2008 AP Calculus AB

calculator

* only these must use a calculator (there's only 6)

76) f increases where f' is positive
$[-2, 3]$ B

77) I true $\lim_{x \to 2^-}$ = hole
II true $\lim_{x \to 2^+}$ = a point
III false $\lim_{x \to 2^+} \neq \lim_{x \to 2^-}$ C

*78) $f'(x) = \sin(x^3 - x)$
$0 \leq x \leq 2$
f increases where f' is pos.
Look at graph of f' - find points of intersection with x-axis
$1 \leq x \leq 1.691$ B

79) $\int_{-5}^{2} f(x)dx = -17$ $\int_{5}^{2} f(x)dx = -4$
find $\int_{-5}^{5} f(x)dx$
$\int_{2}^{5} f(x)dx = 4$

$\int_{-5}^{5} = \int_{-5}^{2} + \int_{2}^{5} = -17 + 4 = -13$
B

*80) $f'(x) = x^2 \cos(x^2)$
f has points of inflection where f' changes signs, so f' changes from inc/dec or dec/inc
Look at graph of f' on given interval changes 5 times E

81) G(x) is an antiderivative for f(x)
$G(2) = -7$ (means $\int_0^2$)
$G(4) = \int_0^2 + \int_2^4$
$-7 + \int_2^4 f(t)$ E

*82) $v(t) = 7 - (1.01)^{-t^2}$
$a(3) = 1.055$ B
use math 8

*83) $A = \int_1^2 (x^3 - 8x^2 + 18x - 5) - (x+5)$
- use calculator to find boundaries
- use math 9

$\int_1^2 (x^3 - 8x^2 + 18x - 5) - (x+5) + \int_2^5 (x+5) - (x^3 - 8x^2 + 18x - 5)$
$1.583 + 11.25$
$= 11.833$ B

be careful - there are 3 points of intersection!

84) f has a max where f' changes from + to −, This occurs only at 4

C

85) $\int_{-4}^{-1} f'(x)$

Fundamental Thm of calc
$\int$ of $f'(x)$ =
$F(-1) - F(-4)$
$-1.5 - .75$
$= -2.25$

B

86) C

use info about f, f', f'' to eliminate and select correct answer

*87) $x(0) = 2$
$v(t) = \sqrt[3]{1+t^2}$

$x(0) + \int_0^3 \sqrt[3]{1+t^2}$

$2 + \int_0^{30} \sqrt[3]{1+t^2}$

$2 + 4.512 = 6.512$

D

88) $S = 4\pi r^2$
$\frac{dS}{dt} = 8\pi r \frac{dr}{dt}$
$= 8\pi(3)(-2)$
$= -48\pi$

C

$\frac{dr}{dt} = -2$
$r = 3$
$\frac{dS}{dt} = ?$

89) $-2 \le x \le 2$
$f(-2) = f(2) = 0$
$(-2,0)$ $(2,0)$

E

This is Rolle's Thm – since Rolle's Thm doesn't apply (there is no place where $f'(x) = 0$) the deriv doesn't exist

90) $f'(3) = 2$ deriv pos, so f is increasing at 3
$f''(x) < 0$ (concave down)

A

this is a bit tricky – you can try plotting points to see the concavity, and use points given to confirm slope

*91) $y = \frac{\cos x}{x^2+x+2}$ $[-1,3]$

$\frac{1}{4}\int_{-1}^{3} \frac{\cos x}{x^2+x+2}\,dx = .183$

C

92) $7\int_0^4 f(x) = dx$

$x=4$
$y=7$

boundaries are x's for f(x)

B