<2-1> (2.2.1)
¥int_{-¥infty}^{¥infty}e^{-x^2}dx=¥sqrt{¥pi}

<2-2> (2.2.2)
¥int_{-¥infty}^{¥infty}e^{-ax^2}dx=¥sqrt{¥frac{¥pi}{a}}

<2-3>
x=¥frac{x^¥prime}{¥sqrt{a}}

<2-4>
dx=¥frac{1 }{¥sqrt{a}} dx^¥prime

<2-5>
x^¥prime¥left(=¥sqrt{a}x¥right)

<2-6>
¥int_{-¥infty}^{¥infty}e^{-ax^2}dx
=¥frac{1}{¥sqrt{a}}¥int_{-¥infty}^{¥infty}e^{-x^{¥prime2}}dx^¥prime

<2-7>
¥int_{-¥infty}^{¥infty}e^{-ax^2}dx=¥frac{1}{¥sqrt{a}}¥sqrt{¥pi}=¥sqrt{¥frac{¥pi}{a}}

<2-8>
¥begin{array}{rl}
¥displaystyle{¥frac{d}{da}¥left(¥int_{-¥infty}^{¥infty}e^{-ax^2}dx¥right)}&=¥displaystyle{¥int_{-¥infty}^{¥infty}¥frac{d¥left(e^{-ax^2}¥right)}{da}dx} ¥¥ ¥¥
&=-¥displaystyle{¥int_{-¥infty}^{¥infty}x^2e ^{-ax^2}dx}
¥end{array}

<2-8>
¥begin{array}{rl}
¥displaystyle{¥frac{d}{da}¥left(¥int_{-¥infty}^{¥infty}e^{-ax^2}dx¥right)}&=¥displaystyle{¥int_{-¥infty}^{¥infty}¥frac{d¥left(e^{-ax^2}¥right)}{da}dx} ¥¥ ¥¥
&=-¥displaystyle{¥int_{-¥infty}^{¥infty}x^2e ^{-ax^2}dx}
¥end{array}

<2-9>
¥begin{array}{rl}
¥displaystyle{¥frac{d}{da}¥left(
¥sqrt{¥frac{¥pi}{a}}
¥right)}&=¥displaystyle{¥sqrt{¥pi}¥frac{d¥left(a^{-1/2}¥right)}{da}} ¥¥ ¥¥
&=¥displaystyle{-¥sqrt{¥pi}¥frac{a^{-3/2}}{2}}
¥end{array}

<2-10>

¥int_{-¥infty}^{¥infty}x^2e ^{-ax^2}dx=¥frac{¥sqrt{¥pi}}{2}a^{-3/2}

<2-11>
¥begin{array}{rl}
¥displaystyle{¥int_{-¥infty}^{¥infty}x^4e ^{-ax^2}dx}
&=¥displaystyle{¥left(¥frac{¥sqrt{¥pi}}{2}¥cdot¥frac{3}{2}¥right)a^{-5/2}} ¥¥ ¥¥
&=¥displaystyle{¥frac{1¥cdot3¥sqrt{¥pi}}{2^2}a^{-5/2}}
¥end{array}

<2-12>
¥begin{array}{rl}
¥displaystyle{¥int_{-¥infty}^{¥infty}x^6e ^{-ax^2}dx}
&=¥displaystyle{¥left(¥frac{¥sqrt{¥pi}}{2}¥cdot¥frac{3}{2}¥cdot¥frac{5}{2}¥right)a^{-7/2}}
¥¥ ¥¥
&=¥displaystyle{¥frac{1¥cdot3¥cdot5¥sqrt{¥pi}}{2^3}a^{-7/2}}
¥end{array}

<2-13>
¥int_{-¥infty}^{¥infty}x^{2n}e ^{-ax^2}dx
=¥frac{1¥cdot3¥cdot5¥cdots(2n-1)¥sqrt{¥pi}}{2^n}a^{-(2n+1)/2} ¥quad
(n=0,1,2,¥cdots)

<2-14> (2.2.3)
¥int_{-¥infty}^{¥infty}x^{2n}e ^{-x^2}dx
=¥frac{1¥cdot3¥cdot5¥cdots(2n-1)¥sqrt{¥pi}}{2^n} ¥quad
(n=0,1,2,¥cdots)

<2-15>
x^{2n}e ^{-x^2}¥equiv f(x)

<2-16>
f(-x)=f(x)

