4[20] Let $f(x)=\dfrac{x-3}{\sqrt{x}-\sqrt{3}}$ and let $g(x)=\begin{cases} f(x);\ x>3 \\ (x-1)\sqrt{\dfrac{x^2}{3}};\ x\leq 3 \end{cases}$.

Formally **prove** that $g(x)$ is or is not continuous at $x=3$.

5[5]. Formally **prove** that $g(x) = \sqrt{x-5}$ is or is not continuous at $x = 5$?

6[9]. **Find** $\lim_{x\to\infty} f(x)$ and $\lim_{x\to-\infty} f(x)$ for the function $f(x) = \dfrac{2x+5}{|3x-4|}$. **What information** do these limits provide about the graph of f?

7[9]. **Write** a function $f(x)$ (in factored form) which has the following properties:

i. $\lim_{x\to\pm\infty} f(x) = 2$

ii. $\lim_{x\to-1} f(x) = \infty$

iii. $f(x)$ has a removable (hole) discontinuity at $x = -5$