

2012

**Answer Key for AP Calculus AB
Practice Exam, Section I**

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

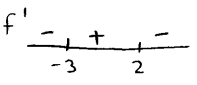
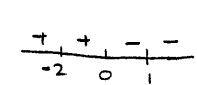
76 $f' > 0 \rightarrow f$ inc
 f' inc $\rightarrow f$ conc. up
E

77 IVT $\rightarrow f(a) > k$
 $f(b) < k$ } $\therefore f(x) = k$ on (a, b)
 $f(2) = 10 > 13$
 $f(4) = 20 < 13$ } $\therefore f(x) = 13$ on $(2, 4)$
A

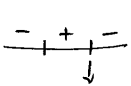
78 $y = e^{4-x} - 2$
 $0 = e^{4-x} - 2$
 $x = .606$
 $y'(606) = 2.961$
D

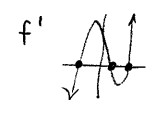
2012 AB
 Calculator

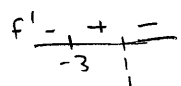
79 avg velocity = $\frac{1}{b-a} \int_a^b v(t) dt$
 $= \frac{1}{8-0} \int_0^8 v(t) dt$
B

80 f' 
 I. rel. min @ $x = -3$ ✓
 b/c f' neg to pos
 f'' 
 II. no inf pt @ $x = -2$ x
 III. f conc. down on $(0, 4)$ ✓
E I + III only

81 water in tank = initial water + \int rate water pump in
 $= 800 + \int_0^{20} r(t) dt$
 $= 1220.143$
D

82 rel. max $\rightarrow f'$ changes pos to neg
 f' 
 rel. max @ $x = 1$
C



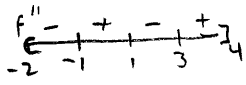
85 rel. max $\rightarrow f'$ changes pos to neg
 f' 
 rel. max @ $x = 1$
C

83 total distance = $\int_a^b |v(t)| dt$
 car stop $\rightarrow v(t) = 0$ @ $t = 8$
 distance = $\int_0^8 |v(t)| dt$
 over estimate $\approx 50 + 48 + 47 + 40 + 25 + 15 + 8 + 3$
 ≈ 236
 under estimate $\approx 0 + 3 + 8 + 15 + 25 + 40 + 47 + 48$
 ≈ 186
 \therefore **D**

84 f conc. down $\rightarrow f'' < 0$
 or f' dec
 f' dec $\rightarrow (-1.5, -1) \cup (0, 1)$
D

88 $\frac{dx}{dt} = 4$ ft/sec
 $\frac{ds}{dt} = ?$
 $\frac{15}{6} = \frac{x+s}{s}$
 $15s = 6x + 6s$
 $9s = 6x$
 $9 \frac{ds}{dt} = 6 \frac{dx}{dt}$
 $9 \frac{ds}{dt} = 6(4)$
 $\frac{ds}{dt} = 2.667$ ft/sec
B

86 $\int_4^7 f(t) dt = 0$ $f' > 0 \rightarrow f$ inc
 so, not Cor D
 area = 0 (need pos area + neg area)
 A \rightarrow all neg. area, not A
 E \rightarrow all pos. area, not E
 B \rightarrow some pos + neg, **B**

87 $f'' < 0 \rightarrow f$ conc. down
 f'' 
 f conc. down on $(-2, -1)$
 $\cup (1, 3)$
E


89 $v(3) = v(0) + \int_0^3 a(t) dt$
 $= 5 + \int_0^3 \frac{t+3}{\sqrt{t^3+1}} dt$
 $= 11.716$
E

90 $\int_6^{12} f(2x) dx = 10$
 $u = 2x$ $u(12) = 24$
 $du = 2 dx$ $u(6) = 12$
 $\frac{1}{2} du = dx$
 $= \int_{12}^{24} f(u) \cdot \frac{1}{2} du$
 $= \frac{1}{2} \int_{12}^{24} f(u) du = 10$
 $\int_{12}^{24} f(u) du = 20$
B

91

x	f'(x)	f''(x)
-2	3	>
0	1	>
3	4	>
5	7	>
6	5	>

 f'' changes signs twice,
 $\therefore f$ has at least 2 inf pts
B

92 
 Area Square = $(\text{side})^2$
 $= (\sqrt{x} - x^2)^2$
 $V = \int_0^1 (\sqrt{x} - x^2)^2 dx$
 $= .129$
A