For **1–3**: do not use a calculator on these problems. Your answers should be numbers. However, you do not have to perform grade school level arithmetic. E.g., something as below is acceptable:

$$\frac{3}{10}\left[\frac{13}{17}+(2)\sqrt{\frac{14}{15}}+\sqrt{\frac{16}{17}}\right] \qquad \text{or} \qquad \frac{(17)\,(18)}{(19)\,(20)\,(21)\,(22)}\ .$$

You may use a calculator for **4**.

Let

$$f\,(x)=x^2\ +\ 1 \qquad \text{and} \qquad [a,b]=[-1,1] \qquad \text{and} \qquad n=4\ .$$

1. Find the Trapezidal Rule approximation T_n of $\int_a^b f\,(x)\ dx$ with n steps.

ANSWER: $T_n\ =$

Table for $n=3$. $\Delta x=$

i	x_i	weight	$f\,(x_i)$
0			
1			
2			
3			
4			

2. Find a good upper bound for $\max_{a\le x\le b}\ |f''\,(x)|$.

ANSWER: $\max\limits_{a\le x\le b}\ |f''\,(x)|\ \le$

3. The Trapezoidal Rule Error Theorem gives that $\left|T_n-\int_a^b f\,(x)\ dx\right|\ \le$.

4. Find the smallest integer n so that the Trapezoidal Rule Error Estimate (TREE) guarantees that $\left|T_n-\int_a^b f\,(x)\ dx\right|\ \le\ 10^{-4}$. ANSWER: $n\ =$.

Recall: $1\text{E}^{-4}\ =\ 10^{-4}\ =\ \frac{1}{(10)^4}\ =\ \frac{1}{10000}\ =\ 0.0001$