<2-17>
¥begin{array}{rl}
¥displaystyle{¥int_{-¥infty}^{¥infty}x^{2n}e ^{-x^2}dx}
&=¥displaystyle{¥int_{-¥infty}^{0}x^{2n}e ^{-x^2}dx+¥int_{0}^{¥infty}x^{2n}e ^{-x^2}dx}
¥¥ ¥¥
&=¥displaystyle{2¥int_{0}^{¥infty}x^{2n}e ^{-x^2}dx}
¥end{array}

<2-18> (2.2.4)
¥int_{0}^{¥infty}x^{2n}e ^{-x^2}dx
=¥frac{1¥cdot3¥cdot5¥cdots(2n-1)¥sqrt{¥pi}}{2^{n+1}} ¥quad (n=0,1,2,¥cdots)

<2-19>
xe^{-ax^2}¥equiv g(x)

<2-20>
g(-x)=-g(x)

<2-21>
¥int_{-¥infty}^{¥infty}xe ^{-ax^2}dx=0

<2-22> (2.2.5)
¥int_{-¥infty}^{¥infty}x^{2n+1}e ^{-x^2}dx=0¥quad(n=0,1,2,¥cdots)

<2-23>
¥int_{0}^{¥infty}xe ^{-ax^2}dx

<2-24>
x=¥sqrt{¥frac{y}{a}}

<2-25>
dx=¥frac{1}{2¥sqrt{ay}}dy

<2-26>
¥begin{array}{rl}
¥displaystyle{¥int_{0}^{¥infty}xe ^{-ax^2}dx}
&=¥displaystyle{¥int_{0}^{¥infty}¥sqrt{¥frac{y}{a}}e ^{-y}¥frac{1}{2¥sqrt{ay}}dy} ¥¥ ¥¥
&=¥displaystyle{¥frac{1}{2a}¥int_{0}^{¥infty} e ^{-y}dy}
¥end{array}

<2-27>
¥int_{0}^{¥infty} e ^{-y}dy=1

<2-28>
¥int_{0}^{¥infty}xe ^{-ax^2}dx=¥frac{1}{2a}

<2-29>
¥int_{0}^{¥infty}x^3e ^{-ax^2}dx=¥frac{1}{2a^2}

<2-30>
¥int_{0}^{¥infty}x^{2n+1}e ^{-ax^2}dx=¥frac{n!}{2a^{n+1}}

<2-31> (2.2.6)
¥int_{0}^{¥infty}x^{2n+1}e ^{-x^2}dx=¥frac{n!}{2}¥quad(n=0,1,2,¥cdots)

<2-32>
¥left¥{¥begin{array}{ll}
¥displaystyle{¥int_{-¥infty}^{¥infty}x^{2n}e
^{-x^2}dx=¥frac{1¥cdot3¥cdot5¥cdots¥sqrt{¥pi}}{2^n}}
&(2.2.3) ¥¥ ¥¥
¥displaystyle{¥int_{0}^{¥infty}x^{2n}e
^{-x^2}dx=¥frac{1¥cdot3¥cdot5¥cdots¥sqrt{¥pi}}{2^{n+1}}}
&(2.2.4) ¥¥ ¥¥
¥displaystyle{¥int_{-¥infty}^{¥infty}x^{2n+1}e ^{-x^2}dx=0}}
&(2.2.5) ¥¥ ¥¥
¥displaystyle{¥int_{0}^{¥infty}x^{2n+1}e ^{-x^2}dx=¥frac{n!}{2}}
&(2.2.6)
¥end{array}¥right.¥quad(n=0,1,2,¥ldots)

<2-33>
dv_xdv_ydv_z¥equiv d¥Gamma

<2-34> (2.2.7)
¥begin{array}{rl}
P(v_x,v_y,v_z)d¥Gamma&=¥displaystyle{¥left(¥frac{m}{2¥pi
kT}¥right)^{3/2}e^{-E/{kT}}d¥Gamma} ¥¥ ¥¥
&=¥displaystyle¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}¥exp¥left[-¥frac{mv_x^2}{2kT}¥right]
¥exp¥left[-¥frac{mv_y^2}{2kT}¥right] ¥exp¥left[-¥frac{mv_z^2}{2kT}¥right]d¥Gamma}
¥end{array}

<2-35> (2.2.8)
E=¥frac{m}{2}¥left(v_x^2+v_y^2+v_z^2¥right)

<2-36>
¥left¥{¥begin{array}{l}
-¥infty¥le v_x¥le¥infty ¥¥ ¥¥
-¥infty¥le v_y¥le¥infty ¥¥ ¥¥
-¥infty¥le v_z¥le¥infty
¥end{array}¥right.

