

In[\* ]:= Integrate[Sin[x]^2, x]

$$\text{Out[* ]} = \frac{x}{2} - \frac{1}{4} \sin[2x]$$

In[1]:= Manipulate[n + 4, {n, 0, 5}]

Out[1]=

In[3]:= Sum[x^2, {n, 0, 10}]

$$\text{Out[3]} = 11x^2$$

In[4]:= Sum[x^n, {x, 0, 10}]

$$\text{Out[4]} = 1 + 0^n + 2^n + 3^n + 4^n + 5^n + 6^n + 7^n + 8^n + 9^n + 10^n$$

In[6]:= Sum[x^3, {x, 0, k}]

$$\text{Out[6]} = \frac{1}{4} k^2 (1 + k)^2$$

In[7]:=

Integrate[Sin[s], s]

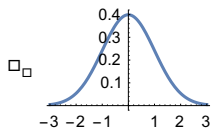
$$\text{Out[7]} = -\cos[s]$$

In[8]:= D[Sin[x]^3 \* Exp[x], x]

$$\text{Out[8]} = 3e^x \cos[x] \sin[x]^2 + e^x \sin[x]^3$$

In[10]:= f[x\_] := Exp[-x^2 / 2] / Sqrt[2 Pi]

In[11]:= Plot[f[x], {x, -3, 3}]



In[12]:= Integrate[f[x], {x, -1, 1}]

$$\text{Out[12]} = \text{Erf}\left[\frac{1}{\sqrt{2}}\right]$$

$$\text{In[13]} := \text{N}\left[\text{Erf}\left[\frac{1}{\sqrt{2}}\right]\right]$$

$$\text{Out[13]} = 0.682689$$

In[14]:= Integrate[f[x], {x, 0, Infinity}]

Out[14]=  $\frac{1}{2}$

In[15]:= f[2]

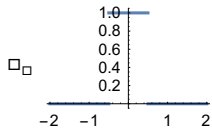
Out[15]=  $\frac{1}{e^2 \sqrt{2\pi}}$

In[16]:= N[ $\frac{1}{e^2 \sqrt{2\pi}}$ ]

Out[16]= 0.053991

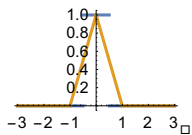
In[17]:= g[x\_] := If[x > -1/2 && x < 1/2, 1, 0]

In[18]:= Plot[g[x], {x, -2, 2}]



In[19]:= g2[x2\_] := Integrate[g[y] \* g[x2 - y], {y, -Infinity, Infinity}]

In[21]:= Plot[{g[y2], g2[y2]}, {y2, -3, 3}]



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In[22]:= g2[y2]

Out[22]= 
$$\begin{cases} 1 - y2 & 0 < y2 < 1 \\ 1 + y2 & -1 < y2 \leq 0 \\ 0 & \text{True} \end{cases}$$

In[23]:= g[y2]

Out[23]= 
$$\text{If}\left[y2 > -\frac{1}{2} \ \&\& \ y2 < \frac{1}{2}, 1, 0\right]$$

g4[y4\_] := Integrate[g2[x4] \* g2[

In[24]:= (y4 - x4)], {x4, -Infinity, Infinity}]

