

```
> restart;  
read("c:/appl/appl7.txt");
```

#### PROCEDURES:

*AllPermutations(n), AllCombinations(n, k), Benford(X), BootstrapRV(Data),  
CDF:CHF:HF:IDF:PDF:SF(X, [x]), CoefOfVar(X), Convolution(X, Y),  
ConvolutionIID(X, n), CriticalPoint(X, prob), Determinant(MATRIX), Difference(X, Y),  
Display(X), ExpectedValue(X, [g]), KSTest(X, Data, Parameters), Kurtosis(X),  
Maximum(X, Y), MaximumIID(X, n), Mean(X), MGF(X), Minimum(X, Y),  
MinimumIID(X, n), Mixture(MixParameters, MixRVs),  
MLE(X, Data, Parameters, [Rightcensor]), MLENHPP(X, Data, Parameters, obstime),  
MLEWeibull(Data, [Rightcensor]), MOM(X, Data, Parameters),  
NextCombination(Previous, size), NextPermutation(Previous), OrderStat(X, n, r, ["wo"]),  
PlotDist(X, [low], [high]), PlotEmpCDF(Data, [low], [high]),  
PlotEmpCIF(Data, [low], [high]), PlotEmpSF(Data, Censor),  
PlotEmpVsFittedCDF(X, Data, Parameters, [low], [high]),  
PlotEmpVsFittedCDF(X, Data, Parameters, [low], [high]),  
PlotEmpVsFittedSF(X, Data, Parameters, Censor, low, high),  
PPPlot(X, Data, Parameters), Product(X, Y), ProductIID(X, n),  
QQPlot(X, Data, Parameters), RangeStat(X, n, ["wo"]), Skewness(X), Transform(X, g),  
Truncate(X, low, high), Variance(X), VerifyPDF(X)*

#### Procedure Notation:

*X and Y are random variables  
Greek letters are numeric or symbolic parameters  
x is numeric or symbolic  
n and r are positive integers,  $n \geq r$   
low and high are numeric  
g is a function  
Brackets [] denote optional parameters  
"double quotes" denote character strings  
MATRIX is a 2 x 2 array of random variables  
A capitalized parameter indicates that it must be  
entered as a list --> ex. Data := [1, 12.4, 34, 52.45, 63]*

#### Variate Generation:

*ArcTanVariate(alpha, phi), BinomialVariate(n, p, m), ExponentialVariate(lambda),  
NormalVariate(mu, sigma), UniformVariate(), WeibullVariate(lambda, kappa, m)*

#### DATA SETS:

*BallBearing, HorseKickFatalities, Hurricane, MP6, RatControl, RatTreatment, USSHalfBeak  
ArcSinRV(), ArcTanRV(alpha, phi), BetaRV(alpha, beta), CauchyRV(a, alpha), ChiRV(n),*

*ChiSquareRV(n), ErlangRV(lambda, n), ErrorRV(mu, alpha, d), ExponentialRV(lambda),  
 ExponentialPowerRV(lambda, kappa), ExtremeValueRV(alpha, beta), FRV(n1, n2),  
 GammaRV(lambda, kappa), GeneralizedParetoRV(gamma, delta, kappa),  
 GompertzRV(delta, kappa), HyperbolicSecantRV(), HyperExponentialRV(p, l),  
 HypoExponentialRV(l), IDBRV(gamma, delta, kappa), InverseGaussianRV(lambda, mu),  
 InvertedGammaRV(alpha, beta), KSRV(n), LaPlaceRV(omega, theta),  
 LogGammaRV(alpha, beta), LogisticRV(kappa, lambda), LogLogisticRV(lambda, kappa),  
 LogNormalRV(mu, sigma), LomaxRV(kappa, lambda), MakehamRV(gamma, delta, kappa),  
 MuthRV(kappa), NormalRV(mu, sigma), ParetoRV(lambda, kappa), RayleighRV(lambda),  
 StandardCauchyRV(), StandardNormalRV(), StandardTriangularRV(m),  
 StandardUniformRV(), TRV(n), TriangularRV(a, m, b), UniformRV(a, b),  
 WeibullRV(lambda, kappa)*

Error, attempting to assign to `DataSets` which is protected.  
 Try declaring `local DataSets`; see ?protect for details.

```

> bf := ChiRV(3);
  bfname := "ChiRV(3)";
  bf := 
$$\left[ \left[ x \rightarrow \frac{x^2 e^{-\frac{1}{2}x^2}}{\sqrt{\pi}}, [0, \infty], ["Continuous", "PDF"] \right] \right]$$

  bfname := "ChiRV(3)"
(1)

> #plot(1/csch(t)+1, t = 0..0.0010);
  #plot(diff(1/csch(t),t), t=0..0.0010);
  #limit(1/csch(t), t=0);
> solve(exp(-t) = y, t);
  -ln(y)
(2)

```

```

> # discarded -ln(t + 1), t-> csch(t), t->arccsch(t), t -> tan(t),
> #name of the file for latex output
  filename := "C:/LatexOutput/Trash.tex";

glist := [t -> t^2, t -> sqrt(t), t -> 1/t, t -> arctan(t), t
-> exp(t), t -> ln(t), t -> exp(-t), t -> -ln(t), t -> ln(t+1),
t -> 1/(ln(t+2)), t -> tanh(t), t -> sinh(t), t -> arcsinh(t),
t-> csch(t+1), t->arccsch(t+1), t-> 1/tanh(t+1), t-> 1/sinh(t+1),
t-> 1/arcsinh(t+1), t-> 1/csch(t)+1, t-> tanh(1/t), t->csch
(1/t), t-> arccsch(1/t), t-> arctanh(1/t) ]:

base := t -> PDF(bf, t):

print(base(x)):

#begin loopint through transformations
for i from 1 to 22 do
#for i from 1 to 3 do

```

```
print( "i is", i, " -----"
-----" );

g := glist[i]:
l := bf[2][1];
u := bf[2][2];
Temp := Transform(bf, [[unapply(g(x), x)], [l,u]]);

#terminal output

PlotDist(PDF(Temp), 0, 40);
PlotDist(HF(Temp), 0, 40);

od;
```

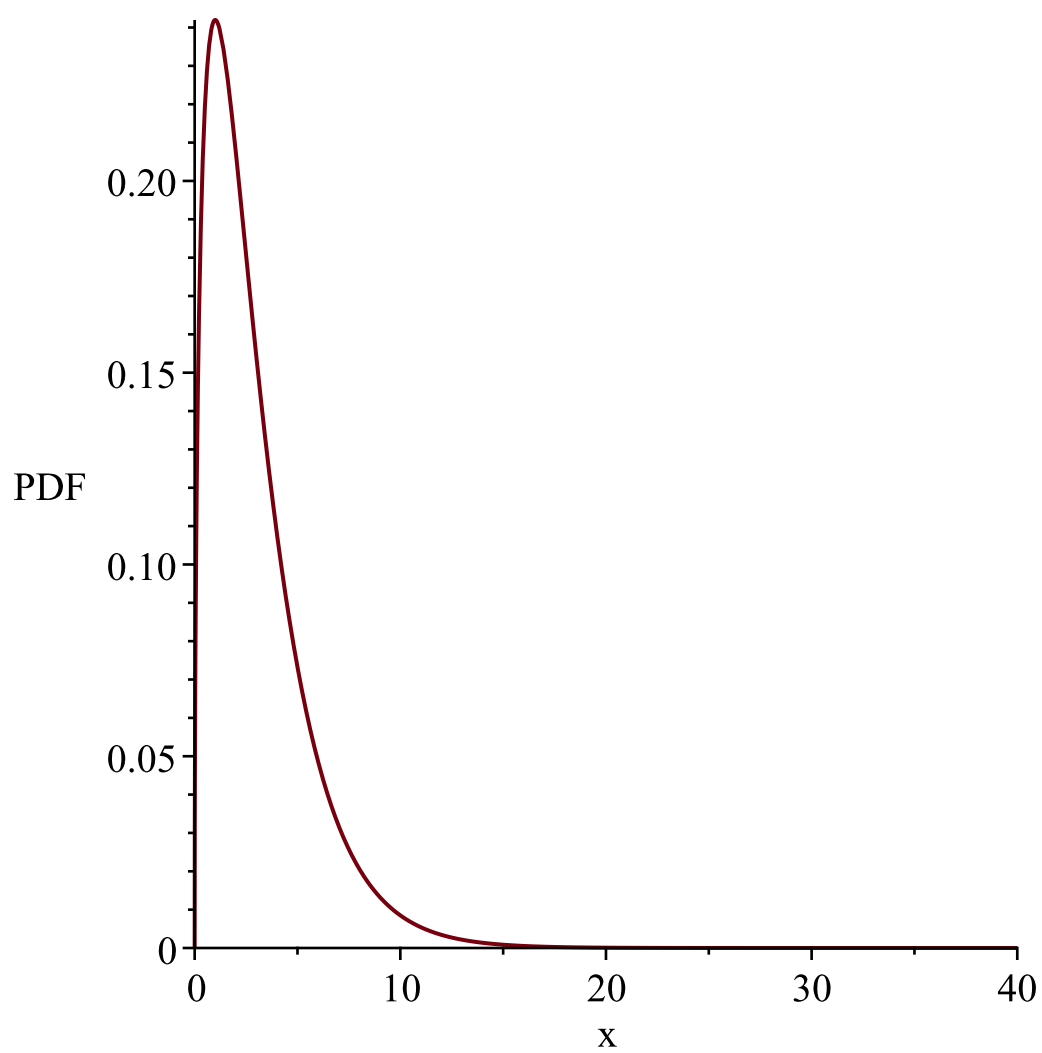
*filename* := "C:/LatexOutput/Trash.tex"

