http://www.harryzaims.com/201/201-spring-11/tests/

Old Tests.

1. $\frac{d}{dx}\left[x^2-5x\right]$ by limit defin

2. Prove $\lim_{x\to 2}(3x-7)=-1$

3. $\lim_{x\to c}\frac{p(x)}{g(x)}=\lim_{x\to c}\frac{\text{poly }1}{\text{poly }2}$

3a. $\lim_{x\to 3}\frac{x^2+2x-15}{x^2-5x+6}$

3b. $\lim_{x\to 3}\frac{x^2+2x-15}{x^2+5x+6}$

3c. $\lim_{x\to 3}\frac{x^3-27}{x^2-5x+6}$

4. $\int (x+1)\sin(x^2+2x)\,dx$

5. a. $\frac{d}{dx}\int_0^x \frac{\sqrt{t^2+40t-2}}{\sin(\pi t)}\,dt$

b. $\frac{d}{dx}\int_0^{\sin x} \frac{\sqrt{t^2+40t-2}}{\sin(\pi t)}\,dt$

1 $\dfrac{f(x+h)-f(x)}{h} = \dfrac{(x+h)^2-5(x+h)-(x^2-5x)}{h}$

$= \dfrac{x^2+2xh+h^2-5x-5h-x^2+5x}{h}$

$= \dfrac{2xh+h^2-5h}{h} = 2x+h-5 \xrightarrow{h\to 0} 2x-5$

$= f'(x).$

2 Let $\varepsilon>0$ be given. Define $\delta = \frac{\varepsilon}{3}$.
Then, if $0<|x-2|<\delta$, we have
$|3x-7-(-1)| = |3x-6| = 3|x-2| < 3\delta = 3\cdot\frac{\varepsilon}{3}$
$= \varepsilon$ ■

3a $\dfrac{x^2+2x-15}{x^2-5x+6} = \dfrac{(x-3)(x+5)}{(x-3)(x-2)} = \dfrac{x+5}{x-2} \xrightarrow{x\to 3} 8$
$(x\neq 3)$

3b $\dfrac{x^2+2x-15}{x^2+5x+6} = \dfrac{(x-3)(x+5)}{(x+3)(x+2)} \xrightarrow{x\to 3} 0$

3b
what I "meant" $\dfrac{x^2+5x+6}{x^2+2x-15} = \dfrac{(x+3)(x+2)}{(x+5)(x-3)} \xrightarrow{x\to 3} \nexists$

3c

(4) $\int (x+1)\sin(x^2+2x)\,dx$

$$\left(\begin{aligned} u &= x^2+2x \\ \Longrightarrow du &= (2x+2)\,dx \\ dx &= \frac{du}{2x+2} = \frac{du}{2(x+1)} \end{aligned} \right)$$

$$= \int \cancel{(x+1)} \sin(x^2+2x) \frac{du}{2\cancel{(x+1)}}$$

$$= \frac{1}{2}\int \sin u \, du$$

$$= \frac{1}{2}\left[-\cos u\right] + C = -\frac{1}{2}\cos(x^2+2x) + C$$

(5)

Nov 18-12:47 PM

FINAL

FTC I $\quad g(x)$

5a $\quad \frac{d}{dx}\int_0^x \frac{\sqrt{t^2+40t-2}}{\sin(\pi t)}\,dt = \frac{\sqrt{x^2+40x-2}}{\sin(\pi x)} = \frac{dg}{dx}$

$g(\sin x)$ $\quad$ FTC I w/ chain rule

b $\quad \frac{d}{dx}\int_0^{\sin x} \frac{\sqrt{t^2+40t-2}}{\sin(\pi t)}\,dt$

$= \left(\frac{\sin^2 x + 40\sin x - 2}{\sin(\pi \sin x)}\right)\left(\cos x\right) = \frac{dg}{d\sin x}\cdot\frac{d\sin x}{dx}$

Doug

December

FINAL EXAM 12:10 - 2:00 p.m.

Sun	Mon	Tue	Wed	Thu
1	2	3	4	5
8	9	10	11	12