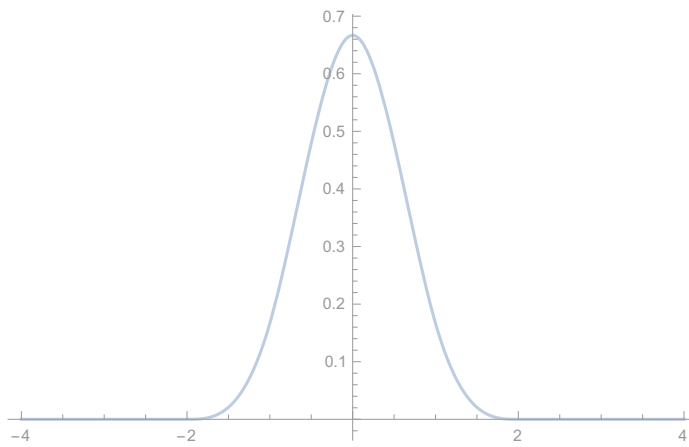
g4[y



In[25]:= `g4[y4_] := Integrate[g2[x5] * g2[y4 - x5], {x5, -Infinity, Infinity}]`

□□ `Plot[g4[y5], {y5, -4, 4}]`

Out[27]=



In[29]:=

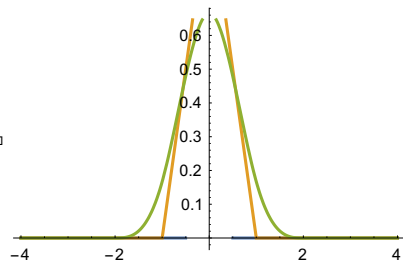
In[31]:= `1 + 1`

Out[31]= 2

In[34]:= `Plot[{g[x6], g2[x6], g4[x6]}, {x6, -4, 4}]`



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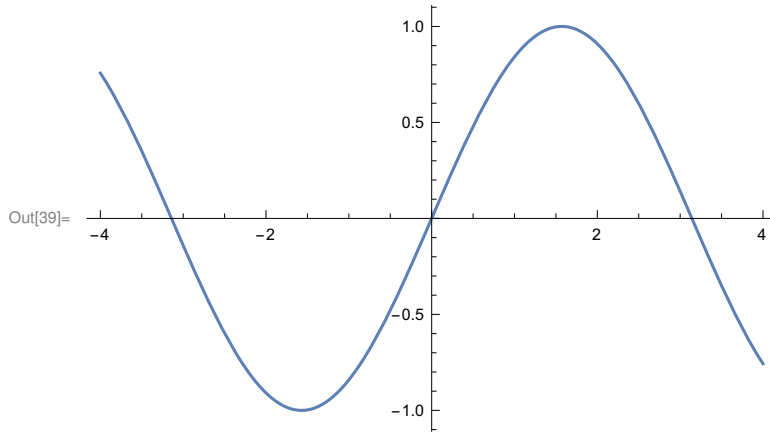
In[36]:= **g4[aa]**

$$\text{Out[36]= } \begin{cases} \frac{1}{6} (4 - 6 aa^2 - 3 aa^3) & -1 < aa < 0 \\ \frac{1}{3} (2 + 3 aa - aa^3) & aa == 0 \\ \frac{1}{6} (8 - 12 aa + 6 aa^2 - aa^3) & 1 \leq aa < 2 \\ \frac{1}{6} (8 + 12 aa + 6 aa^2 + aa^3) & -2 < aa \leq -1 \\ \frac{1}{6} (4 - 6 aa^2 + 3 aa^3) & 0 < aa < 1 \\ 0 & \text{True} \end{cases}$$

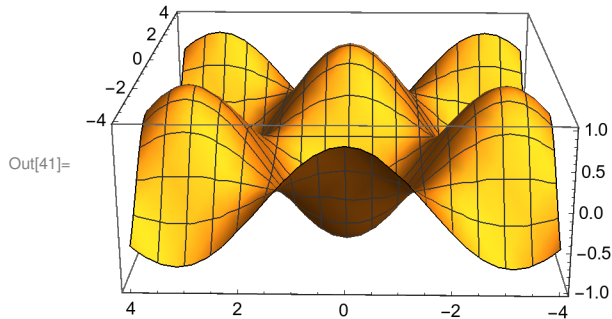
In[38]:= **g4[.3]**

Out[38]= 0.590167

In[39]:= **Plot[Sin[x], {x, -4, 4}]**



In[41]:= **Plot3D[Sin[x] \* Cos[y], {x, -4, 4}, {y, -4, 4}]**



In[45]:= **nn = NormalDistribution[0, 1]**

Out[45]= NormalDistribution[0, 1]