<2-37>
¥iiint P(v_x,v_y,v_z)d¥Gamma=1

<2-38>
¥langle K¥rangle=¥frac{3kT}{2}

<2-39>
K=¥frac{m}{2}¥left(v_x^2+v_y^2+v_z^2¥right)

<2-40>
¥left(v_x^2,v_y^2,v_z^2¥right)

<2-41> (2.2.9)
¥begin{array}{rl}
¥displaystyle{¥langle K¥rangle}
&=¥displaystyle{¥iiint P(v_x,v_y,v_z)¥frac{mv_x^2}{2}d¥Gamma} ¥¥ ¥¥
&=¥displaystyle{3¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}¥left(¥int_{-¥infty}^{¥infty}
¥frac{mv_x^2}{2}e^{-(mv_x^2/2)/kT}dv_x¥right)} ¥¥ ¥¥
&¥displaystyle{¥times¥left(¥int_{-¥infty}^{¥infty}e^{-(mv_y^2/2)/kT}dv_y¥right)} ¥¥ ¥¥
&¥displaystyle{¥times¥left(¥int_{-¥infty}^{¥infty}e^{-(mv_z^2/2)/kT}dv_z¥right)}
¥end{array}

<2-42> (2.2.10)
¥left¥{¥begin{array}{l}
¥displaystyle{v_x=¥left(¥frac{2kT}{m}¥right)^{1/2}p}¥¥ ¥¥
¥displaystyle{v_y=¥left(¥frac{2kT}{m}¥right)^{1/2}q}¥¥ ¥¥
¥displaystyle{v_z=¥left(¥frac{2kT}{m}¥right)^{1/2}r}
¥end{array}¥right.

<2-43> (2.2.11)
¥left¥{¥begin{array}{l}
¥displaystyle{p=¥left(¥frac{m}{2kT}¥right)^{1/2}v_x}¥¥ ¥¥
¥displaystyle{q=¥left(¥frac{m}{2kT}¥right)^{1/2}v_y}¥¥ ¥¥
¥displaystyle{r=¥left(¥frac{m}{2kT}¥right)^{1/2}v_z}
¥end{array}¥right.

<2-44> (2.2.12)
¥begin{array}{rl}
¥displaystyle{¥langle K¥rangle}
&=¥displaystyle{3¥left(¥frac{m}{2¥pi
kT}¥right)^{3/2}¥times¥left(¥frac{2kT}{m}¥right)^{1/2}
¥left[¥int_{-¥infty}^{¥infty}¥left(¥frac{m}{2}¥cdot¥frac{2kT}{m}p^2¥right)
e^{-p^2}dp¥right] ¥¥ ¥¥
&¥qquad¥qquad¥qquad¥times¥displaystyle{¥left(¥frac{2kT}{m}¥right)^{1/2}¥left[¥int_{-¥i
nfty}^{¥infty}e^{-q^2}dq¥right]
¥times¥left(¥frac{2kT}{m}¥right)^{1/2}¥left[¥int_{-¥infty}^{¥infty}e^{-r^2}dr¥right]} ¥¥ ¥¥
&=¥displaystyle{3¥left(¥frac{kT}{¥pi^{3/2}}¥right)
¥left[¥int_{-¥infty}^{¥infty}p^2e^{-p^2}dp¥right]
¥times¥left[¥int_{-¥infty}^{¥infty}e^{-q^2}dq¥right]
¥times¥left[¥int_{-¥infty}^{¥infty}e^{-r^2}dr¥right]}
¥end{array}

<2-45>
¥int_{-¥infty}^{¥infty}p^2e^{-p^2}dp=¥frac{¥sqrt{¥pi}}{2}

<2-46>
¥int_{-¥infty}^{¥infty}e^{-q^2}dq=¥int_{-¥infty}^{¥infty}e^{-r^2}dr=¥sqrt{¥pi}

<2-47> (2.2.13)
¥begin{array}{rl}
¥langle K¥rangle
&=¥displaystyle{3¥left(¥frac{kT}{¥pi ^{3/2}}¥right)¥times¥left(¥frac{¥sqrt{¥pi}}{2}¥right)
¥times¥left(¥sqrt{¥pi}¥right)^2} ¥¥ ¥¥
&=¥displaystyle{¥frac{3kT}{2}}
¥end{array}

