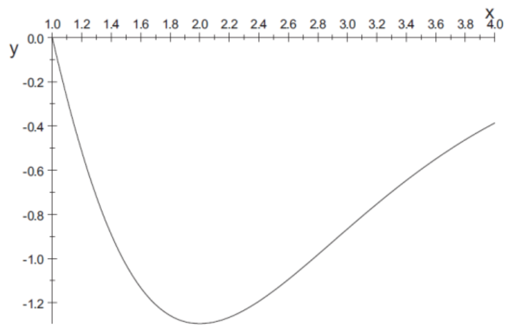
SAYISAL İNTEGRAL ÖRNEK

A) $I=\int_1^4 \frac{13(x-x^2)}{\sqrt{e^{3x}}}dx$ integralini h=0.5 olmakla **Sol, Sağ dikdörtgenler ve Yamuk Yöntemi** yardımı ile hesaplayınız.



Bu durumda $n=\frac{b-a}{h}=\frac{4-1}{0.5}=\frac{3}{0.5}=6$ olur

Ve ya $I=\int_1^4 \frac{13(x-x^2)}{\sqrt{e^{3x}}}dx$ n=6 olmakla hesaplayınız . Bu durumda

$h=\frac{b-a}{n}=\frac{4-1}{6}=\frac{3}{6}=0.5$ olur.

i	x_i			$F_i= F(x_i)$	
0	x_0	=	1	$f_0=$ 0	
	$x_{1/2}$			$f_{1/2}=$	**
1	x_1	=	1.5	$f_1=$ −1.0276	
	$x_{3/2}$			$f_{3/2}=$	**
2	x_2	=	2	$f_2=$ −1.2945	
	$x_{5/2}$			$f_{5/2}=$	**
3	x_3	=	2.5	$f_3=$ −1.1465	
	$x_{7/2}$			$f_{7/2}=$	**
4	x_4	=	3	$f_4=$ −0.8665	
	$x_{9/2}$			$f_{9/2}=$	**
5	x_5	=	3.5	$f_5=$ −0.5969	
	$x_{11/2}$			$f_{11/2}=$	**
6	x_6	=	4	$f_6=$ −0.3867	

i	x_i			$F_i = F(x_i)$	
0	x_0	=	1	$f_0 =$ 0	
	$x_{1/2}$			$f_{1/2} =$	**
1	x_1	=	1.5	$f_1 = -1.0276$	
	$x_{3/2}$			$f_{3/2} =$	**
2	x_2	=	2	$f_2 = -1.2945$	
	$x_{5/2}$			$f_{5/2} =$	**
3	x_3	=	2.5	$f_3 = -1.1465$	
	$x_{7/2}$			$f_{7/2} =$	**
4	x_4	=	3	$f_4 = -0.8665$	
	$x_{9/2}$			$f_{9/2} =$	**
5	x_5	=	3.5	$f_5 = -0.5969$	
	$x_{11/2}$			$f_{11/2} =$	**
6	x_6	=	4	$f_6 = -0.3867$	

$$I_{sol} = \int_1^4 \frac{13(x-x^2)}{\sqrt{e^{3x}}}dx = h\sum_{i=1}^{n-1} f_i = h(f_0+f_1+f_2+f_3+f_4+f_5) =$$

= 0.5x[0 - 1.0276 - 1.2945 - 1.1465 - 0.8665 - 0.5969]=0.5x(-4.9320)=-2.466

$$I_{sağ} = \int_1^4 \frac{13(x-x^2)}{\sqrt{e^{3x}}}dx = h\sum_{i=1}^{n} f_i = h(f_1+f_2+f_3+f_4+f_5+f_6) =$$

= 0.5x[−1.0276−1.2945−1.1465−0.8665−0.5969−0.3867]=0.5x(-5.3187)=-2.6594

$$I_{yamuk} = \int_1^4 \frac{13(x-x^2)}{\sqrt{e^{3x}}}dx = \frac{h}{2}\left[f_0 + 2\sum_{i=1}^{n-1} f_i + f_n\right] = \frac{h}{2}\left[f_0 + 2(f_1+f_2+f_3+f_4+f_5)+f_6\right] =$$

= 0.25x[0−2x(1.0276+1.2945+1.1465+0.8665+0.5969)-0.3867]=-2.5627

i	x_i			$F_i= F(x_i)$	
0	x_0	=	1	$f_0 =$ 0	
	$x_{1/2}$		1.25	$f_{1/2} =$ −0.623	**
1	x_1	=	1.5	$f_1 =$ −1.0276	
	$x_{3/2}$		1.75	$f_{3/2} =$ −1.236	**
2	x_2	=	2	$f_2 =$ −1.2945	
	$x_{5/2}$		2.25	$f_{5/2} =$ −1.2511	**
3	x_3	=	2.5	$f_3 =$ −1.1465	
	$x_{7/2}$		2.75	$f_{7/2} =$ −1.0112	**
4	x_4	=	3	$f_4 =$ −0.8665	
	$x_{9/2}$		3.25	$f_{9/2} =$ −0.7259	**
5	x_5	=	3.5	$f_5 =$ −0.5969	
	$x_{11/2}$		3.75	$f_{11/2} =$ −0.4835	**
6	x_6	=	4	$f_6 =$ −0.3867	

Merkez dikdöretgenler Yöntemi

$$I_{mer} = \int_1^4 \frac{13(x-x^2)}{\sqrt{e^{3x}}}dx = h \sum_{i=0}^{n-1} f\left(x_{i+\frac{1}{2}}\right) = h\left[f\left(x_{\frac{1}{2}}\right) + f\left(x_{\frac{3}{2}}\right) + f\left(x_{\frac{5}{2}}\right) + \ldots + f\left(x_{n-\frac{1}{2}}\right)\right] =$$

=0.5*[−0.623−1.236−1.2511−1.0112−0.72581−0.4835] = -2.6653