

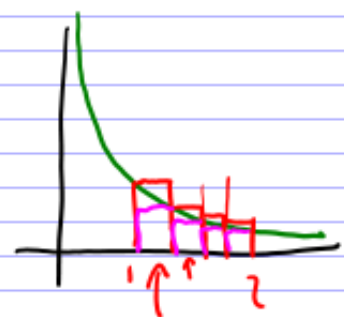
Panel 1

<u>Calculus</u>			
	<u>Def.</u>	<u>Geometry</u>	<u>How-to</u>
<u>limits</u>	given any $\epsilon > 0$ , there is $\delta > 0$ st. if $ x-c  < \delta$ $\rightarrow  f(x) - L  < \epsilon$	if $x$ gets closer to $c$ , $f(x)$ gets closer to $L$	plug in $x=c$ , or use l'Hospital or factoring...
<u>continuity</u>	1) $f(c)$ exists 2) $\lim_{x \rightarrow c} f(x)$ exists 3) $\lim_{x \rightarrow c} f(x) = f(c)$	no gaps or holes in the graph	check limits maybe left, right
<u>derivatives</u>	$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$	slope of tangent	power, product, quotient, chain rule
<u>integration</u>	$\int_a^b f(x) dx =$ limit of Riemann sum	area under curve, if $f(x) > 0$ , or "signed" area	antiderivative, subst. rule

Panel 2

$\int_1^2 \frac{1}{x} dx$

left endpoints  
right endpoints  
& division



left:  $\frac{1}{4} [f(1) + f(1.25) + f(1.5) + f(1.75)] =$   
 $\frac{1}{4} \left( \frac{1}{1} + \frac{1}{1.25} + \frac{1}{1.5} + \frac{1}{1.75} \right)$

right:  $\frac{1}{4} [f(1.25) + f(1.5) + f(1.75) + f(2)]$   
 ...

2

Panel 3

$$f(x) = \arcsin(x^4) \cdot (1+x^4)^3$$

$$\frac{1}{(1+x^4)^2} \cdot 2x(1+x^4)^2 + \arcsin(x^4) \cdot 3(1+x^4)^2 \cdot 4x^3$$

$$\int_0^{\pi/4} \frac{\sin(x)}{\cos^3(x)} dx = - \int_1^{1/2} \frac{1}{u^3} du = - \frac{1}{-2} u^{-2} \Big|_1^{1/2} = \frac{1}{2} (2-1) = \frac{1}{2}$$

$u = \cos(x)$

$du = -\sin(x) dx$

At  $x=0$ , then  $u = \cos(0) = 1$

At  $x = \pi/4$ ,  $\cos(\pi/4) = 1/\sqrt{2} = u$

Panel 4

$$\int x^2 e^{-x^3} dx = -\frac{1}{3} \int e^u du = -\frac{1}{3} e^u + C = -\frac{1}{3} e^{-x^3} + C$$

$u = x^2$        $u = -x^3$

$du = 2x dx$        $du = -3x^2 dx$

Exams

- ① Definitions
- ② Use definitions
- ③ Picture problem
- ④ limits
- ⑤ derivs
- ⑥ Integrals
- ⑦ Sketch a graph rational or using ln, exp
- ⑧ Story prob. (exp. growth/decay or max/min)
- ⑧ ⑨ surprise! (2<sup>nd</sup> fund. thm calc)

Panel 5