<2-48>
¥vec{v}=¥vec{i}v_x+¥vec{j}v_y+¥vec{k}v_z

<2-49> (2.2.14)
¥begin{array}{rl}
¥displaystyle{¥langle¥vec{v}¥rangle}
&=¥displaystyle{¥vec{i}¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}
¥left[¥int_{-¥infty}^{¥infty}v_xe^{-(mv_x^2/2)/kT}dv_x¥right)} ¥¥ ¥¥
&¥quad¥displaystyle{¥times¥left[¥int_{-¥infty}^{¥infty}e^{-(mv_y^2/2)/kT}dv_y¥right]
¥times¥left[¥int_{-¥infty}^{¥infty}e^{-(mv_z^2/2)/kT}dv_z¥right]} ¥¥ ¥¥
&+¥displaystyle{¥vec{j}¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}
¥left[¥int_{-¥infty}^{¥infty}e^{-(mv_x^2/2)/kT}dv_x¥right)} ¥¥ ¥¥
&¥quad¥displaystyle{¥times¥left[¥int_{-¥infty}^{¥infty}v_ye^{-(mv_y^2/2)/kT}dv_y¥right]
¥times¥left[¥int_{-¥infty}^{¥infty}e^{-(mv_z^2/2)/kT}dv_z¥right]} ¥¥ ¥¥
&+¥displaystyle{¥vec{k}¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}
¥left[¥int_{-¥infty}^{¥infty}e^{-(mv_x^2/2)/kT}dv_x¥right)} ¥¥ ¥¥
&¥quad¥displaystyle{¥times¥left[¥int_{-¥infty}^{¥infty}e^{-(mv_y^2/2)/kT}dv_y¥right]
¥times¥left[¥int_{-¥infty}^{¥infty}v_ze^{-(mv_z^2/2)/kT}dv_z¥right]}
¥end{array}

<2-50> (2.2.15)
¥langle¥vec{v}¥rangle=0

<2-51>
v=¥sqrt{v_x^2+ v_y^2+ v_z^2}

<2-52> (2.2.16)
¥begin{array}{rl}
¥displaystyle{¥langle v¥rangle}
&=¥displaystyle{¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}¥int_{-¥infty}^{¥infty}
e^{-(mv_x^2/2)/kT}dv_x¥int_{-¥infty}^{¥infty}e^{-(mv_y^2/2)/kT}dv_y} ¥¥ ¥¥
&¥qquad¥times¥displaystyle{¥int_{-¥infty}^{¥infty}¥sqrt{v_x^2+ v_y^2+ v_z^2}
e^{-(mv_z^2/2)/kT}dv_z}}
¥end{array}

<2-53>
¥left¥{¥begin{array}{l}
x=r¥sin¥theta¥cos¥phi ¥¥ ¥¥
y=r¥sin¥theta¥sin¥phi ¥¥ ¥¥
z=r¥cos¥theta
¥end{array}¥right.

<2-54> (2.2.17)
¥left¥{¥begin{array}{l}
v_x=v¥sin¥theta¥cos¥phi ¥¥ ¥¥
v_y=v¥sin¥theta¥sin¥phi ¥¥ ¥¥
v_z=v¥cos¥theta
¥end{array}¥right.

<2-55> (2.2.18)
¥begin{array}{rl}
¥displaystyle{¥langle v¥rangle}
&=¥displaystyle{¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}¥int_{0}^{¥infty}v^2dv
¥int_{-¥pi}^{¥pi}¥sin¥theta d¥theta¥int_{0}^{2¥pi}ve^{-(mv^2/2)/kT}d¥phi} ¥¥¥¥
&=¥displaystyle{¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}¥int_{0}^{¥infty}v^3
e^{-(mv^2/2)/kT}dv¥int_{-¥pi}^{¥pi}¥sin¥theta d¥theta¥int_{0}^{2¥pi}d¥phi} ¥¥ ¥¥
&=¥displaystyle{¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}4¥pi¥int_{0}^{¥infty}v^3
e^{-(mv^2/2)/kT}dv} ¥¥ ¥¥
&=¥displaystyle{¥sqrt{¥frac{8kT}{¥pi m}}}
¥end{array}

