Approximate Integration Errata and Addendum

Slide 0: The most important new points in this package are the Trapezoid rule

$$T_n = \frac{\Delta x}{2}\left(f(x_0) + 2f(x_1) + ... + 2f(x_{n-1}) + f(x_n)\right)$$

Simpson's rule

$$S_{2n} = \frac{\Delta x}{3}\Big(f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + 2f(x_4) + ... + 2f(x_{2n-2}) + 4f(x_{2n-1}) + f(x_{2n})\Big)$$

which in your textbook is denoted by

$$S_m = \frac{\Delta x}{3}\Big(f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + 2f(x_4) + ... + 2f(x_{m-2}) + 4f(x_{m-1}) + f(x_m)\Big)$$

where we have the implicit assumption here that m is even. Also, the three error bounds with theorems as stated in the notes are very important. Another key idea is that *as n gets really large, USUALLY Simpson's rule is the best approximation.* It's not always true but as a rule of thumb, using Simpson's rule will give you a good bound.

Slide 3 Line 2: 'Let $x_1, x_2, .., x_n$' should read 'Let $x_0, x_1, ..., x_n$'.

Slide 5 Line 2: The sum listed is L_4.

Slide 5 Line 7: The sum is 42.72027090.

Slide 7 Line 2: The sum listed is R_4.

Slide 7 Line 7: The sum is 32.02479662.

Slide 9 Line 2: The sum listed is M_4.

Slide 9 Line 3: Remove 0.5.

Slide 9 Line 7: The sum is 74.23479834.

Slide 12 Line 2: The sum listed is T_4.

Slide 12 Line 3: There should be a $0.5\big($ around the entire sum

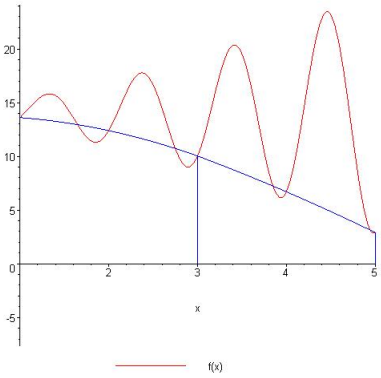
Slide 12 Line 7: At the end of this line should be the $\big)$ enclosing the sum.

Slide 12 Line 8: The sum is 37.37253376.

Slide 15 Line Final: The value of K is also equal to $\frac{2}{e}$.

Slide 18 Line 8: Change 'piece more' to read 'piece twice as much'.

Slide 21 Line ??: The picture drawn is incorrect. This is actually S_8. MAPLE has a funny quirk that when you tell it which partition of Simpson's rule you want, it will actually double it. Hence I put in what I thought was S_4 but it actually output S_8. The correct picture is



Slide 22 Line 2: The sum listed is S_4.

Slide 22 Line 7: The sum is 37.04120590.