MATH 6 – QUIZ 1
3 FEBRUARY 2012

Name: SOLUTIONS

NO CALCULATORS

1. Solve the following differential equation.

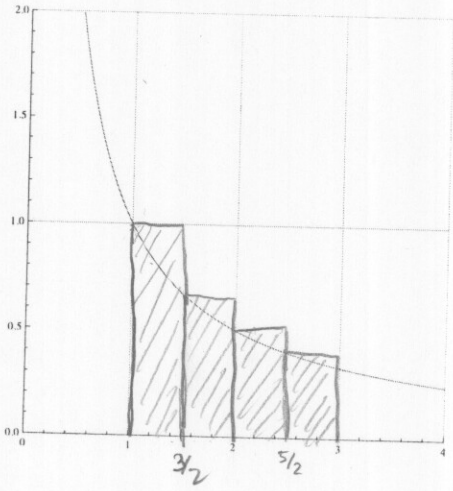
$$f'(x) = 8x^3 + 5, \quad f(1) = 5$$

$f(x) = \int 8x^3 + 5\,dx = 8\int x^3\,dx + \int 5\,dx = 8 \cdot \frac{x^4}{4} + 5x + C$

$= 2x^4 + 5x + C$.

$5 = f(1) = 2 + 5 - 2$, so $\boxed{f(x) = 2x^4 + 5x - 2}$

2. Estimate $\int_1^3 \frac{1}{x}\,dx$ using four rectangles of equal width. You may choose left or right endpoints. Draw your rectangles on the graph below.



Using left endpts: $\int_1^3 \frac{1}{x}\,dx \approx \frac{1}{2} \cdot 1 + \frac{1}{2} \cdot \frac{1}{3/2} + \frac{1}{2} \cdot \frac{1}{2} + \frac{1}{2} \cdot \frac{1}{5/2}$

$= \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5}$

$= \frac{30}{60} + \frac{20}{60} + \frac{15}{60} + \frac{12}{60}$

$= \boxed{\frac{77}{60}}$

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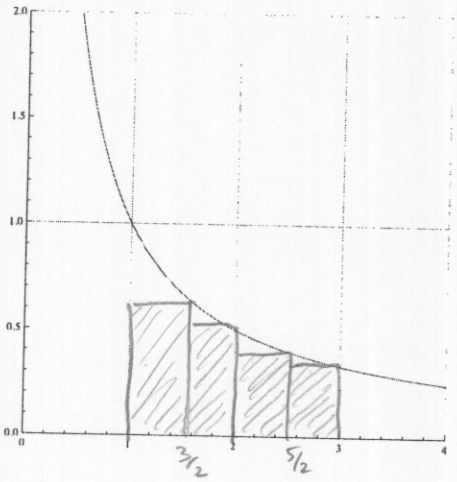

Using right endpts:

$$\int_1^3 \frac{1}{x}\,dx \approx \frac{1}{2}\cdot\frac{1}{3/2} + \frac{1}{2}\cdot\frac{1}{2} + \frac{1}{2}\cdot\frac{1}{5/2} + \frac{1}{2}\cdot\frac{1}{3}$$

$$= \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}$$

$$= \frac{20}{60} + \frac{15}{60} + \frac{12}{60} + \frac{10}{60} = \boxed{\frac{57}{60}}$$