Name: KEY	ID: KEY	Sec: 14 22

MATH-101 Term-131 IN-Class-QUIZ-12

(show all your work and circle one letter to get a full mark or you will get zero)

3) The sum of the absolute maximum and the absolute minimum values of the function $f(x)=2x^3+3x^2-12x$ is

(a) 45
(b) -33
(c) 38
(d) -7
(e) 35
(f) none of the above

$f'(x)=6x^2+6x-12=0$
$\Rightarrow x^2+x-2=0 \Rightarrow (x+2)(x-1)=0$
$\Rightarrow x=1, x=-2$ are criticals
Now, $f(x)=x[2x^2+3x-12]=x[x(2x+3)-12]$

2) The sum of all critical points of the function $f(x)=\frac{x^2+6}{\sqrt{4x-7}}$ is

(a) 49/12
(b) 19/4
(c) 10/12
(d) 5
(e) 3
(f) none of the above

$f'(x)=\dfrac{2x\sqrt{4x-7}-\frac{2(x^2+6)}{\sqrt{4x-7}}}{(4x-7)}\times\frac{\sqrt{}}{\sqrt{}}$
$=\dfrac{2x(4x-7)-2(x^2+6)}{(4x-7)\sqrt{4x-7}}$
$=\dfrac{6x^2+14x-12}{(4x-7)\sqrt{4x-7}}$

$f'=0 \Rightarrow (3x-2)(x+3)=0$
$x=2/3$ and $x=-3$
f' DNE $\Rightarrow x=7/4$
Domain is $4x-7>0 \Rightarrow x>7/4$
So we have only one critical $x=\frac{2}{3}$

1) The sum of the absolute maximum and the absolute minimum values of the function
$$f(x)=\begin{cases} x2-4x & \text{if } 0\le x<5 \\ -x+10 & \text{if } 5\le x\le 6 \end{cases}$$
is

(a) 1
(b) 4
(c) 0
(d) 9
(e) 5
(f) none of the above

$f'(x)=\begin{cases} 2x-4 & \text{if } 0<x<5 \\ -1 & \text{if } 5<x<6 \end{cases}$

$f'_-(5)=6$, $f'_+(5)=-1 \Rightarrow f$ is not diff at $x=5$
$\Rightarrow x=5$ is critical point
$f'(x)=0 \Rightarrow 2x-4=0 \Rightarrow x=2\in[0,5]$
$\Rightarrow x=2$ is a critical point

$x=0$	$x=2$	$x=5$	$x=6$
$f(0)=0$	$f(2)=-4$	$f(5)=5$	$f(6)=4$

largest $=5$, smallest $=-4$ $\Rightarrow$ global max value $=5$, global min value $=-4$; Sum $=1$

$\Rightarrow$ it is easy to evaluate using $f(x)=x[x(2x+3)-12]$ not to use $f(x)=2x^3+3x^2-12x$

$x=-3$	$x=-2$	$x=1$	$x=3$
$f(-3)=9$	$f(-2)=20$	$f(1)=-7$	$f(3)=45$

global max + global min $=45-7=38$