* problems which must use a calculator

# 2007 multiple Choice (Calculator)

C *76) $v(t) = t^2 \ln(t+2)$

$a(6) = v'(6) = \boxed{29.453}$ $\boxed{\text{math } 8}$

D 77) $\int_0^3 f(x)\,dx = 6$ $\int_3^5 f(x)\,dx = 4$

$\int_0^5 (3 + 2f(x))\,dx = \int_0^5 3 + \int_0^5 2f(x)$ $2\int_0^5 f(x)$

$3x\Big|_0^5$

$15 + 2\left(\int_0^3 f(x) + \int_3^5 f(x)\right)$

$15 + 2(6 + 4) = \boxed{35}$

E 78) H gives temperature

H' gives the instaneous rate of change

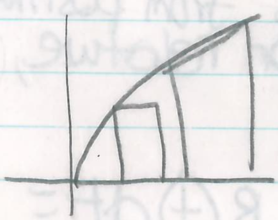
H'(24) gives rate of change at end of $24^{th}$ hr

A *79) at t=0, 81.637 gallons

$\int_0^6 9\sin(\sqrt{t+1}) = 45.031$ $\boxed{36.606}$

$\boxed{\text{math } 9}$ 81.637 − 45.031

D 80)



left and trapezoid are both underestimates for increasing function

B *81) $f'(x) = x - 4e^{-\sin(2x)}$

points of inflection where f'' changes signs, and f' changes from inc ⟷ dec.

graph f'(x)

C 82) Since f is continuous ... not necessarily differentiable

Choice D is Rolles Thm (f(a) must = f(b))

choice E is MVT

Choice C says there is a max.

91) $v(t) = 5te^{-t} - 1$ total distance $\int_0^4 |v(t)|\,dt + 1 = \boxed{2.821}$

C* 92) max where $f'$ changes + to − or endpoints 1.465 or 2 $\boxed{\text{Math 9}}$

$\int_0^{1.465} = .591$ $\int_0^{2} = .452$

D* 83) $f'$ inc (so $f''$ pos, $f$ ccu)
$f''$ inc (so $f'''$ pos) $f'$ ccu

$\frac{45 - 34.2}{3 - 2.8} = 29$ $\frac{48.05 - 45}{3.1 - 3.0} = 30.5$

$f'(3)$ is between the slopes of the 2 points that have 3 as one of their x's.

E 84) $f$ decreases where $f'$ is neg
$[0,2]\ [4,6]$

D* 85) $\int_1^4 \left[\frac{x^2}{10} - \left(\frac{-x^2}{10}\right)\right]^2 dx$ $\boxed{\text{math 9}}$
$\boxed{8.184}$

B 86) I - not necessarily - min might occur between selected chart values.
II Rolles - true
III not necessarily - $f(x)$ might decrease between table values

A 87) $f$ has max where $f'$ changes from positive to negative (question asked for relative, not absolute)

C* 88) $R(t) = 2\sqrt{1 + 5t^3}$ $\frac{1}{4-0}\int_0^4 R(t)\,dt = \boxed{14.691}$

D 89) $h(x) = (2f(x) + 3)(1 + g(x))$
$h'(x) = (2f(x) + 3)(g'(x)) + (1 + g(x))(2f'(x))$
$h'(1) = (2f(1) + 3)(g'(1)) + (1 + g(1))(2f'(1))$
$= (9)(4) + (-2)(-4) = 36 + 8 = \boxed{44}$

E 90) $f(3) = 8$ $f'(3) = 9$, $f$ and $g$ are inverses
$g(8) = 3$ $g'(8) = \frac{1}{f'(3)} = \boxed{1/9}$ $g'(x) = \frac{1}{f'(x)}$