Quiz #1 Math 101 Semester 022

Name:	I.D.		

27/2.2 Find $\lim_{x\to 2^+} \frac{1}{|2-x|} + [[2x-1]]$

$\lim_{x\to 2^+} \frac{1}{|2-x|} + \lim_{x\to 2^+} [[2x-1]]$

$\infty + 3 = \infty$

19/2.3 Find $\lim_{x\to-\infty} \frac{\sqrt{5x^2-2}}{x+3}$

$= \lim_{x\to-\infty} \frac{\sqrt{5x^2-2}\,/|x|}{x+3\,/|x|}$

$= \lim_{x\to-\infty} \frac{\sqrt{5-\frac{2}{x^2}}}{\frac{x}{|x|}+\frac{3}{|x|}} = -5$

Quiz #2 Math101 022

Name:	I.D.		

23b/2.4 Find a value for the constant k that will make the following function continuous

$$f(x)=\begin{cases} kx^2 & x\le 2 \\ 2x+k & x>2 \end{cases}$$

$\lim_{x\to 2} f(x) = f(2) = k(2)^2 = 4k$

$\lim_{x\to 2^+} f(x) = \lim_{x\to 2^+} 2x+k = 4+k = 4k$

$\Rightarrow 3k = 4$

$k = 4/3$

30/2.5 Find $\lim_{h\to 0} \dfrac{h^2}{2-2\cos^2 3h}$

$= \lim_{h\to 0} \dfrac{h^2}{2(1-\cos^2 3h)} = \lim_{h\to 0} \dfrac{h^2}{2\sin^2 3h}$

$= \dfrac{1}{2(9)}\left[\lim \dfrac{3h}{\sin 3h}\right]^2$

$= 1/18$

4/3.1 Given a function $s(t)=1/t^2$ and values $t_0=1$ and $t_1=2$

A. Find the average velocity over the interval [1,2]? $\dfrac{s(2)-s(1)}{2-1} = \dfrac{\frac{1}{4}-1}{1} = -3/4$

B. What is the instantaneous velocity $t_0=1$?

C. What is the instantaneous velocity at a general point t_0?

(c) $\lim_{t\to t_0} \dfrac{\frac{1}{t^2}-\frac{1}{t_0^2}}{t-t_0} = \lim_{t\to t_0} \dfrac{\frac{t_0^2-t^2}{t^2 t_0}}{t-t_0}$

$= \lim_{t\to t_0} \dfrac{-(t-t_0)(t+t_0)}{(t-t_0)(t^2 t_0)} = -\dfrac{2t_0}{t_0^3} = -\dfrac{2}{t_0^2}$

B = −2 from C

Quiz #3 and 4 Math 101 Semester 022

Name:	I.D.		

51/3.3 Show that $y = x^3 + 3x + 1$ satisfies $y''' + xy'' - 2y' = 0$.

$y''' = 6 \quad y'' = 6x \quad y' = 3x^2 + 3$

Then $y''' + xy'' - 2y' = 6 + x(6x) - 2(3x^2 + 3)$

$= 6 + 6x^2 - 6x^2 - 6 = 0.$

35/3.4 Find $\frac{d^{87}}{dx^{87}}(\sin x) = \frac{d^3 \sin x}{dx^3}$ $\quad 87 = 21 \cdot 4 + 3$

$= -\cos x$

30/3.6 Find equations of all tangent lines to the graph of $y^3 + yx^2 + x^2 - 3y^2 = 0$ at $x = 0$

$3y^2 y' + y'x^2 + 2xy + 2x - 6yy' = 0$

$y' = \frac{-2yx - 2x}{3y^2 + x^2 - 6y}$

$y^3 - 3y^2 = 0$

$y^2(y - 3) = 0$

$y = 0 \quad y = 3$

$y'|_{(0,0)}$ ∄ indefine $\quad x = 0 \quad$ V. t.

$y'|_{(0,3)} = 0 \quad$ H. t. $\quad y = 3.$