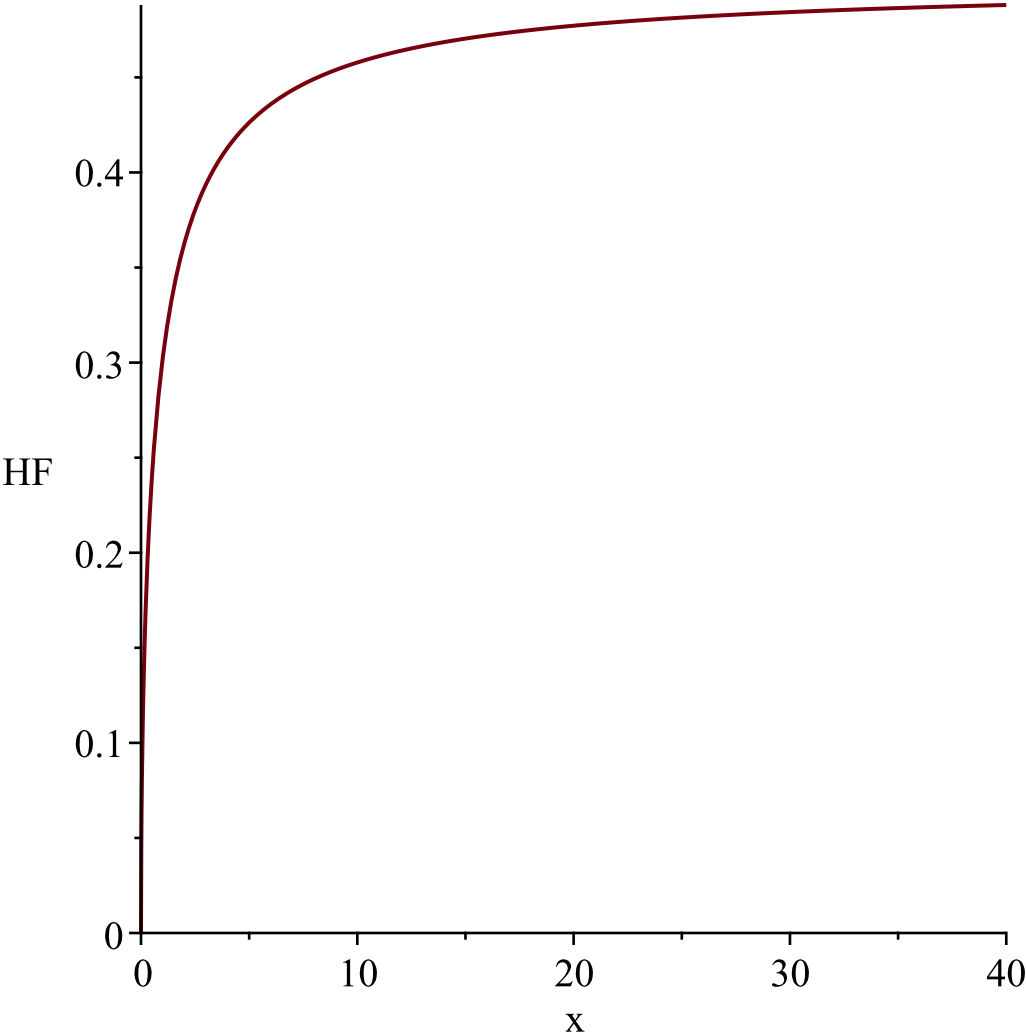
$$\frac{x^2 e^{-\frac{1}{2}x^2} \sqrt{2}}{\sqrt{\pi}}$$

"i is", 1,  
" -----"  
-----"

$$\begin{aligned} g &:= t \rightarrow t^2 \\ l &:= 0 \\ u &:= \infty \end{aligned}$$

$$Temp := \left[ \left[ y \sim \rightarrow \frac{1}{2} \frac{\sqrt{y \sim} e^{-\frac{1}{2}y \sim} \sqrt{2}}{\sqrt{\pi}} \right], [0, \infty], ["Continuous", "PDF"] \right]$$

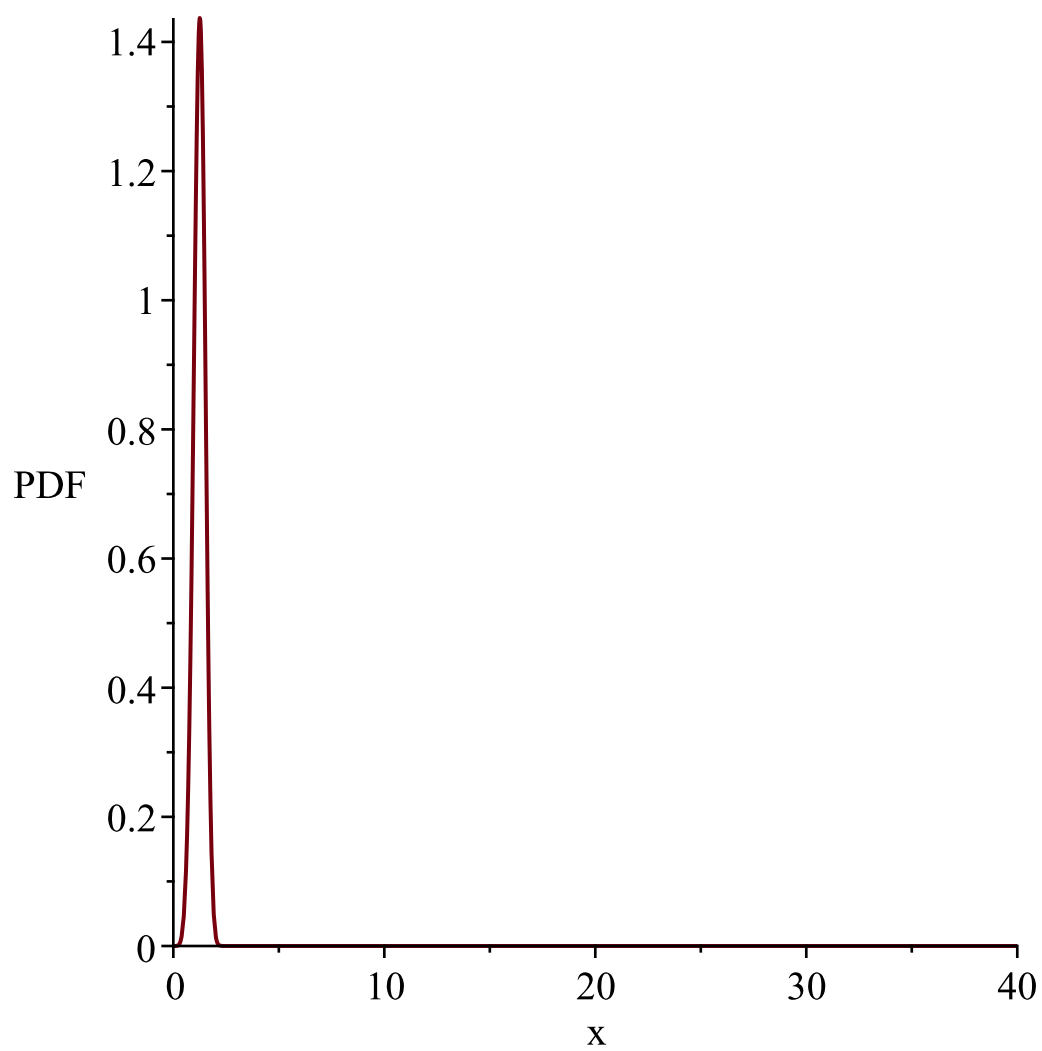


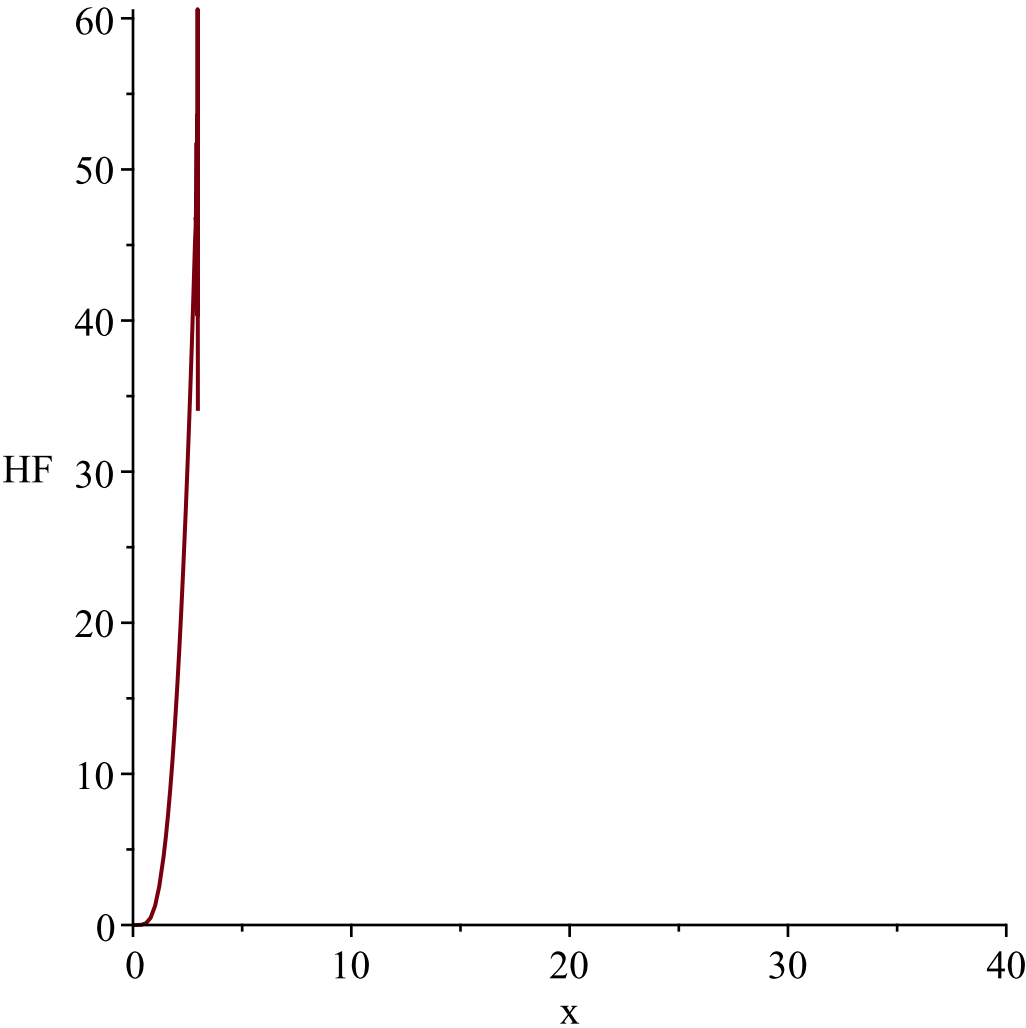


"i is", 2,  
"-----"  
-----"

$$\begin{aligned} g &:= t \rightarrow \sqrt{t} \\ l &:= 0 \\ u &:= \infty \end{aligned}$$

$$Temp := \left[ \left[ y \rightsquigarrow \frac{2 y^5 e^{-\frac{1}{2} y^4} \sqrt{2}}{\sqrt{\pi}} \right], [0, \infty], ["Continuous", "PDF"] \right]$$





