Math 1210 Final Review Key

① $13\frac{1}{3}$

② $y = -x + 4$

③ (a) $\frac{6}{11}$ (b) ∞ (c) $\frac{3}{2}$

④ (a) $-\frac{1}{2}x^{2/3} + C$

(b) $\sqrt{t^4 - 6} + C$

(c) $1\frac{3}{4}$

(d) $\frac{1}{4}$

(e) 0

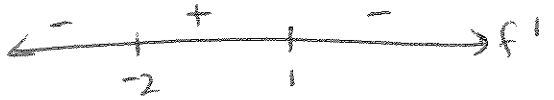
⑤ (a) $\frac{1}{3}\left(x^3 + (x^2-5x)^{1/3}\right)^{-2/3}\left(3x^2 + \frac{1}{3}(x^2-5x)^{-2/3}(2x-5)\right)$

(b) $(4x^3+9x)(\cos x + 10x^4) - (\sin x + 2x^5 - 3)(12x^2+9)$

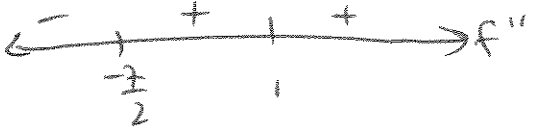
(c) $4(x^2+2x)^3(2x+2)\tan x + (x^2+2x)^4 \sec^2 x$

(d) $y' = \frac{8x^3 - 10x + 3y}{3y^2 - 3x}$

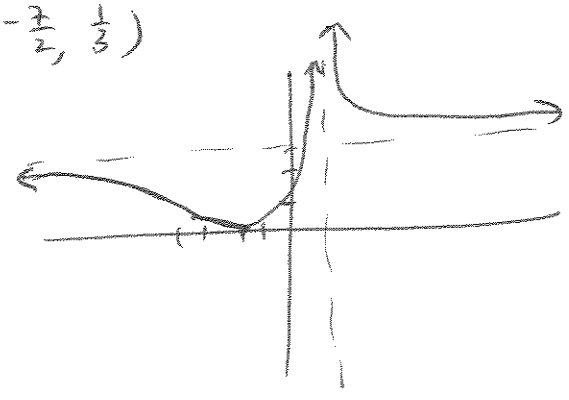
⑥ (a) VA: $x = 1$, HA: $y = 3$

(b) 

(c) min: $(-2, 0)$ max: none

(d) 

(e) $(-\frac{7}{2}, \frac{1}{3})$

(f) 

(7) (a) $V = \pi \int_0^4 4y\,dy$

(b) $V = \pi \int_0^2 (4-x^2)^2\,dx$

(c) $V = \pi \int_0^2 (4-x^2+3)^2 - 3^2\,dx$

(d) $V = \pi \int_0^2 (4-x)(4-x^2)\,dx$

(8) $\frac{17\sqrt{17}-1}{6}$

(9) 60 ft-pds

(10) $\frac{56\pi}{3}$

(11) $\left(\frac{7}{5}, \frac{3}{4}\right)$

(12) $\frac{1}{4\pi}$ $\frac{ft}{sec}$

(13) $y^4 = -3x^4 + 8x + \frac{4}{x} - 8$

(14) $\frac{3\pi}{5}$

(15) $10\sqrt{2} \times 15\sqrt{2}$ ft

(16) $\sqrt{2} \times \sqrt{2}$ inches

(17) process should end with $f'(x) = \frac{-3}{(x+2)^2}$

(18) $-\frac{8}{3}$ $\frac{ft}{sec}$

(19) $\Delta x = \frac{2}{n}$, $x_i = \frac{2i}{n}$, $\sum_{i=1}^{n} f(x_i)\Delta x = \sum_{i=1}^{n} \left[\left(\frac{2i}{n}\right)^2 + 3\right]\left(\frac{2}{n}\right)$, $\int_0^2 x^2+3\,dx = \frac{26}{3}$

(20) $c = \sqrt[3]{2}$

(21) process should end with $f'(x) = 2x+3$

(22) $y' = 16x^7 - 15x^4 + 2x - 9$

(23) $y = \frac{1}{3}x^3 - 5x + 2$

(24) (a) $\frac{\sqrt{8}}{9} = \frac{2\sqrt{2}}{9}$

(b) $\frac{\sqrt{3}}{-5}$

(c) DNE

(25) (a) 0

(b) $\frac{-2}{\sqrt{3}}$

(26) discontinuous at $x=-5$ because $f(-5)$ DNE

(27) VA: $x=-3$, HA: $y=-4$

(28) (a) $g'(x) = \frac{(x^2-9)(12x^2-4x+1) - (4x^3-2x^2+x)(2x)}{(x^2-9)^2}$

(b) $y' = (-10x^{-3}+3)(2x^4-7x) + (5x^{-2}+3x)(8x^3-7)$

(29) (a) 4

(b) $\frac{3}{4}$

(30) (a) $y' = \frac{3\cos x(\cos x + \sin x) + 3(\sin x - \cos x)\sin x}{9\cos^2 x}$