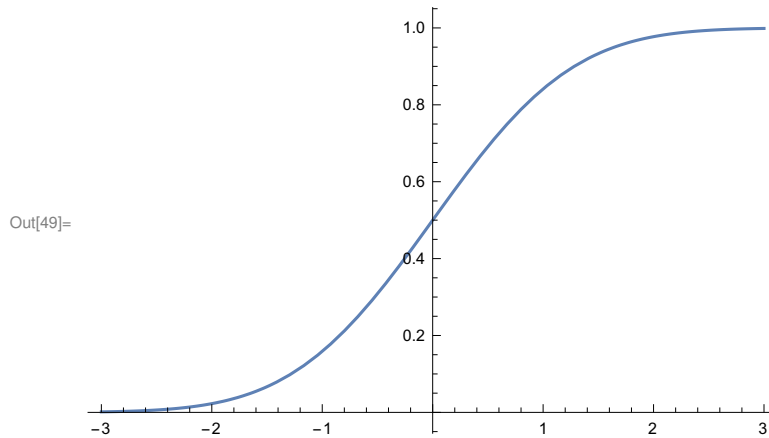
In[46]:= **PDF[nn, 3]**

$$\text{Out[46]= } \frac{1}{e^{9/2} \sqrt{2 \pi}}$$

$$\text{In[47]:= } N\left[\frac{1}{e^{9/2} \sqrt{2\pi}}\right]$$

Out[47]= 0.00443185

In[49]:= Plot[CDF[nn, xa], {xa, -3, 3}]



In[51]:= CDF[nn, 2]

$$\text{Out[51]= } \frac{1}{2} \text{Erfc}\left[-\sqrt{2}\right]$$

$$\text{In[52]:= } N\left[\frac{1}{2} \text{Erfc}\left[-\sqrt{2}\right]\right]$$

Out[52]= 0.97725

In[53]:= Mean[nn]

In[54]:= VarianceEstimatorFunctione0

Out[54]= VarianceEstimatorFunctione0

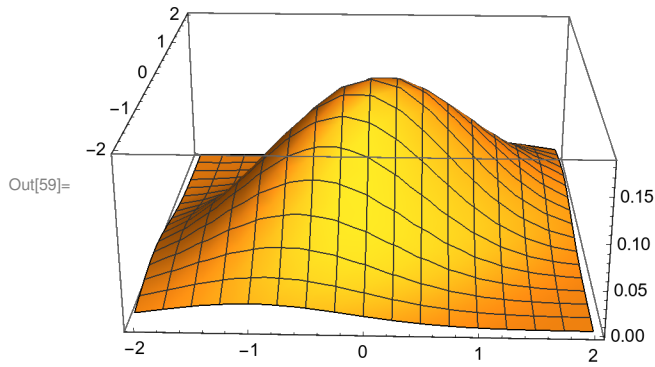
In[55]:= Variance[nn]

Out[55]= 1

In[56]:= n3 = MultinormalDistribution[{0, 0}, {{1, .5}, {.5, 1}}]

Out[56]= MultinormalDistribution[{0, 0}, {{1, 0.5}, {0.5, 1}}]

In[59]:= Plot3D[PDF[n3, {za, zb}], {za, -2, 2}, {zb, -2, 2}]



In[62]:= PDF[n3, {zc, zd}]

Out[62]=  $0.183776 e^{\frac{1}{2}(-zc(1.33333zc - 0.666667zd) - zd(-0.666667zc + 1.33333zd))}$

In[63]:= Integrate[%, {zd, -Infinity, Infinity}]

Out[63]=  $0.398942 e^{-0.5zc^2}$

In[64]:= D[Sqrt[x], x]

Out[64]=  $\frac{1}{2\sqrt{x}}$