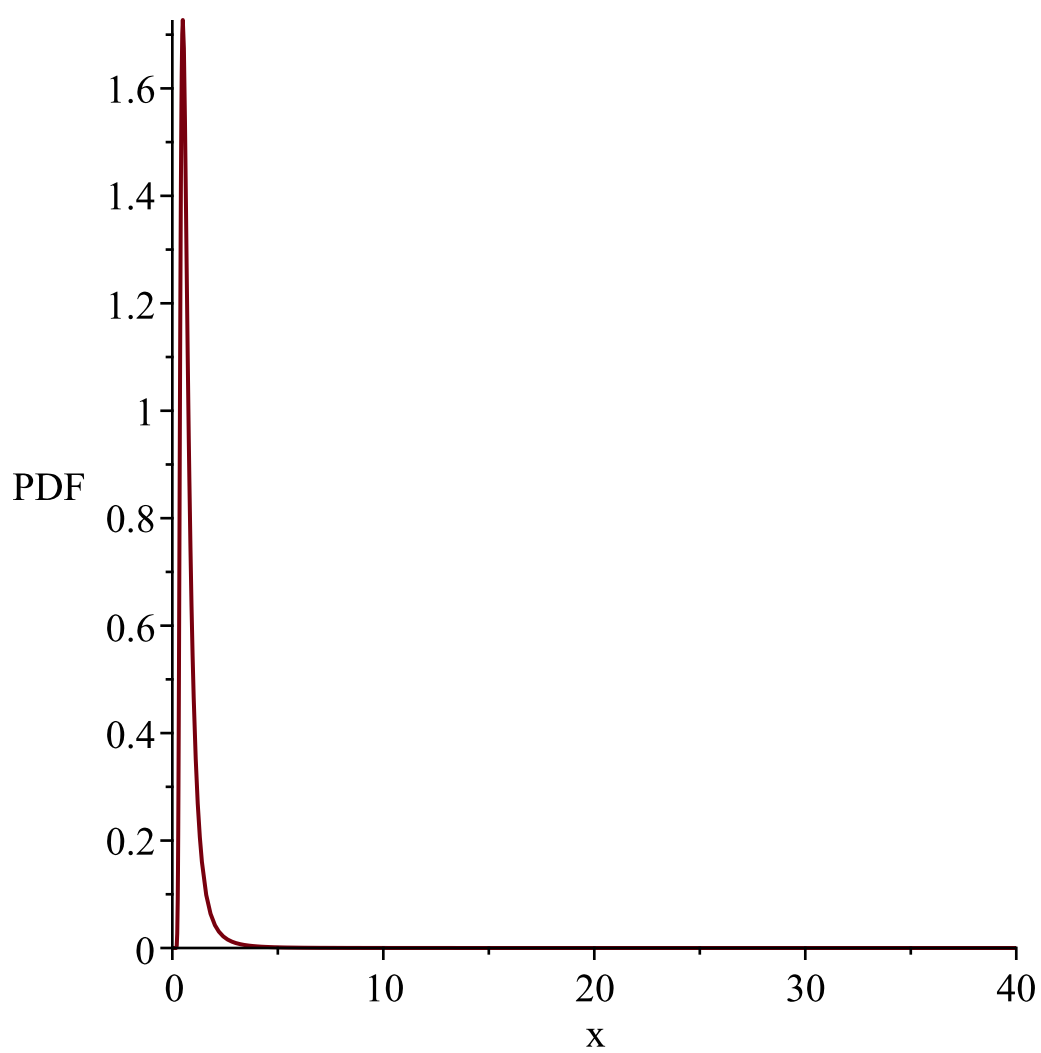
"i is", 3,  
"-----"  
-----"

$$g := t \rightarrow \frac{1}{t}$$

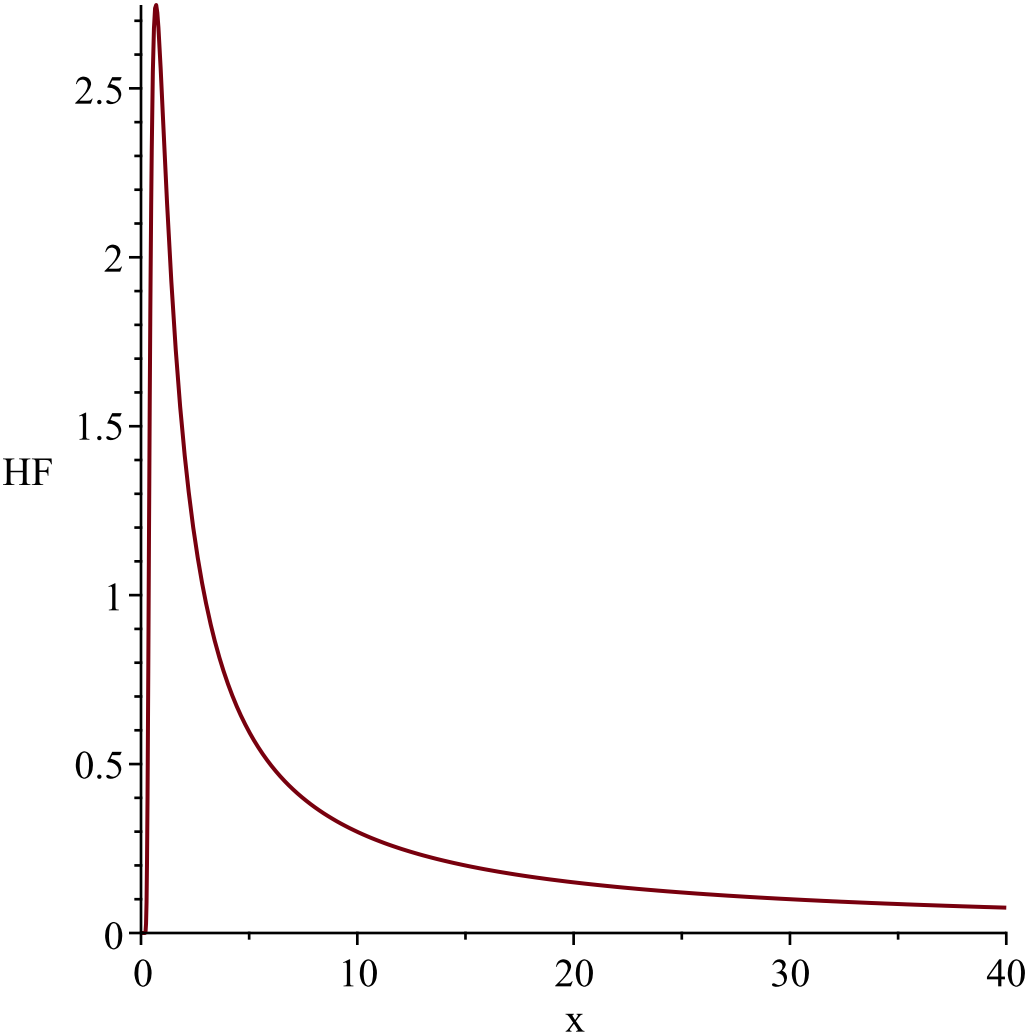
$$l := 0$$

$$u := \infty$$

$$Temp := \left[ \left[ y \rightsquigarrow \frac{e^{-\frac{1}{2y^2}} \sqrt{2}}{y^4 \sqrt{\pi}} \right], [0, \infty], ["Continuous", "PDF"] \right]$$



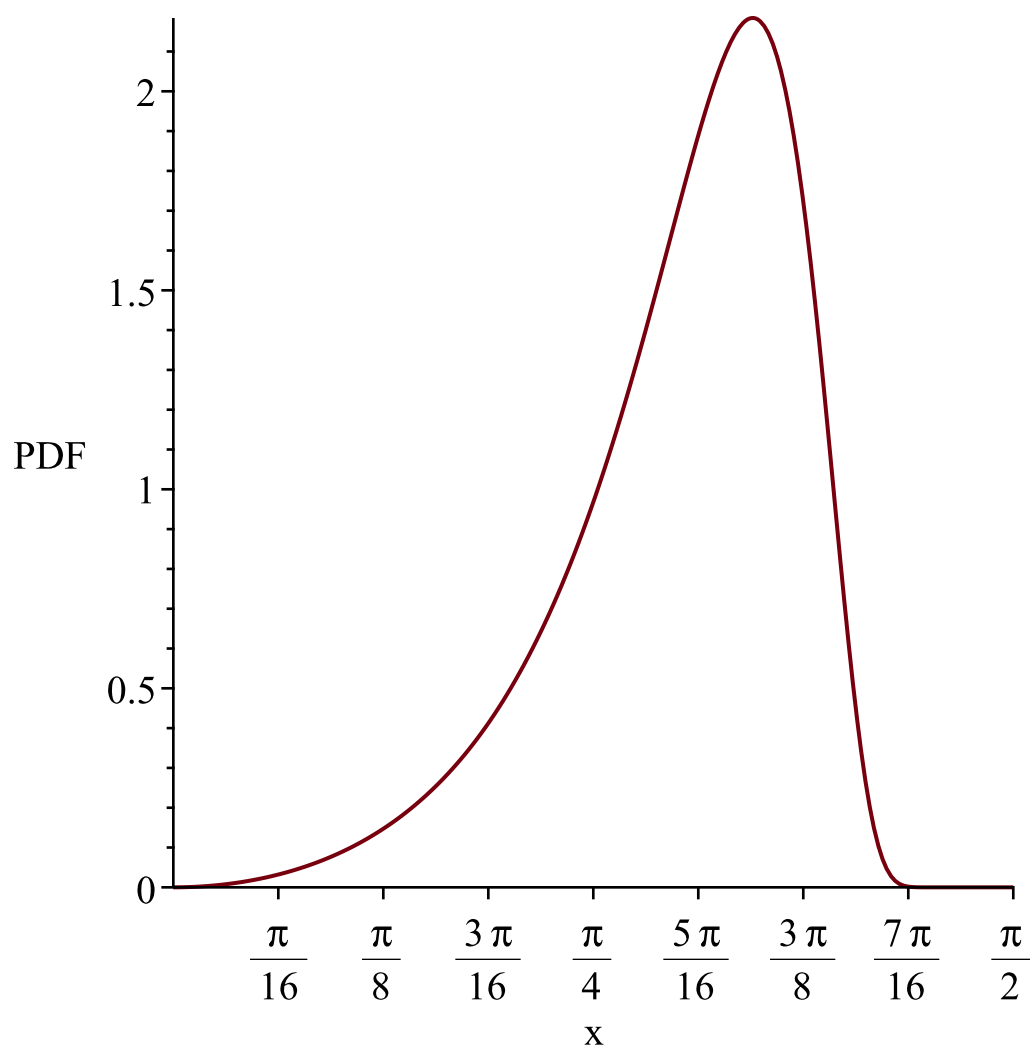




"i is", 4,  
"-----"  
-----"