<2-56>
K=¥frac{m}{2}¥left(v_x^2+ v_y^2+ v_z^2¥right)=¥frac{m}{2}v^2

<2-57>
¥langle v^2¥rangle=¥frac{3kT}{m}

<2-58>
¥langle v¥rangle^2=¥frac{8kT}{m}¥simeq¥frac{2,55kT}{m}

<2-59>
¥sqrt{¥langle v^2¥rangle-¥langle v¥rangle^2}

<2-60> (2.3.1)
P(¥vec{v};T)d¥vec{v}=¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}
e^{-¥beta¥epsilon(¥vec{v})} d¥vec{v}

<2-61> (2.3.2)
¥beta=¥frac{1}{kT}

<2-62> (2.3.3)
¥epsilon(¥vec{v})=¥frac{m}{2}¥vec{v}^2
=¥frac{m}{2}v_x^2+¥frac{m}{2}v_y^2+¥frac{m}{2}v_z^2

<2-63> (2.3.4)
¥iiint P(¥vec{v};T)d¥vec{v}=1

<2-64> (2.3.5)
P({¥vec{v}};T)d¥vec{v}_1d¥vec{v}_1¥ldotas d¥vec{v}_N¥proptoe^{-¥beta E({¥vec{v}})
d¥vec{v}_1¥ldotas d¥vec{v}_N

<2-65> (2.3.6)
E(¥{¥vec{v}¥})=¥frac{m}{2}¥left(v_1^2+v__2^2+v_N^2)

<2-66> (2.3.7)
P(¥{¥vec{v}¥};T)d¥vec{v}_1 d¥vec{v}_2¥ldots d¥vec{v}_N=CW¥left[E(¥{¥vec{v}¥})¥right]
e^{-¥beta E(¥{¥vec{v}¥})} d¥vec{v}_1 d¥vec{v}_2¥ldots d¥vec{v}_N

<2-67> (2.3.8)
¥iiint P(¥{¥vec{v}¥})d¥vec{v}_1 d¥vec{v}_2¥ldots d¥vec{v}_N=1

<2-68> (2.3.9)
P[¥{¥vec{r}¥},¥{¥vec{v}¥};T]d¥Gamma
= CW[E(¥{¥vec{r}¥},¥{¥vec{v}¥})]e^{-¥beta E(¥{¥vec{r}¥},¥{¥vec{v}¥})} d¥Gamma

<2-69> (2.3.10)
d¥vec{r}_1 d¥vec{r}_2¥ldots d¥vec{r}_Nd¥vec{v}_1 d¥vec{v}_2¥ldots d¥vec{v}_N
¥equiv d¥Gamma

<2-70> (2.3.11)
¥iiint_VP[¥{¥vec{r}¥},¥{¥vec{v}¥};T]d¥Gamma= 1

<2-71> (2.3.12)
W[E(¥{¥vec{r}¥},¥{¥vec{v}¥})]e^{-¥beta E(¥{¥vec{r}¥},¥{¥vec{v}¥})}

<2-72> (2.3.13)
x=e^{¥ln x}

<2-73> (2.3.14)
¥begin{array}{rl}
¥displaystyle{We^{-¥beta E}&=¥displaystyle{e^{¥ln W}e^{-¥beta E}}} ¥¥ ¥¥
&=¥displaystyle{e^{-¥beta E -kT¥ln W}}
¥end{array}

<2-74> (2.3.15)
¥begin{array}{rl}
C&=¥displaystyle{¥frac{1}{¥displaystyle{¥iiint_V¥exp¥left[-¥beta
¥left¥{E(¥{¥vec{r}¥},¥{¥vec{v}¥})-kT¥ln W(¥{¥vec{r}¥},¥{¥vec{v}¥})¥right¥}
¥right]d¥Gamma} ¥¥ ¥¥
&=¥displaystyle{¥frac{1}{Z(T)}}
¥end{array}

<2-75> (2.3.16)
Z(T)¥equiv¥iiint_V
e^{-¥beta[E(¥{¥vec{r}¥},¥{¥vec{v}¥})-kT¥ln W(¥{¥vec{r}¥},¥{¥vec{v}¥})]}
d¥Gamma

<2-76> (2.3.17)
¥iiint_VE(¥{¥vec{r}¥},¥{¥vec{v}¥})P[¥{¥vec{r}¥},¥{¥vec{v}¥};T]d¥Gamma¥equiv U

<2-77> (2.3.18)
k¥iiint_V¥ln W(¥{¥vec{r}¥},¥{¥vec{v}¥})P[¥{¥vec{r}¥},¥{¥vec{v}¥};T]d¥Gamma¥equiv S

