2012

Answer Key for AP Calculus BC Practice Exam, Section I

●	76	B
●	77	B
●	78	C
	79	E
●	80	E
●	81	D
●	82	C
●	83	C
●	84	D
	85	B
●	86	B
●	87	B
●	88	E
●	89	E
	90	E
	91	D
●	92	B

AB Subscore = $\frac{\text{AB pts}}{14/17}$

2012 BC Calculator

(76) (A) true, no jumps, hole or asym

(B) FALSE, "cusp"

$\lim_{x\to 0^-} f'(x) \neq \lim_{x\to 0^+} f'(x)$

(C) TRUE, $f'(x)$ DNE or $=0$ is crit #

(D) TRUE, $f(0)$ is lowest y-value

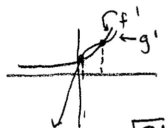
(E) TRUE, $f(x)$ conc down on $(-\infty, 0)$; $f(x)$ conc. up on $(0, \infty)$

$\boxed{B}$

(77) graph $f'(x)$ and $g'(x)$

when is $f' > g'(x)$?

on $(-\infty, 0.831) \cup (7.384, \infty)$



$\boxed{B}$

(78) $\int_{-1}^{9} (3f(x)+2)\,dx$

$= 3\int_{-1}^{9} f(x)\,dx + \int_{-1}^{9} 2\,dx$

$= 3\left[\tfrac{1}{2}(4+3)(-1) + \tfrac{1}{2}(6)(2)\right] + 2x\Big|_{-1}^{9}$

$= 3[2.5] + 20$

$= 27.5$ $\boxed{C}$

(79) $f(x) = f(3) + f'(3)(x-3) + \frac{f''(3)}{2!}(x-3)^2 + \frac{f'''(3)}{3!}(x-3)^3$

$= 2 + -1(x-3) + \frac{6}{2}(x-3)^2 + \frac{12}{3!}(x-3)^3$

$\boxed{E}$ $= 2 - (x-3) + 3(x-3)^2 + 2(x-3)^2$

(80) f': $-$ | $+$ | $-$ at -3, 2

I. rel min @ $x=-3$ ✓ b/c f' neg to pos

f'': $+$ $+$ $-$ $-$ at -2, 0, 1

II. no inf pt @ $x=-2$ ✗

III. f con. down on $(0,4)$ ✓

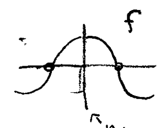
$\boxed{E}$ I & III only

(81) inf pt → f'' changes signs

f'': $-$ $+$ at 0, 1, 2

$f(x) = f(-x)$ → $f(x)$ is even, symmetrical about origin

f'': $-$ $+$ $-$ $+$ at -2, -1, 0, 1, 2



$\boxed{D}$ inf pt @ $x=-1$, $x=1$

(82) avg value of y $= \frac{1}{b-a}\int_a^b y$

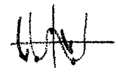
$= \frac{1}{\pi/2 - 0}\int_0^{\pi/2} \sqrt{\cos x}\,dx$

$\boxed{C}$ $= .763$

(83) def of f cont → $\lim_{x\to a^-} f(x) = \lim_{x\to a^+} f(x)$ and $\lim_{x\to a} f(x) = f(a)$

$\boxed{C}$ $f(3) = \lim_{x\to 3^-} f(x) = \lim_{x\to 3^+} f(x)$ ✓

(84) f conc. down → $f'' < 0$ or f' dec



f' dec → $(-1.5, -1) \cup (0, 1)$

$\boxed{D}$

(85) speed = 50, $ds/dt = 20$

rate fuel $= F'(S) \cdot \frac{ds}{dt}$

$= F'(50) \cdot 20$

$= 4.299$

$\boxed{B}$

(86) $\int_4^7 f(t)\,dt = 0$ (area = 0, so need pos or neg area)

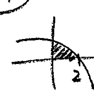
$f' > 0$ → f inc, so, not C or D

A → all neg area, not A

E → all pos area, not E

B → some pos & neg area $\boxed{B}$

(87)



→ Area square $= (\text{Side})^2 = (\ln(3-x))^2$

$V = \int_0^2 (\ln(3-x))^2\,dx$

$= 1.029$

$\boxed{B}$

(88) f' inc → $f'' > 0$, f conc. up } on $(-\infty, 0)$ so, only A or E

f' dec → $f'' < 0$, f conc. down } on $(0, \infty)$ $\boxed{E}$

(89) $v(3) = v(0) + \int_0^3 a(t)\,dt$

$= 5 + \int_0^3 \frac{t+3}{\sqrt{t^3+1}}\,dt$

$\boxed{E}$ $= 11.710$

(90) $\sum_{n=1}^{\infty} a_n$ converges

$a_n > \frac{a_n}{n}$ $\forall n, 1 < n < \infty$

so, by Direct Comparison Test, $\sum_{n=1}^{\infty} \frac{a_n}{n}$ converges

$\boxed{E}$

(91) $r = 2\cos 3\theta$, $r = 2$

Area O $= \int_0^{2\pi} \frac{1}{2}(2)^2\,d\theta = \pi(2)^2 = 4\pi$

Area ✿ $= \int_0^{\pi} \frac{1}{2}(2\cos 3\theta)^2\,d\theta = \pi$

Area O $-$ Area ✿ $= 4\pi - \pi$

$= 3\pi$

$\boxed{D}$ $= 9.425$

(92) $h(x) = h(2-x)$

$h'(x) = h'(2-x) \cdot -1$

$= -h'(2-x)$

$h'(1) = -h'(2-1)$

$h'(1) = -h'(1)$

$h'(1) = 0$ ✓ II true

$h'(0) = -h'(2-0)$

$= -h'(2)$ III False.

∴, II only $\boxed{B}$