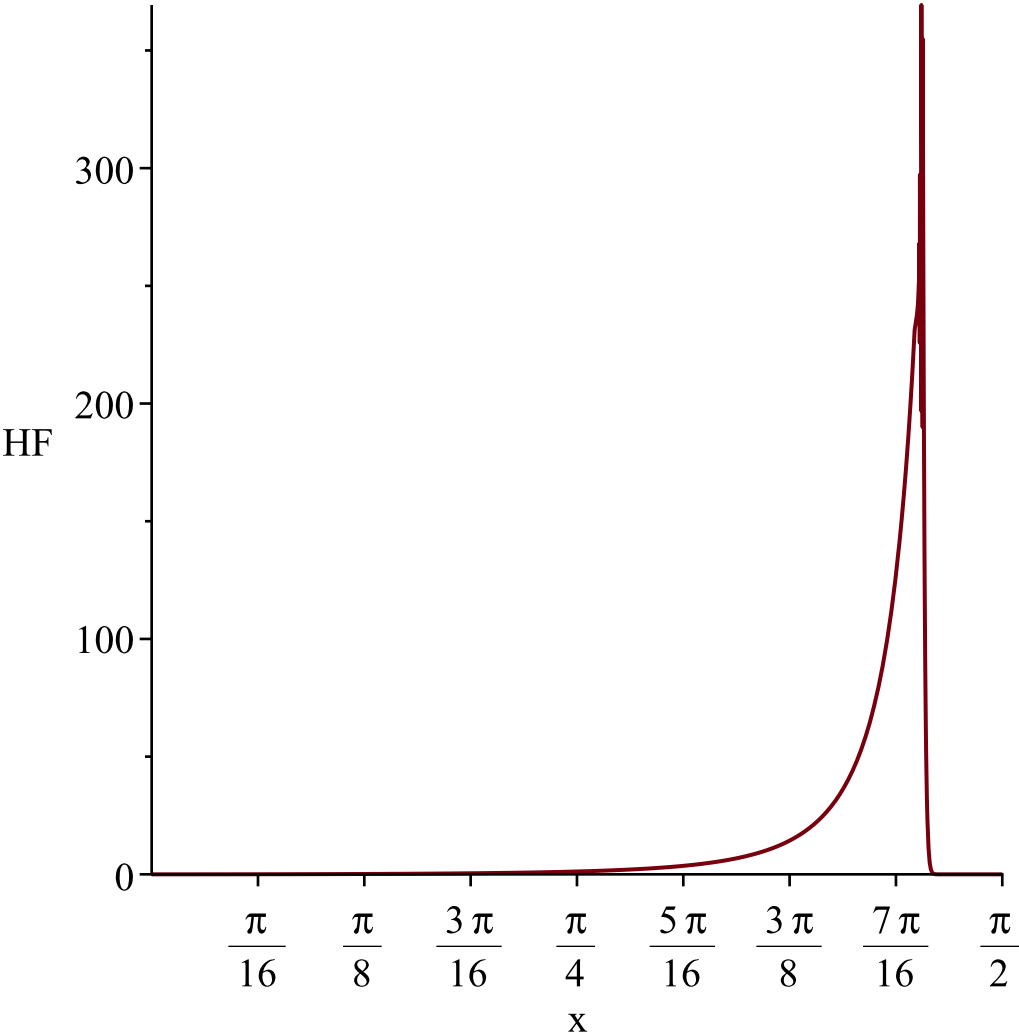
```
g := t→arctan(t)
l := 0
u := ∞
Temp := ⌊⌊ y~→  $\frac{\sqrt{2} \sin(y\sim)^2 e^{-\frac{1}{2} \frac{\sin(y\sim)^2}{\cos(y\sim)^2}}}{\sqrt{\pi} \cos(y\sim)^4}$  ⌋, ⌊ 0,  $\frac{1}{2} \pi$  ⌋, ["Continuous", "PDF"] ⌋
```

*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable,  $\frac{1}{2} \pi$   
Resetting high to RV's maximum support value*



*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable,  $\frac{1}{2} \pi$*

*Resetting high to RV's maximum support value*



"i is", 5,  
"  
-----"

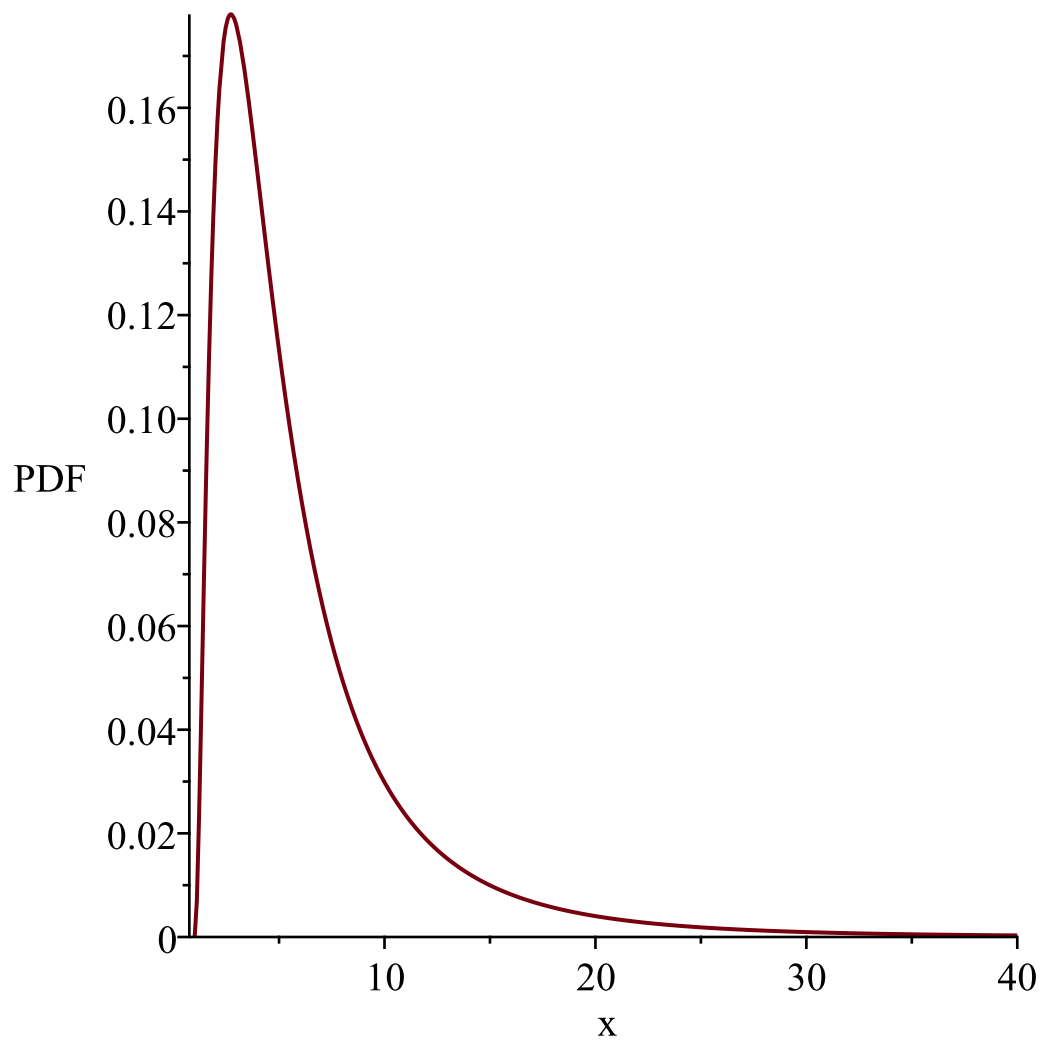
```
g := t→et
l := 0
u := ∞

Temp := ⌊⌊  
y~→  $\frac{\ln(y\sim)^2 e^{-\frac{1}{2} \ln(y\sim)^2} \sqrt{2}}{\sqrt{\pi} y\sim}$ , [1, ∞], ["Continuous", "PDF"] ⌋⌋
```

*WARNING(PlotDist): Low value provided by user, 0  
is less than minimum support value of random variable*

