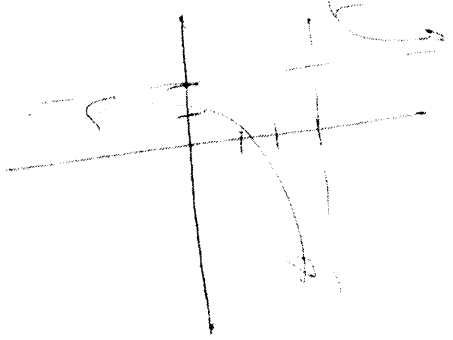
Chap 1-4 Review

1.) $\lim_{x \to 5} \frac{x^2 - 25}{x - 5} = \frac{(x+5)(x-5)}{x-5} = \boxed{10}$

2.) $\lim_{x \to \infty} \frac{2x^2 + 3}{x^2 - 4} = \frac{\frac{2x^2}{x^2} + \frac{3}{x^2}}{\frac{x^2}{x^2} - \frac{4}{x^2}} = \boxed{2}$

3.) $f(x) = 2 + \frac{1}{x-3}$



$\lim_{x \to 3^+} f(x) = +\infty$

$\lim_{x \to 3^-} f(x) = -\infty$

$\lim_{x \to -\infty} f(x) = 2$

$\lim_{x \to \infty} f(x) = 2$

4.) $f(x) = -.1x^2 + 7 \quad x = 0 \text{ to } x = 5$

$\frac{1}{2}(1)\left[f(0) + 2f(1) + 2f(2) + 2f(3) + 2f(4) + f(5)\right]$

$\frac{1}{2}\left[(7) + 2(6.9) + 2(6.6) + 2(6.1) + 2(5.4) + (4.5)\right]$

$= \boxed{30.75}$

~~4.~~ $\frac{dy}{dx}$ $y = \tan^{-1}(5x) - \sec^{-1}(2x+1)$

$f' = \frac{5}{1+25x^2} - \frac{2}{|2x+1|\sqrt{(2x+1)^2-1}}$ Skip

5.) a.) $x(t) = \frac{15}{1.6} t^{1.6} + C$

$v(t) = 15t^{.6}$

b.) $9.375t^{1.6} - 2$

6.) $f(x) = \begin{cases} -(x-3)^2+7 & x \geq 2 \\ ax^3+b & x<2 \end{cases}$

$-1+7 = 8a+b$

$6 = 8a+b$

$f'(x) = \begin{cases} -2(x-3) & x \geq 2 \\ 3ax^2 & x<2 \end{cases}$

$2 = 12a$

$\frac{1}{6} = a$

$a = \frac{1}{6} \quad b = 4\frac{2}{3}$

7.)

$f'(x) = \sin x \qquad f(\pi) = 8$

a.)

$f(x) = -\cos x + C$

$f(\pi) = -(-1) + C = 8$

$C = 7$

$f(x) = -\cos x + 7$

b.) $f'(x) = x^2 + 12x - 7 \qquad f(3) = 10$

$f(x) = \frac{1}{3}x^3 + 6x^2 - 7x + C$

$f(3) = 9 + 54 - 21 + C = 10$

$C = -32$

$f(x) = \frac{1}{3}x^3 + 6x^2 - 7x - 32$

8.) $B = f(g(x)) + 3(f(x))^2$

$B' = f'(g(x)) \cdot g'(x) + 6(f(x)) \cdot f'(x)$

$B'(1) = f'(g(1)) \cdot g'(1) + 6(f(1)) \cdot f'(1)$

$= f'(3) \cdot -3 + 6(3) \cdot 2)$

$= (4 \cdot -3) + (6 \cdot 3 \cdot 2) = -12 + 36 = \boxed{24}$

9.) $M = f(g(x^2))$

$M' = f'(g(x^2)) \cdot g'(x^2) \cdot 2x$

$M'(1) = f'(g(1)) \cdot g'(1) \cdot 2(1)$

$f'(3) \cdot -3 \cdot 2 = 4 \cdot -3 \cdot 2 = \boxed{-24}$

10.) $D = [f(x)+g(x)]^3$

$D' = 3[f(x)+g(x)]^2 \cdot [f'(x)+g'(x)]$

$D'(2) = 3[f(2)+g(2)]^2 \cdot [f'(2)+g'(2)]$

$= 3[5+1]^2 \cdot [3+-2]$

$= 3(6)^2 \cdot 1$

$= \boxed{108}$

11.) $f(x) = \begin{cases} \frac{x(x+1)}{x} & x \neq 0 \\ 1 & x = 0 \end{cases}$

$\boxed{D}$

12.) point $(\frac{\pi}{2}, \frac{\pi}{2})$

slope $f'(x) = 1 + -2\sin x$

$f'(\frac{\pi}{2}) = 1 - 2\sin\frac{\pi}{2}$

$= 1 - 2(1) = -1$

point slope form:

$y - \frac{\pi}{2} = -(x - \frac{\pi}{2})$

$y - \frac{\pi}{2} = -x + \frac{\pi}{2} + \frac{\pi}{2}$

$y = -x + \pi$

$y + x = \pi$

"B"

More Multiple Choice

1.) D 2.) A 3.) E 4.) C

5.) A 6.) A 7.) E 8.) C

9.) D 19.) D 20.) E (3,5) 21.) D

22.) A 23.) C 24.) B