<2-78>
E-kT¥ln W

<2-79>
U-ST¥equiv F(T,V)

<2-80> (2.3.20)
¥frac{de^{ax}}{dx}=ae^{ax}

<2-81> (2.3.21)
¥frac{dZ(T)}{d¥beta}=-¥iiint_V E(¥{¥vec{r}¥},¥{¥vec{v}¥})
e^{-¥beta E(¥{¥vec{r}¥},¥{¥vec{v}¥})}d¥Gamma

<2-82> (2.3.22)
¥begin{array}{rl}
¥displaystyle{¥frac{1}{Z(T)}¥frac{dZ(T)}{d¥beta}}
&=-¥displaystyle{¥iiint_V E(¥{¥vec{r}¥},¥{¥vec{v}¥})
¥frac{e^{-¥beta E(¥{¥vec{r}¥},¥{¥vec{v}¥})}}{Z(T)}d¥Gamma} ¥¥ ¥¥
&=-¥displaystyle{¥iiint_V
E(¥{¥vec{r}¥},¥{¥vec{v}¥})P¥left[¥{¥vec{r}¥},¥{¥vec{v}¥};T¥right]d¥Gamma}
¥end{array}

<2-83> (2.3.23)
¥begin{array}{rl}
U&=-¥displaystyle{¥frac{1}{Z(T)}¥frac{dZ(T)}{d¥beta}} ¥¥ ¥¥
&=-¥displaystyle{ ¥frac{d¥ln Z(T)}{d¥beta}}

¥end{array}
<2-84> (2.3.24)
¥frac{d¥ln y(x)}{dx}=¥frac{1}{y}¥frac{dy}{dx}

<2-85>
f(-x)=f(x)

<2-86>
I=¥int_{-¥infty}^{¥infty}f(x)dx

<2-87>
I=¥int_{-¥infty}^{0}f(x)dx+¥int_{0}^{¥infty}f(x)dx

<2-88>
dx=-dx^¥prime

<2-89>
¥int_{-¥infty}^{0}f(x)dx=¥int_{+¥infty}^{0}f(-x^¥prime)(-dx^¥prime)
=-¥int_{+¥infty}^{0}f(x^¥prime)dx^¥prime
+¥int_{0}^{¥infty}f(x)dx

<2-90>
¥int_{a}^{b}F(x)dx=-¥int_{b}^{a}F(x)dx

<2-91>
-¥int_{-¥infty}^{0}f(x)dx=¥int_{0}^{+¥infty}f(x^¥prime)dx^¥prime=¥int_{0}^{+¥infty}f(x)dx

<2-92>
¥int_{-¥infty}^{0}f(x)dx=2¥int_{0}^{¥infty}f(x)dx

<2-93>
¥begin{array}{l}
¥displaystyle{¥left(¥frac{m}{2kT}¥right)^{3/2}¥left(¥int_{-¥infty}^{¥infty}e^{-(mv_x^2/2)/kT}
dv_x¥right)
¥times¥left(¥int_{-¥infty}^{¥infty}e^{-(mv_y^2/2)/kT}dv_y¥right)} ¥¥ ¥¥
&¥qquad¥times¥displaystyle{¥left(¥int_{-¥infty}^{¥infty}e^{-(mv_z^2/2)/kT}dv_z¥right)}=1
¥end{array}

<2-94>
¥left(¥frac{m}{2kT}¥right)^{3/2}
¥left(¥int_{-¥infty}^{¥infty}e^{-(mv_x^2/2)/kT}dv_x¥right)^3=1

<2-95>
q=¥left(¥frac{m}{2kT}¥right)^{1/2}v_x

<2-96>
dv_x=¥left(¥frac{2kT}{m}¥right)^{1/2}dq

<2-97>
¥mbox{the left side}=¥left(¥frac{m}{2¥pi kT}¥right)^{3/2}
¥left[¥left(¥frac{ {2kT}{m}¥right)^{1/2}¥int_{-¥infty}^{¥infty}e^{-q^2}dq¥right]^3

<2-98>
¥mbox{the left side}=¥left(¥frac{m}{2¥pi}¥right)^{3/2}
¥left[¥left(¥frac{2kT}{m}¥right)^{1/2}¥sqrt{¥pi}¥right]^3=1

<2-99>
¥left(¥frac{mN^{2/3}}{2¥pi kT}¥right)^{3/2}