1

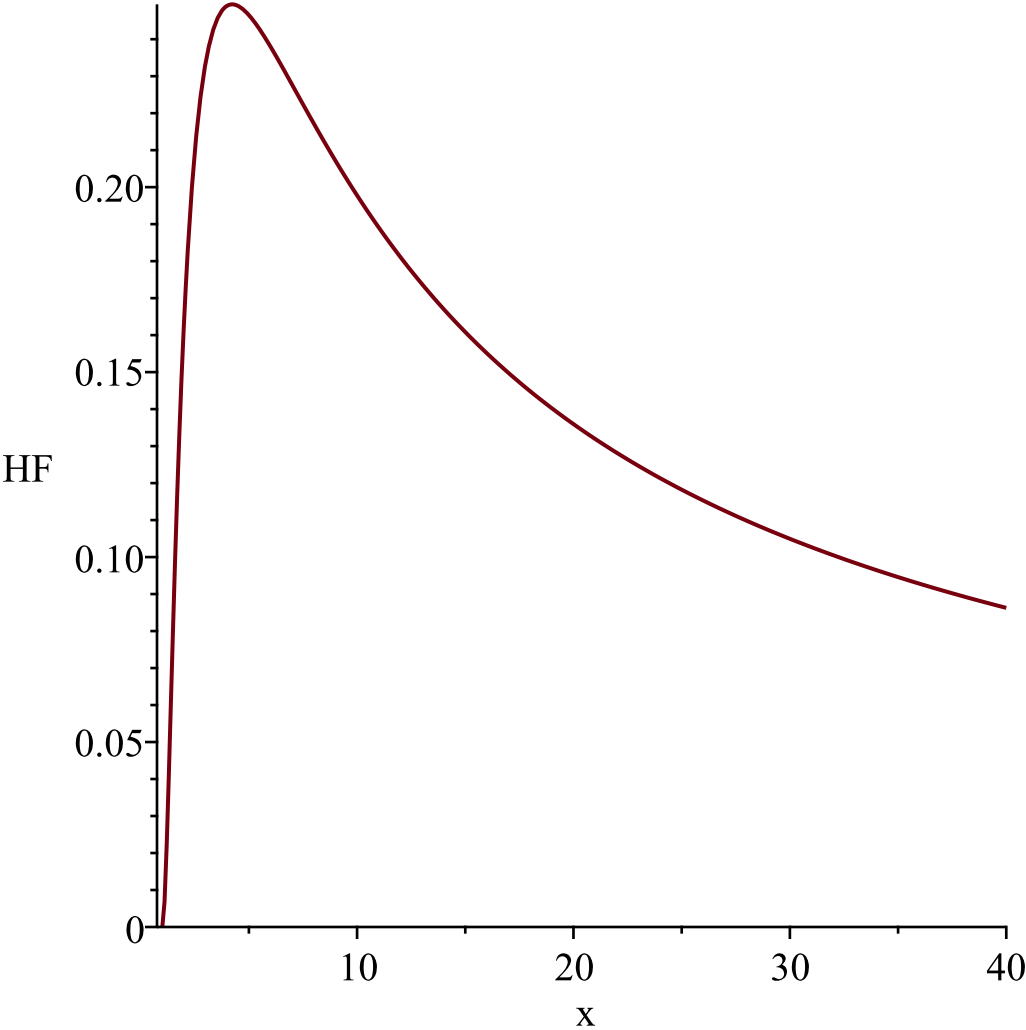
*Resetting low to RV's minimum support value*



*WARNING(PlotDist): Low value provided by user, 0  
is less than minimum support value of random variable*

1

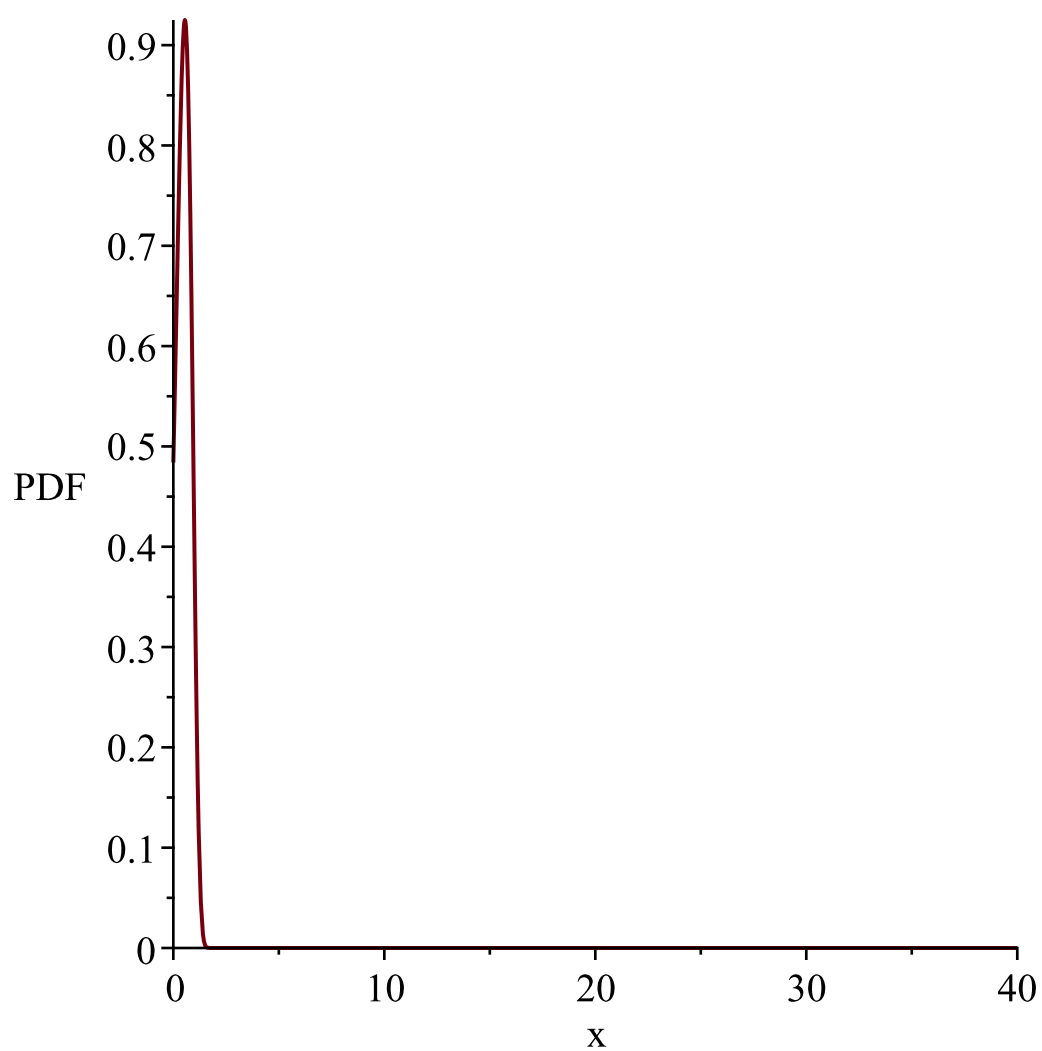
*Resetting low to RV's minimum support value*

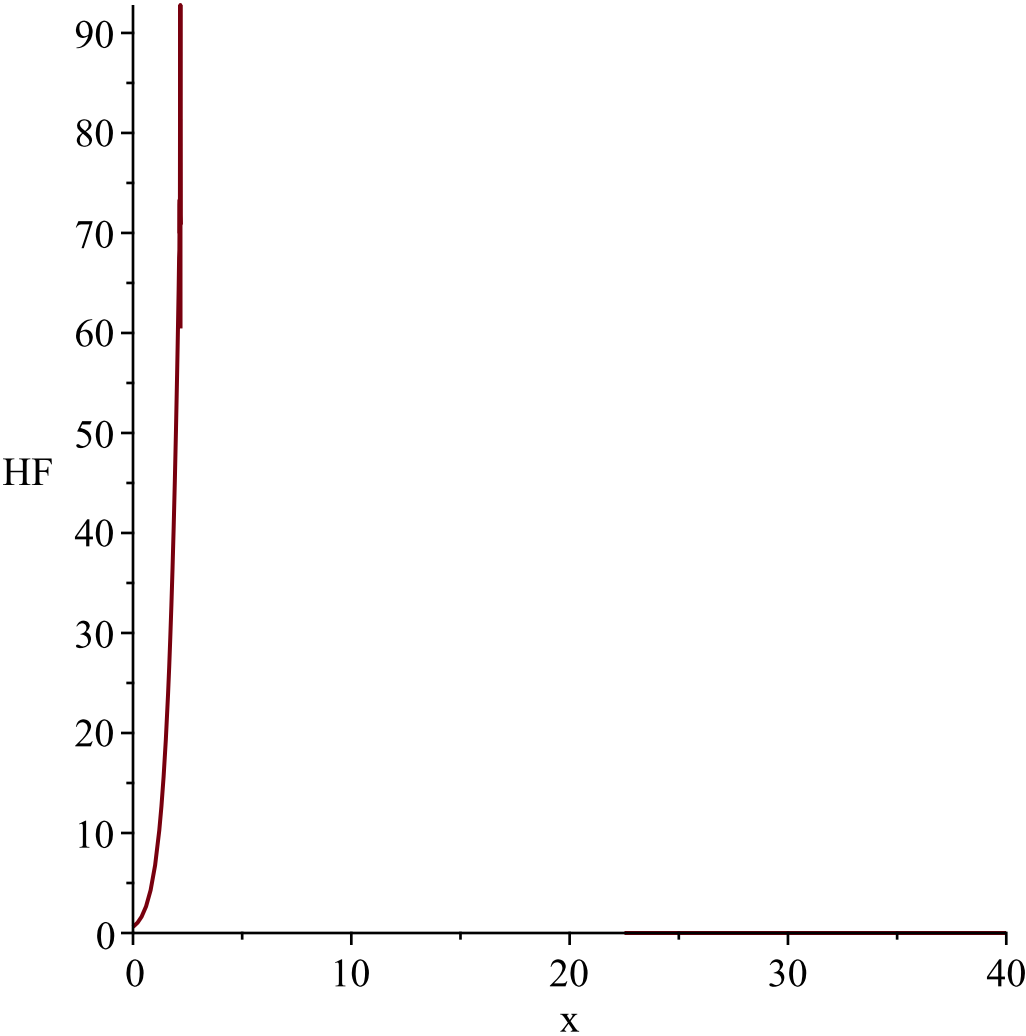


"i is", 6,  
"-----"  
-----"

$$\begin{aligned} g &:= t \rightarrow \ln(t) \\ l &:= 0 \\ u &:= \infty \end{aligned}$$

$$Temp := \left[ \left[ y \rightsquigarrow \frac{e^{3y \sim - \frac{1}{2}} e^{2y \sim} \sqrt{2}}{\sqrt{\pi}} \right], [-\infty, \infty], ["Continuous", "PDF"] \right]$$





