PRACTICE TEST ONE

CALC

(29) $A_{\square} = (2)(4)$
$= 8$

$A_{\triangle} = 5.333714$

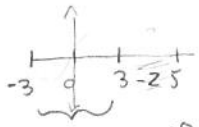
$\%$ unshaded $= \dfrac{5.333714}{8}$

$= .66671425$

$\%$ shaded $= .33328575$

$\boxed{B}$

(30) $\int_3^5 h(x) = -2$



odd $\rightarrow$ so $\int_{-3}^{0} = -\int_{3}^{0}$

$\int_{-3}^{5} h(x)dx = -2$

$\boxed{C}$

(31) I $\rightarrow$ not true
$g'(c) = DNE$, but none that are zero

II $\rightarrow$ g cont $\rightarrow$ yes, no breaks, jumps, asym.

III. $g'(3/2) < 0 \rightarrow$ yes slope @ $x = 3/2$ is negative

$\boxed{D}$

(32) $f(x) = (x+1)^{5/2}$

tangent line approx.

$f(3) = 32$

$f'(x) = \frac{5}{2}(x+1)^{3/2}$

$f'(3) = \frac{5}{2}(4)^{3/2}$

$f'(3) = 20$

$y - 32 = f'(3)(x-3)$

$y - 32 = 20(x-3)$

$y = 20x - 28$

$y = 20(3.1) - 28$

$y = 34$

$\boxed{C}$

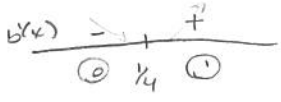
(33) $b(x) = \int_0^{2x^2-x+1} \sqrt{t^2+1}\, dt$

$b'(x) = \frac{d}{dx}\int_0^{2x^2-x+1} \sqrt{t^2+1}\, dt$

$b'(x) = \sqrt{(2x^2-x+1)^2+1}\ (4x-1)$

$0 = \sqrt{(2x^2-x+1)^2+1}\ (4x-1)$

$x = 1/4$



min @ $x = 1/4$

$\boxed{D}$

(34) $\dfrac{dy}{dt} = \dfrac{3}{2y(t+1)}$ $\quad y(0) = 1$

$\int 2y\, dy = \int \frac{3}{t+1} dt$

$y^2 = 3\ln|t+1| + C$

$1 = 3\ln|1| + C$

$1 = C$

$y = \sqrt{3\ln|t+1| + 1}$

(B)

(35)

$A = 5.333714$

$\boxed{B}$

(36) $\frac{1}{3-0}\int_0^3 \frac{x+1}{x^3+2}\,dx$

$= \frac{1}{3}(1.34009)$

$= .44669$

$\boxed{E}$

(37) $f(x) = \begin{cases} x^3 & x<0 \\ x^2 & x>0 \end{cases}$

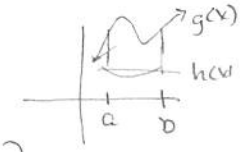
$f'(x) = \begin{cases} 3x^2 & x<0 \\ 2x & x>0 \end{cases}$

$f''(x) = \begin{cases} 6x & x<0 \\ 2 & x>0 \end{cases}$

$\left.\begin{array}{l} \lim_{x\to 0^-} f''(x) = 0 \\ \lim_{x\to 0^+} f''(x) = 2 \end{array}\right\} \neq$, so DNE

$\boxed{E}$

(38) $g+h$ cont. on $[a,b]$ $\quad g(x) \geq h(x)\ \forall x$ on $[a,b]$



I. $p(x) = g(x) - h(x)$

$\exists\, a$ c. s.t. $\frac{p(b)-p(a)}{b-a} = p'(c)$

yes, M.V.T.

II. $\int_a^b g(x)\,dx \geq \int_a^b h(x)\,dx$

TRUE, b/c $g(x) \geq h(x)$

$\boxed{C}$

III. $g'(x) \geq h'(x)$

not necessarily (see drawing)

(39) $\int_0^c (x^6 - e^x)\,dx$

$= \frac{1}{7}x^7 - e^x \Big|_0^c$

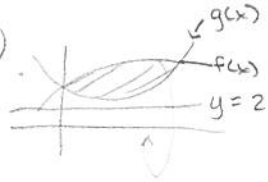
$= \frac{1}{7}c^7 - e^c - (\frac{1}{7}(0)^7 - e^0)$

$0 = \frac{1}{7}c^7 - e^c + 1$

$c = 1.6097637$

$\boxed{D}$

(40)



$V = \pi \int_a^b (f(x)-2)^2 - (g(x)-2)^2\,dx$

$\boxed{D}$

(41) $2xy^4 - x^3\cos y + y = 2\pi^4 + 1 + \pi$

$2x(4y^3\frac{dy}{dx}) + y^4(2) - x^3(-\sin y\frac{dy}{dx}) + \cos y(-3x^2) + \frac{dy}{dx} = 0$

$(8xy^3 + \sin y\, x^3 + 1)\frac{dy}{dx} = 3x^2\cos y - 2y^4$

$$\frac{dy}{dx} = \frac{3x^2\cos y - 2y^4}{8xy^3 + x^3\sin y + 1}$$

$\boxed{E}$

(42) $f(x) = 2x^5 + 2x^3 + 2x$

g inverse of f

$6 = 2x^5 + 2x^3 + 2x$

$x = 1$

$g'(6) = \dfrac{1}{f'(1)}$

$= \dfrac{1}{18}$

$\boxed{E}$

(43) $x^2 + y^2 = 4$

$2x\dfrac{dy}{dt} + 2y\dfrac{dy}{dt} = 0$

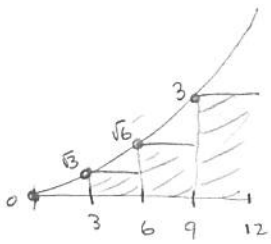
$2(1)(2) + 2(\sqrt{3})\dfrac{dy}{dt} = 0$

$2\sqrt{3}\dfrac{dy}{dt} = -4$

$\dfrac{dy}{dt} = \dfrac{-2}{\sqrt{3}}$

$\boxed{D}$

(44)



$A = (3)(0) + 3(\sqrt{3}) + 3(\sqrt{6}) + 3(3)$

$= 21.54462165$

$\boxed{A}$

(45) $v(t) = -2t^4 + 3t^2 + t + 1$

max acc.

$a(t) = -8t^3 + 6t + 1$

$a'(t) = -24t^2 + 6$

$0 = -24t^2 + 6$

$24t^2 = 6$

$t^2 = \frac{1}{4}$

$t = \pm\frac{1}{2}$

$\boxed{C}$