(b) $y' = \sec^2 x(x^{-3}+5x^2-7) + \tan x(-3x^{-4}+10x)$

(31) $y' = 3\sin(\sin(\cos(3x+1)))\cos(\cos(3x+1))\sin(3x+1)$

(32) $y' = 3\left(\frac{x^5-2}{\tan x}\right)^2\left(\frac{\tan x(5x^4) - (x^5-2)\sec^2 x}{\tan^2 x}\right)$

(33) $f'''(x) = \frac{-12}{(x+4)^4}$

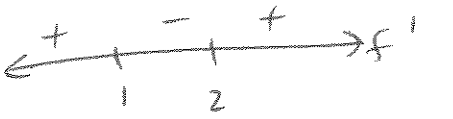
(34) $y = 44x - 48$

(35) (a) $\frac{8x-7-2xy}{x^2 - \frac{3}{2\sqrt{y}}} = y'$ (b) $y' = \frac{-3(4x^3+\cos x)}{(x^4+\sin x)^2}$

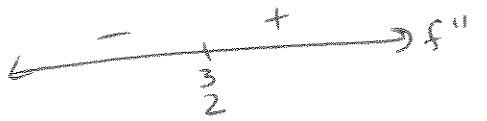
(36) 0.63

(37) $\frac{1}{64\pi}$ $\frac{ft}{sec}$

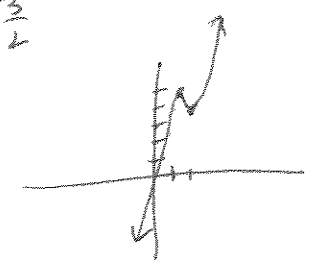
(38) $(-2,-3)$ $(-3,-1)$ $(1,15)$

(39) (a) 

(b) max $(1,5)$ min $(2,4)$

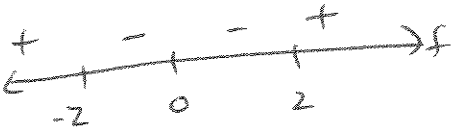
(c) 

(d) $\frac{3}{2}$

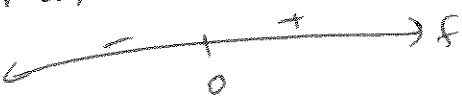
(e) 

(40) $\frac{dy}{dx} = 3\cos x + 8x^{-3} + \frac{5}{2\sqrt{5x-1}}$

(41) 3 inches on each side

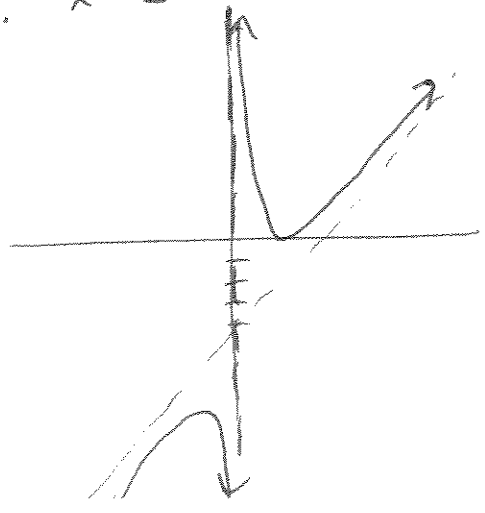
(42) (a) 

(b) max $(-2,-8)$ min $(2,=)$

(c) 

(d) none

(e) VA: $x=0$ (slant asymptote $y=x-4$)

(f) 

(43) (a) $\frac{x^5}{5} - 2\sin x + \frac{3}{5}x^{5/3} + C$

(b) $\frac{1}{4}(2x^2-7)^{-2} + C$

(44) $c = 1$

(45)

n	a_n	b_n	m_n	$f(a_n)$	$f(b_n)$	$f(m_n)$
1	-1	0	-0.5	-1	1	0.625
2	-1	-0.5	-0.75	-1	0.625	0.015625
3	-1	-0.75	-0.875	-1	0.015625	-0.435568 75
4	-0.875	-0.75	-0.8125	-0.435568 75	0.015625	-0.196533203 1
5	-0.8125	-0.75	-0.78125	-0.196533203 1	0.015625	-0.087188 7207

(46) $x_{n+1} = x_n - \frac{x_n^3 - x_n^2 + 1}{3x_n^2 - 2x_n}$

n	x_n
1	-0.5
2	-0.857142857 1
3	-0.764136 6048
4	-0.754 96348 24
5	-0.754 8776737

(47) 1150

(48) $\frac{1}{y} = -x^3 + 5x - 3$

(49) $\Delta x = \frac{4}{n}$, $\Delta x_i = \frac{4}{n} i$; $\sum_{i=1}^{n} f(x_i)\Delta x = \sum_{i=1}^{n} \left(2\left(\frac{4i}{n}\right) - 3\right)\left(\frac{4}{n}\right)$,

$\int_0^4 2x - 3\,dx = 4$

(50) 0

(51) $3\frac{1}{2}$

(52) $\sin 4$

(53) $G'(x) = \int_{\pi}^{x} \sin(t^2-3)\,dt + x\sin(x^2-3)$

(54) 9

55) $\frac{\pi}{45}$

56) $\frac{64\pi}{5}$

57) $\frac{8\pi}{9}$

58) 4π

59) $\frac{56\pi}{3}$

60) 24 ft-pds