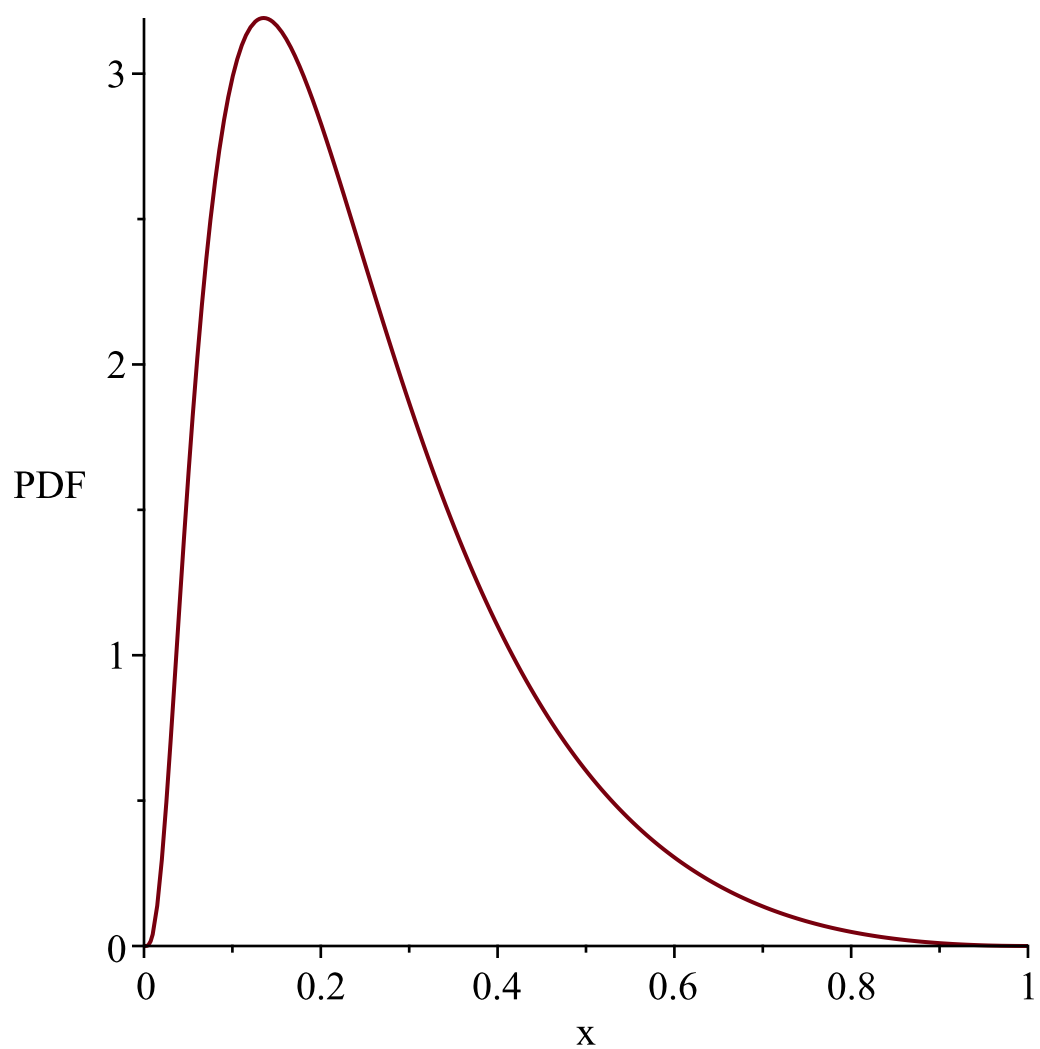
"i is", 7,  
"-----"  
-----"

$$\begin{aligned} g &:= t \rightarrow e^{-t} \\ l &:= 0 \\ u &:= \infty \end{aligned}$$

$$Temp := \left[ \left[ y \sim \rightarrow \frac{\ln(y \sim)^2 e^{-\frac{1}{2} \ln(y \sim)^2} \sqrt{2}}{\sqrt{\pi} y \sim} \right], [0, 1], ["Continuous", "PDF"] \right]$$

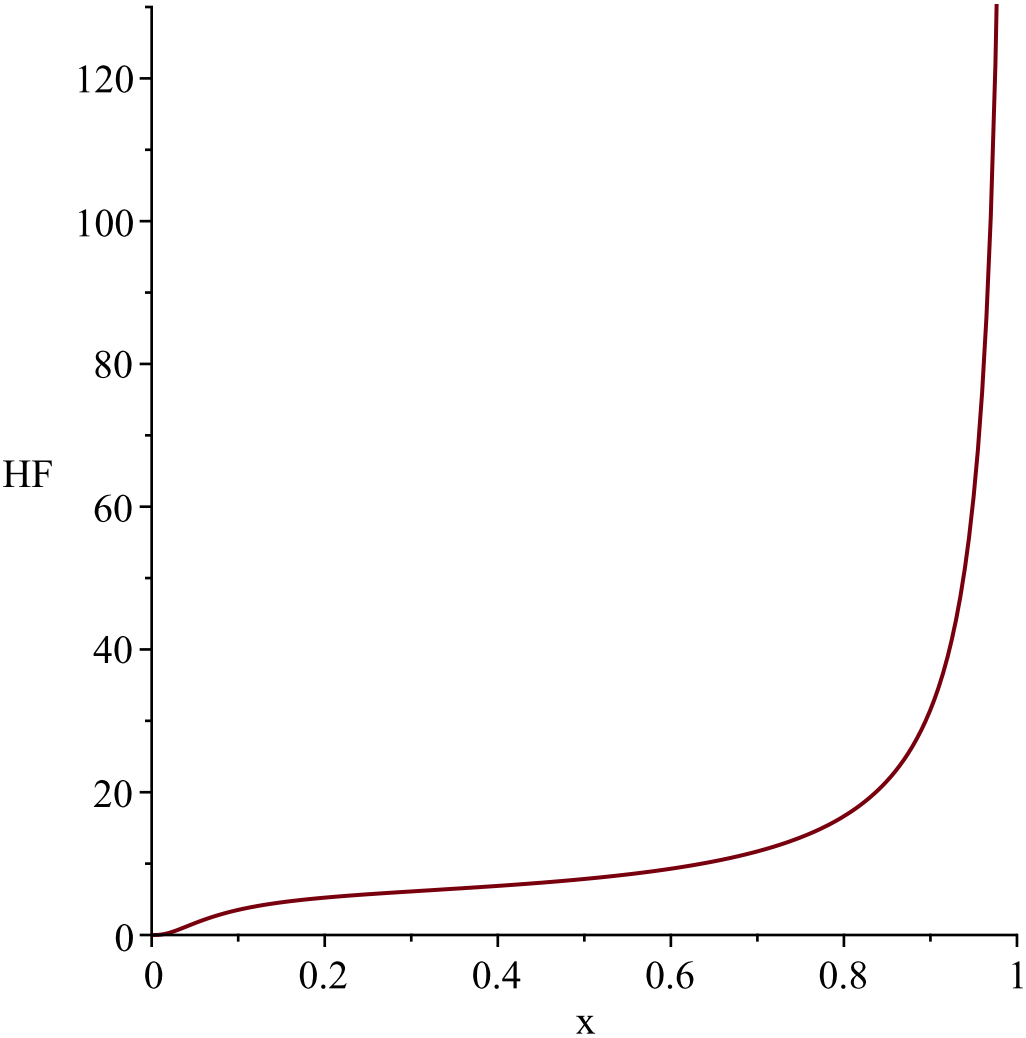
*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable, 1*

*Resetting high to RV's maximum support value*



*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable, 1  
Resetting high to RV's maximum support value*

