

$$\text{In}[1]:= \text{N}\left[\int_{-1}^1 \text{Sin}\left[1 - \text{Cos}\left[e^{x^5}\right]\right] (1-x)^5 (1+x)^3 dx\right]$$

[чи] -1 [синус] [косинус]

$$\text{Out}[1]= 0.436547$$

$$\text{In}[2]:= \text{norm}[1_, r_] := \int_{-1}^1 1 * r * (1-x)^5 * (1+x)^3 dx$$

$$\text{Orthogonalize}\left[\{1, x, x^2, x^3, x^4, x^5, x^6, x^7, x^8\}, \text{norm}\right]$$

[ортогонализировать]

$$\text{Out}[3]= \left\{ \frac{3\sqrt{7}}{8}, \frac{5}{16} \sqrt{\frac{231}{2}} \left( \frac{1}{5} + x \right), \frac{33}{16} \sqrt{\frac{39}{2}} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right), \right.$$

$$\frac{273}{64} \sqrt{\frac{55}{2}} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right),$$

$$\frac{65}{32} \sqrt{\frac{1309}{2}} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \right.$$

$$\left. \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right),$$

$$\frac{153}{128} \sqrt{\frac{19019}{2}} \left( \frac{3}{143} + x^5 - \frac{5}{39} \left( \frac{1}{5} + x \right) + \frac{2}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) - \right.$$

$$\frac{25}{34} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) + \frac{5}{9} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \right.$$

$$\left. \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right),$$

$$\frac{4845}{128} \sqrt{\frac{91}{2}} \left( -\frac{1}{65} + x^6 + \frac{1}{13} \left( \frac{1}{5} + x \right) - \frac{33}{119} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \right.$$

$$\frac{15}{34} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) - \frac{55}{57} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \right.$$

$$\frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) +$$

$$\frac{3}{5} \left( \frac{3}{143} + x^5 - \frac{5}{39} \left( \frac{1}{5} + x \right) + \frac{2}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) - \right.$$

$$\frac{25}{34} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) + \frac{5}{9} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \frac{18}{35} \right.$$

$$\left. \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) \right),$$

$$\frac{3553}{512} \sqrt{6279} \left( \frac{7}{715} + x^7 - \frac{14}{221} \left( \frac{1}{5} + x \right) + \frac{3}{17} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) - \right.$$

$$\frac{315}{646} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) + \frac{35}{57} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \right.$$

$$\left. \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) -$$





$$\begin{aligned}
& \frac{2}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) - \frac{25}{34} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) + \\
& \frac{5}{9} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \right. \\
& \quad \left. \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) + \\
& \frac{2}{3} \left( \frac{7}{715} + x^7 - \frac{14}{221} \left( \frac{1}{5} + x \right) + \frac{3}{17} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) - \frac{315}{646} \right. \\
& \quad \left. \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) + \right. \\
& \quad \frac{35}{57} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \right. \\
& \quad \left. \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) - \frac{6}{5} \left( \frac{3}{143} + x^5 - \frac{5}{39} \left( \frac{1}{5} + x \right) + \right. \\
& \quad \left. \frac{2}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) - \frac{25}{34} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) + \right. \\
& \quad \left. \frac{5}{9} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \right. \\
& \quad \left. \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) + \right. \\
& \quad \left. \frac{7}{11} \left( -\frac{1}{65} + x^6 + \frac{1}{13} \left( \frac{1}{5} + x \right) - \frac{33}{119} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \right. \\
& \quad \left. \frac{15}{34} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) - \right. \\
& \quad \left. \frac{55}{57} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \right. \right. \\
& \quad \left. \left. \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) + \frac{3}{5} \left( \frac{3}{143} + x^5 - \frac{5}{39} \left( \frac{1}{5} + x \right) + \frac{2}{7} \left( -\frac{7}{55} + x^2 + \right. \right. \\
& \quad \left. \left. \frac{1}{3} \left( \frac{1}{5} + x \right) \right) - \frac{25}{34} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) + \right. \\
& \quad \left. \frac{5}{9} \left( -\frac{27}{715} + x^4 + \frac{2}{13} \left( \frac{1}{5} + x \right) - \frac{18}{35} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) + \right. \\
& \quad \left. \left. \frac{1}{2} \left( \frac{3}{55} + x^3 - \frac{4}{13} \left( \frac{1}{5} + x \right) + \frac{3}{7} \left( -\frac{7}{55} + x^2 + \frac{1}{3} \left( \frac{1}{5} + x \right) \right) \right) \right) \right) \right) = 0, x]
\end{aligned}$$

Out[4]= {{x → -0.866595}, {x → -0.69679}, {x → -0.482143}, {x → -0.235601},  
{x → 0.0275523}, {x → 0.291019}, {x → 0.538768}, {x → 0.757123}}

In[5]=  $\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (-0.8665946385607297 - i),$   
[произведение

{i, {-0.6967901301340584,  
-0.4821430883449604, -0.235600883967831, 0.02755234536996465,  
0.29101854578422154, 0.5387678479025229, 0.7571233352842041}}] dx

Out[5]= 0.00775384

In[6]:=  $\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (-0.6967901301340584 - i),$   
[произведение  
 $\{i, \{-0.8665946385607297,$   
 $-0.4821430883449604, -0.235600883967831, 0.02755234536996465,$   
 $0.29101854578422154, 0.5387678479025229, 0.7571233352842041\}\} \, dx$

Out[6]= 0.0761026

In[7]:=  $\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (-0.4821430883449604 - i),$   
[произведение  
 $\{i, \{-0.8665946385607297,$   
 $-0.6967901301340584, -0.235600883967831, 0.02755234536996465,$   
 $0.29101854578422154, 0.5387678479025229, 0.7571233352842041\}\} \, dx$

Out[7]= 0.231437

In[8]:=  $\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (-0.235600883967831 - i),$   
[произведение  
 $\{i, \{-0.8665946385607297,$   
 $-0.6967901301340584, -0.4821430883449604, 0.02755234536996465,$   
 $0.29101854578422154, 0.5387678479025229, 0.7571233352842041\}\} \, dx$

Out[8]= 0.331254

In[9]:=  $\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (0.02755234536996465 - i),$   
[произведение  
 $\{i, \{-0.8665946385607297,$   
 $-0.6967901301340584, -0.4821430883449604, -0.235600883967831,$   
 $0.29101854578422154, 0.5387678479025229, 0.7571233352842041\}\} \, dx$

Out[9]= 0.251019

In[10]:=  $\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (0.29101854578422154 - i),$   
[произведение  
 $\{i, \{-0.8665946385607297,$   
 $-0.6967901301340584, -0.4821430883449604, -0.235600883967831,$   
 $0.02755234536996465, 0.5387678479025229, 0.7571233352842041\}\} \, dx$

Out[10]= 0.0995173

In[11]:=  $\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (0.5387678479025229 - i),$   
[произведение  
 $\{i, \{-0.8665946385607297,$   
 $-0.6967901301340584, -0.4821430883449604, -0.235600883967831,$   
 $0.02755234536996465, 0.29101854578422154, 0.7571233352842041\}\} \, dx$

Out[11]= 0.0178684

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In[12]:= 
$$\int_{-1}^1 (1-x)^5 * (1+x)^3 * \text{Product}[(x-i) / (0.7571233352842041 - i),$$

└─ произведение
      {i, {-0.8665946385607297,
        -0.6967901301340584, -0.4821430883449604, -0.235600883967831,
        0.02755234536996465, 0.29101854578422154, 0.5387678479025229}}] dx
Out[12]= 0.000920897

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