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Tarea 2 Semana del 27 de febrero al 3 de marzo

Instrucciones. Determinar el valor aproximado de la integral usando:

a) Regla del Trapecio

b) Regla de Simpson

$$\int_2^3 \frac{1}{\ln x} dx, n = 10$$

$$[2, 3] \quad n = 10$$

$$A \approx \frac{\Delta x}{2} (f(x_0) + 2(f(x_1) + f(x_2) + \dots + f(x_{n-1})) + f(x_n))$$

$$\Delta x = \frac{b-a}{n} = \frac{3-2}{10} = \frac{1}{10}$$

Trapecio

$$x_i = a + i \Delta x$$

$$x_0 = 2 + 0\left(\frac{1}{10}\right) = 2 + 0 = 2 \quad f(x_0) = \frac{1}{\ln 2} \approx 1.4427$$

$$x_1 = 2 + 1\left(\frac{1}{10}\right) = 2 + \frac{1}{10} = \frac{21}{10} \quad f(x_1) = \frac{2}{\ln \frac{21}{10}} \approx 2.6956$$

$$x_2 = 2 + 2\left(\frac{1}{10}\right) = 2 + \frac{2}{10} = \frac{22}{10} \quad f(x_2) = \frac{2}{\ln \frac{11}{5}} \approx 2.5366$$

$$x_3 = 2 + 3\left(\frac{1}{10}\right) = 2 + \frac{3}{10} = \frac{23}{10} \quad f(x_3) = \frac{2}{\ln \frac{23}{10}} \approx 2.4012$$

$$x_4 = 2 + 4\left(\frac{1}{10}\right) = 2 + \frac{4}{10} = \frac{24}{10} \quad f(x_4) = \frac{2}{\ln \frac{12}{5}} \approx 2.2844$$

$$x_5 = 2 + 5\left(\frac{1}{10}\right) = 2 + \frac{5}{10} = \frac{25}{10} \quad f(x_5) = \frac{2}{\ln \frac{5}{2}} \approx 2.1827$$

$$x_6 = 2 + 6\left(\frac{1}{10}\right) = 2 + \frac{6}{10} = \frac{26}{10} \quad f(x_6) = \frac{2}{\ln \frac{13}{5}} \approx 2.09312$$

$$x_7 = 2 + 7\left(\frac{1}{10}\right) = 2 + \frac{7}{10} = \frac{27}{10} \quad f(x_7) = \frac{2}{\ln \frac{27}{10}} \approx 2.0135$$

$$x_8 = 2 + 8\left(\frac{1}{10}\right) = 2 + \frac{8}{10} = \frac{28}{10} \quad f(x_8) = \frac{2}{\ln \frac{14}{5}} \approx 1.9424$$

$$x_9 = 2 + 9\left(\frac{1}{10}\right) = 2 + \frac{9}{10} = \frac{29}{10} \quad f(x_9) = \frac{2}{\ln \frac{29}{10}} \approx 1.8784$$

$$x_{10} = 2 + 10\left(\frac{1}{10}\right) = 2 + \frac{10}{10} = \frac{30}{10} \quad f(x_{10}) = \frac{1}{\ln 3} \approx 0.9102$$

$$A \approx \frac{1}{20} (1.4427 + 2.6956 + 2.5366 + 2.4012 + 2.2844 + 2.1827 + 2.0931 + 2.0135 + 1.9424 + 1.8784 + 0.9102)$$

$$A \approx \frac{1}{20} (22.3808) \approx 1.1190$$

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$$A \approx \frac{\Delta x}{3} (f(x_0) + 4f(x_1) + 2(f(x_2)) + \dots + 2(f(x_{i-2}) + 4(f(x_{i-1}) + f(x_i))) \quad (2,3) \quad n=10$$

$$\Delta x = \frac{b-a}{n} = \frac{3-2}{10} = \frac{1}{10}$$

Simpson

$$x_i = a + i \Delta x$$

$$x_0 = 2 + 0\left(\frac{1}{10}\right) = 2 + 0 = 2$$

$$x_1 = 2 + 1\left(\frac{1}{10}\right) = 2 + \frac{1}{10} = \frac{21}{10}$$

$$x_2 = 2 + 2\left(\frac{1}{10}\right) = 2 + \frac{2}{10} = \frac{22}{10}$$

$$x_3 = 2 + 3\left(\frac{1}{10}\right) = 2 + \frac{3}{10} = \frac{23}{10}$$

$$x_4 = 2 + 4\left(\frac{1}{10}\right) = 2 + \frac{4}{10} = \frac{24}{10}$$

$$x_5 = 2 + 5\left(\frac{1}{10}\right) = 2 + \frac{5}{10} = \frac{25}{10}$$

$$x_6 = 2 + 6\left(\frac{1}{10}\right) = 2 + \frac{6}{10} = \frac{26}{10}$$

$$x_7 = 2 + 7\left(\frac{1}{10}\right) = 2 + \frac{7}{10} = \frac{27}{10}$$

$$x_8 = 2 + 8\left(\frac{1}{10}\right) = 2 + \frac{8}{10} = \frac{28}{10}$$

$$x_9 = 2 + 9\left(\frac{1}{10}\right) = 2 + \frac{9}{10} = \frac{29}{10}$$

$$x_{10} = 2 + 10\left(\frac{1}{10}\right) = 2 + \frac{10}{10} = 3$$

$$f(x_0) = \frac{1}{\ln 2} \approx 1.4427$$

$$f(x_1) = \frac{4}{\ln 21/10} \approx 5.3912$$

$$f(x_2) = \frac{2}{\ln 22/10} \approx 2.5366$$

$$f(x_3) = \frac{4}{\ln 23/10} \approx 4.8024$$

$$f(x_4) = \frac{2}{\ln 24/10} \approx 2.2844$$

$$f(x_5) = \frac{4}{\ln 25/10} \approx 4.3654$$

$$f(x_6) = \frac{2}{\ln 26/10} \approx 2.0931$$

$$f(x_7) = \frac{4}{\ln 27/10} \approx 4.0271$$

$$f(x_8) = \frac{2}{\ln 28/10} \approx 1.9424$$

$$f(x_9) = \frac{4}{\ln 29/10} \approx 3.7568$$

$$f(x_{10}) = \frac{1}{\ln 3} \approx 0.9102$$

$$A \approx \frac{1}{30} (1.4427 + 5.3912 + 2.5366 + 4.8024 + 2.2844 + 4.3654 + 2.0931 + 4.0271 + 1.9424 + 3.7568 + 0.9102)$$

$$A \approx \frac{1}{30} (33.5623) \approx 1.1187$$

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