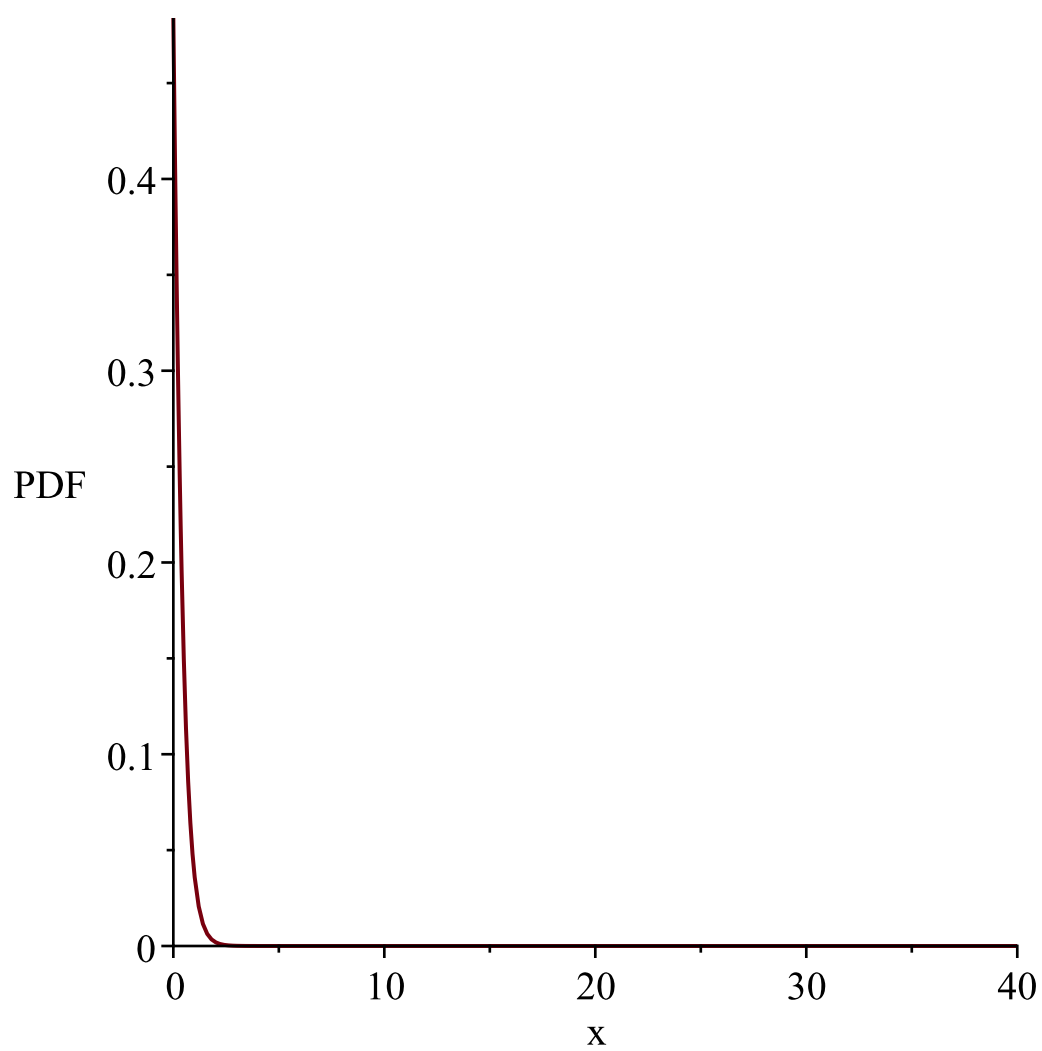


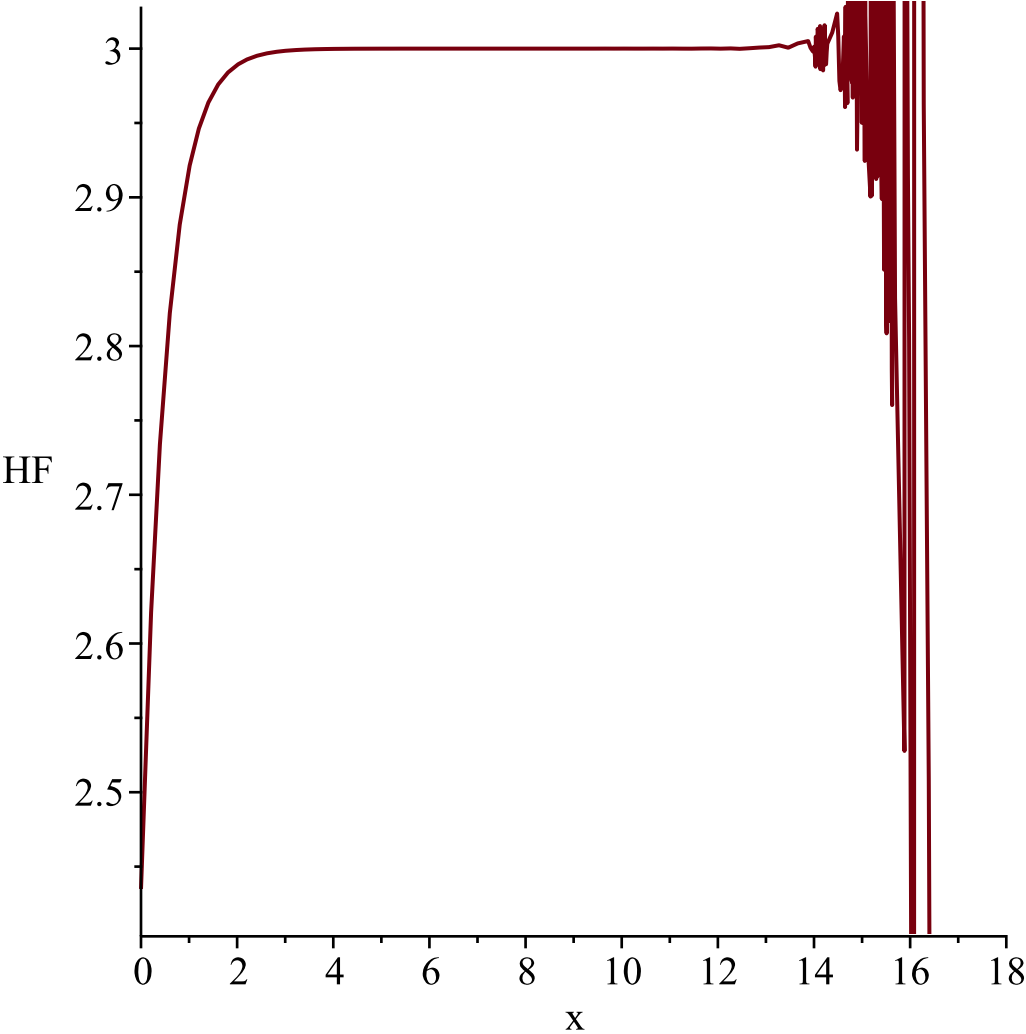


"i is", 8,  
"-----"  
-----"

$$g := t \rightarrow -\ln(t)$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[ \left[ y \sim \rightarrow \frac{e^{-\frac{1}{2} y \sim - 3 y \sim} \sqrt{2}}{\sqrt{\pi}} \right], [-\infty, \infty], ["Continuous", "PDF"] \right]$$





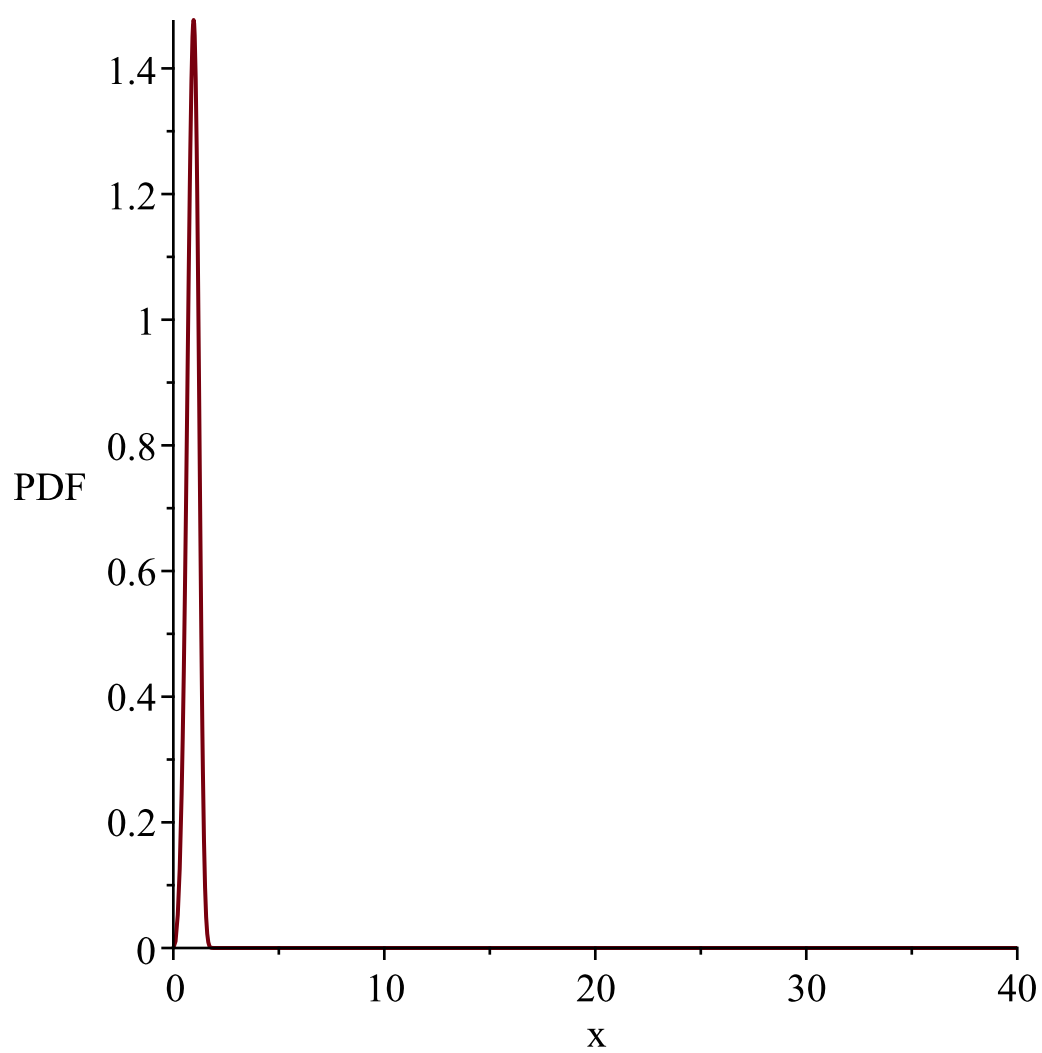
"i is", 9,  
 " \_\_\_\_\_  
 \_\_\_\_\_"

