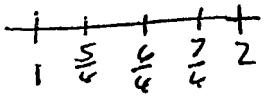
8. Use Trapezoidal rule with $n = 4$ to approximate $\int_1^2 \frac{1}{x} dx$. (You may leave your answer as a sum of fractions; it is not necessary to express it as a decimal.)

$\int_1^2 \frac{1}{x} dx = \frac{1}{4 \cdot 2}\left[\frac{1}{1} + \frac{2}{\frac{5}{4}} + \frac{2}{\frac{6}{4}} + \frac{2}{\frac{7}{4}} + \frac{1}{2}\right]$



9. Let $f(x) = x - \ln x$. Where is $f(x)$ increasing, decreasing, concave up, and concave down. Find the local maxima, local minima, and points of inflection of $y = f(x)$. Graph $y = f(x)$.

$f'(x) = 1 - \frac{1}{x} = \frac{x-1}{x}$

$f''(x) = \frac{1}{x^2}$

f'neg | f'pos

1

f'' always pos

f is increasing for $1 \le x$

f is dec for $0 < x \le 1$

(1, 1) is the loc. min

local max

always c.u.

never c.d.

p of inf

x domain is $0 < x$