Math 112
Quiz 2
Friday, February 1, 2008

Solutions.

1. Evaluate $\int \frac{5x+7}{(x+1)(x+2)}\,dx$.

$$\frac{5x+7}{(x+1)(x+2)} = \frac{A}{x+1} + \frac{B}{x+2} \Rightarrow 5x+7 = A(x+2)+B(x+1)$$

$x=-2 \Rightarrow -3=-B \quad B=3$

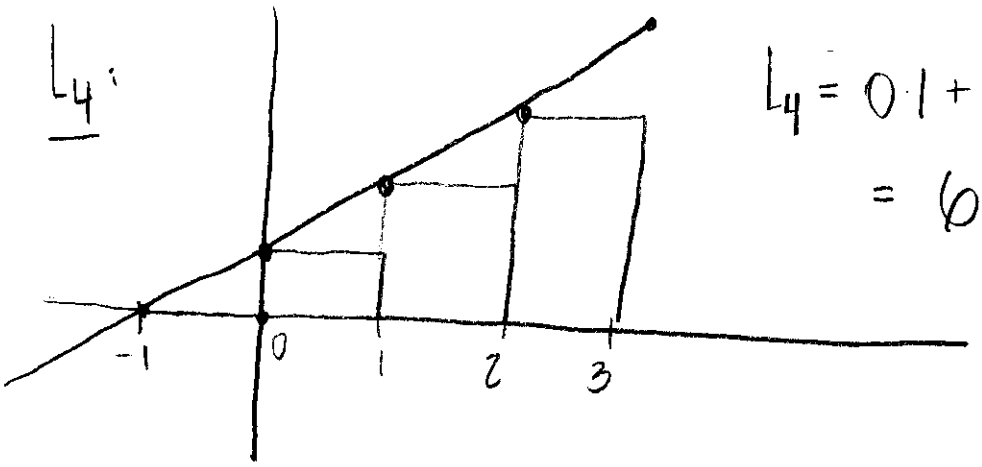
$x=-1 \Rightarrow 2=A \quad A=2$

$$\int \left(\frac{2}{x+1} + \frac{3}{x+2}\right) dx$$

$$= \boxed{2\ln|x+1| + 3\ln|x+2| + C}$$

2. Consider the integral $\int_{-1}^{3}(x+1)\,dx$. Draw a sketch that illustrates the approximating sums L_4 and R_4. Compute each approximation and compare it with the exact value of the integral computed using the FTC.

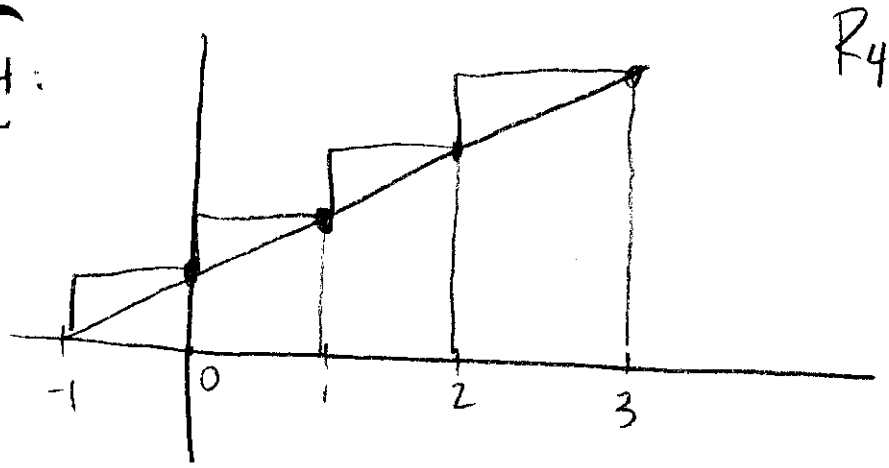
L_4:



$L_4 = 0\cdot 1 + 1\cdot 1 + 2\cdot 1 + 3\cdot 1$

$= 6$

R_4:



$R_4 = 1\cdot 1 + 2\cdot 1 + 3\cdot 1 + 4\cdot 1$

$= 10$

$$\int_{-1}^{3}(x+1)\,dx = \left(\frac{1}{2}x^2 + x\right)\Big|_{-1}^{3} = \left(\frac{9}{2}+3\right) - \left(\frac{1}{2}-1\right)$$

$$= \frac{9}{2} + 3 - \frac{1}{2} + 1 = 8$$

$L_4 < I < R_4$