

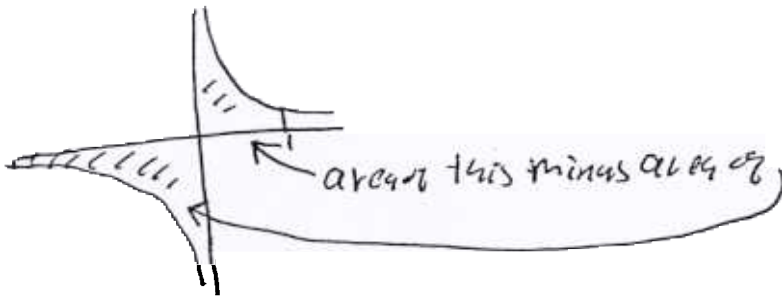
PRINT Your Name: \_\_\_\_\_ Recitation Time: \_\_\_\_\_  
 There are 10 problems on 5 pages. Each problem is worth 10 points. SHOW your work. **CIRCLE** your answer. **CHECK** your answer whenever possible.  
**NO CALCULATORS!**

1. Find  $\int_{-8}^1 \frac{1}{\sqrt[3]{x}} dx = \lim_{a \rightarrow 0^-} \int_{-8}^a x^{-\frac{1}{3}} dx + \lim_{b \rightarrow 0^+} \int_b^1 x^{-\frac{1}{3}} dx$

$$= \lim_{a \rightarrow 0^-} \left[ \frac{3}{2} x^{\frac{2}{3}} \right]_{-8}^a + \lim_{b \rightarrow 0^+} \left[ \frac{3}{2} x^{\frac{2}{3}} \right]_b^1$$

$$= \lim_{a \rightarrow 0^-} \left[ \frac{3}{2} a^{\frac{2}{3}} - 6 \right] + \lim_{b \rightarrow 0^+} \left[ \frac{3}{2} - \frac{3}{2} b^{\frac{2}{3}} \right]$$

$$= \frac{3}{2} - 6 = \left( -\frac{9}{2} \right)$$



2. Find  $\int \sin^3 x \cos^4 x dx = \int \sin x (1 - \cos^2 x) \cos^4 x dx = -\int (u^4 - u^6) du$

$\uparrow$   
 $u = \cos x$   
 $du = -\sin x dx$

$$= \frac{u^7}{7} - \frac{u^5}{5} + C$$

$$= \left( \frac{\cos^7 x}{7} - \frac{\cos^5 x}{5} + C \right)$$

Check:  $\frac{d}{dx} (\text{prop. ans}) = \cos^6 x (-\sin x) - \cos^4 x (-\sin x)$

$$= \cos^4 x \sin x (1 - \cos^2 x) \checkmark$$