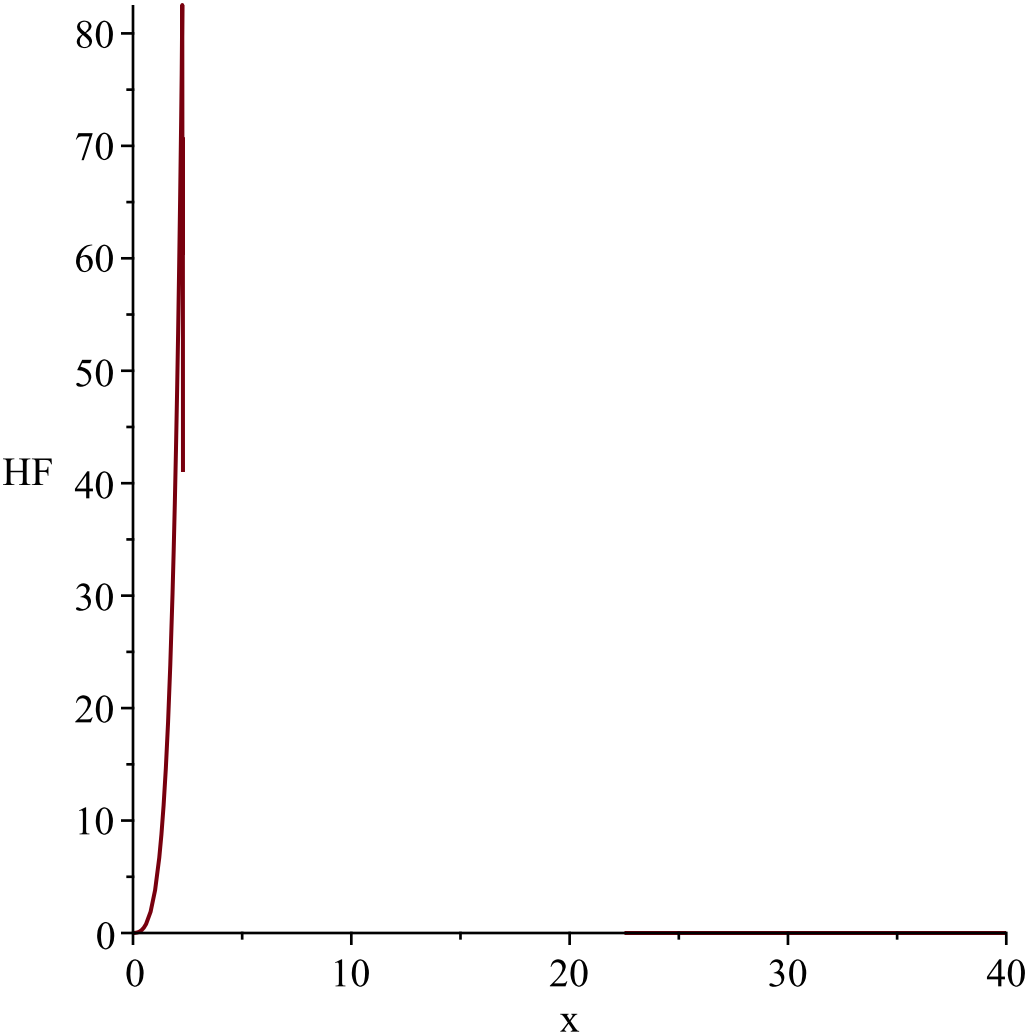
$$g:=t\!\rightarrow\!\ln(t+1)$$

$$l:=0$$

$$u:=\infty$$

$$Temp:=\left[\left[y\!\sim\!\rightarrow\frac{\left(e^{y\!\sim\!}-1\right)^2e^{-\frac{1}{2}\,e^{2,y\!\sim\!}+e^{y\!\sim\!}-\frac{1}{2}+y\!\sim\!}\sqrt{2}}{\sqrt{\pi}}\right],[0,\infty],[\text{"Continuous"},\text{"PDF"}]\right]$$

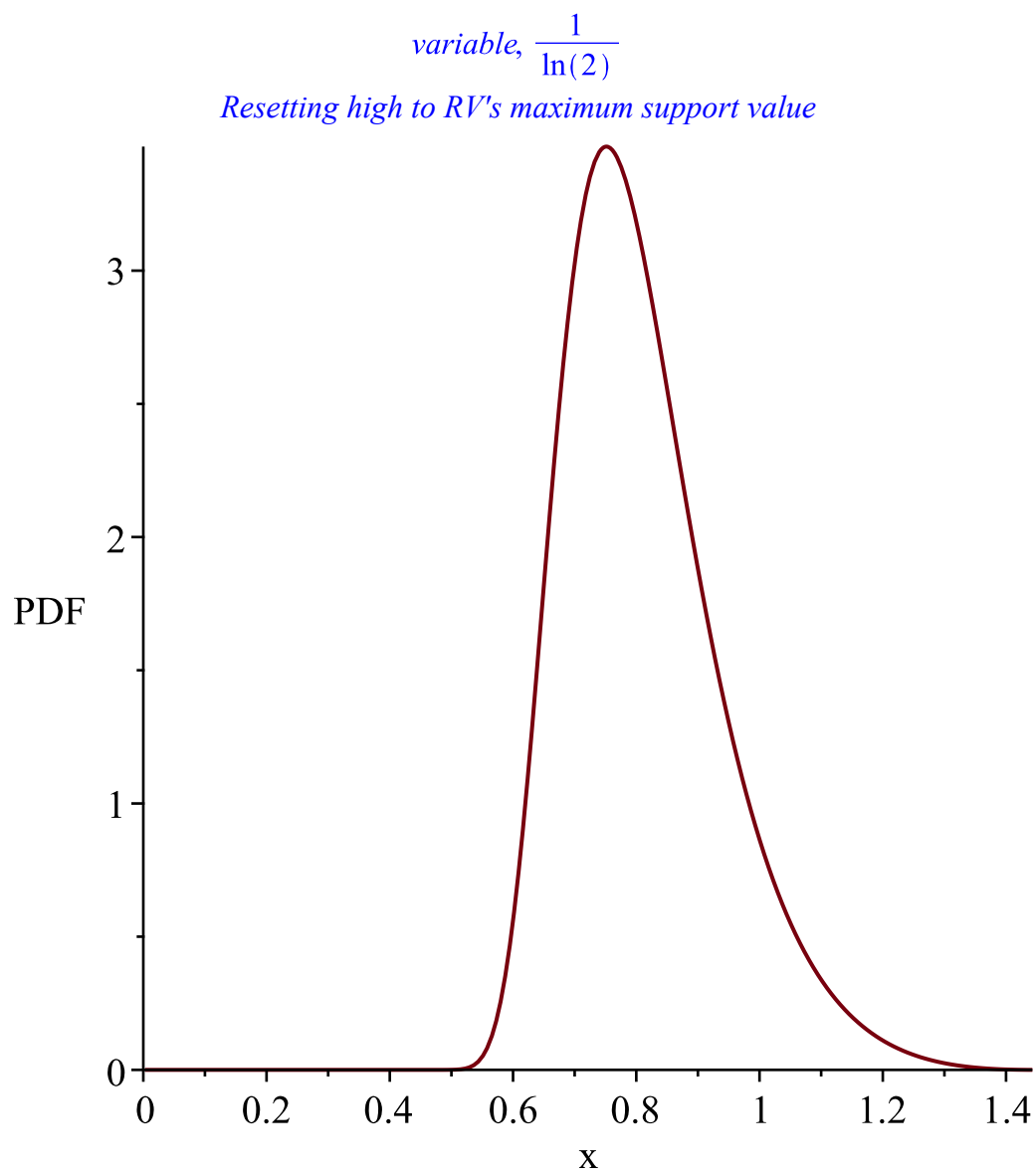




"i is", 10,  
"-----"  
"-----"

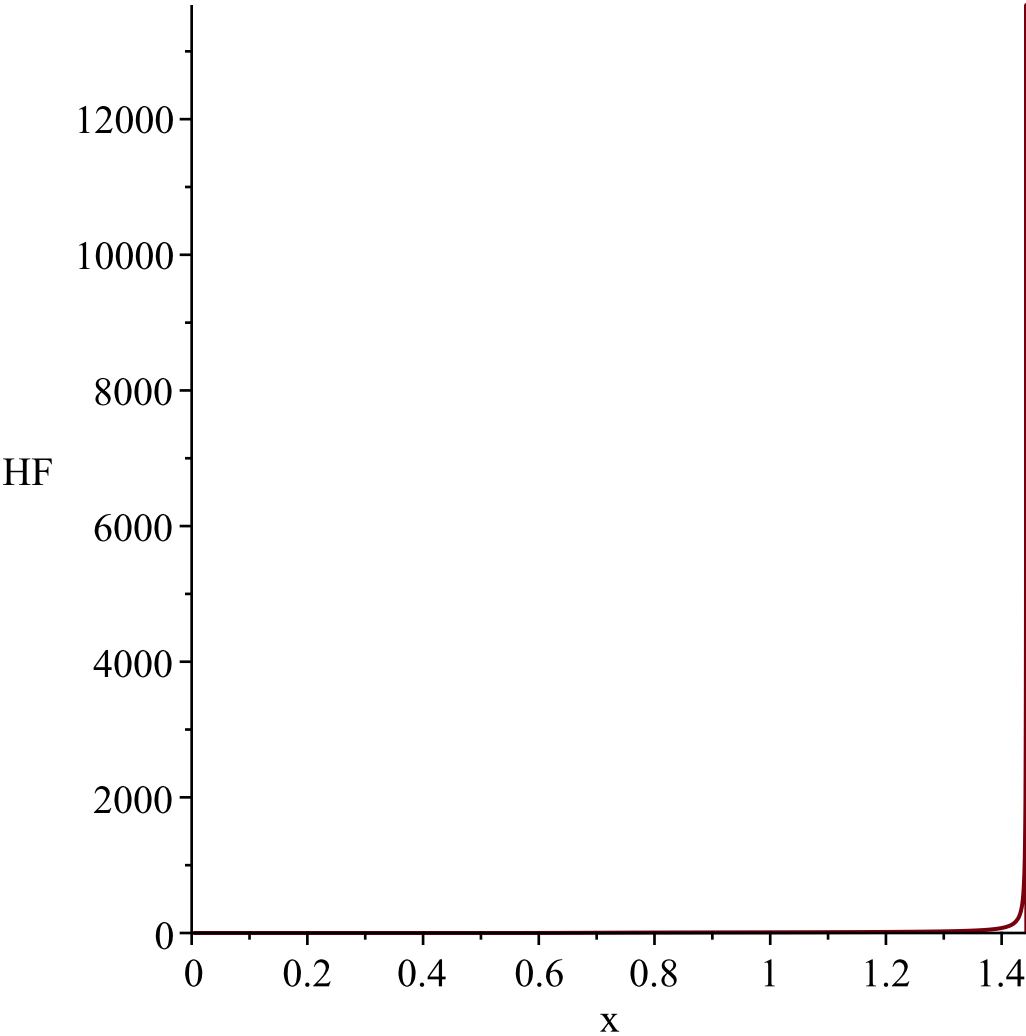
$$g := t \rightarrow \frac{1}{\ln(t+2)}$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[ \left[ y \rightarrow \frac{\left( e^{\frac{1}{y}} - 2 \right)^2 e^{-\frac{1}{2} \frac{e^{\frac{2}{y}} y - 4 e^{\frac{1}{y}} y + 4 y - 2}}{y}} \sqrt{2}}{\sqrt{\pi} y^2} \right], \left[ 0, \frac{1}{\ln(2)} \right], \right. \\ \left. ["Continuous", "PDF"] \right]$$

*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random*



*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random*

*variable,  $\frac{1}{\ln(2)}$*   
*Resetting high to RV's maximum support value*

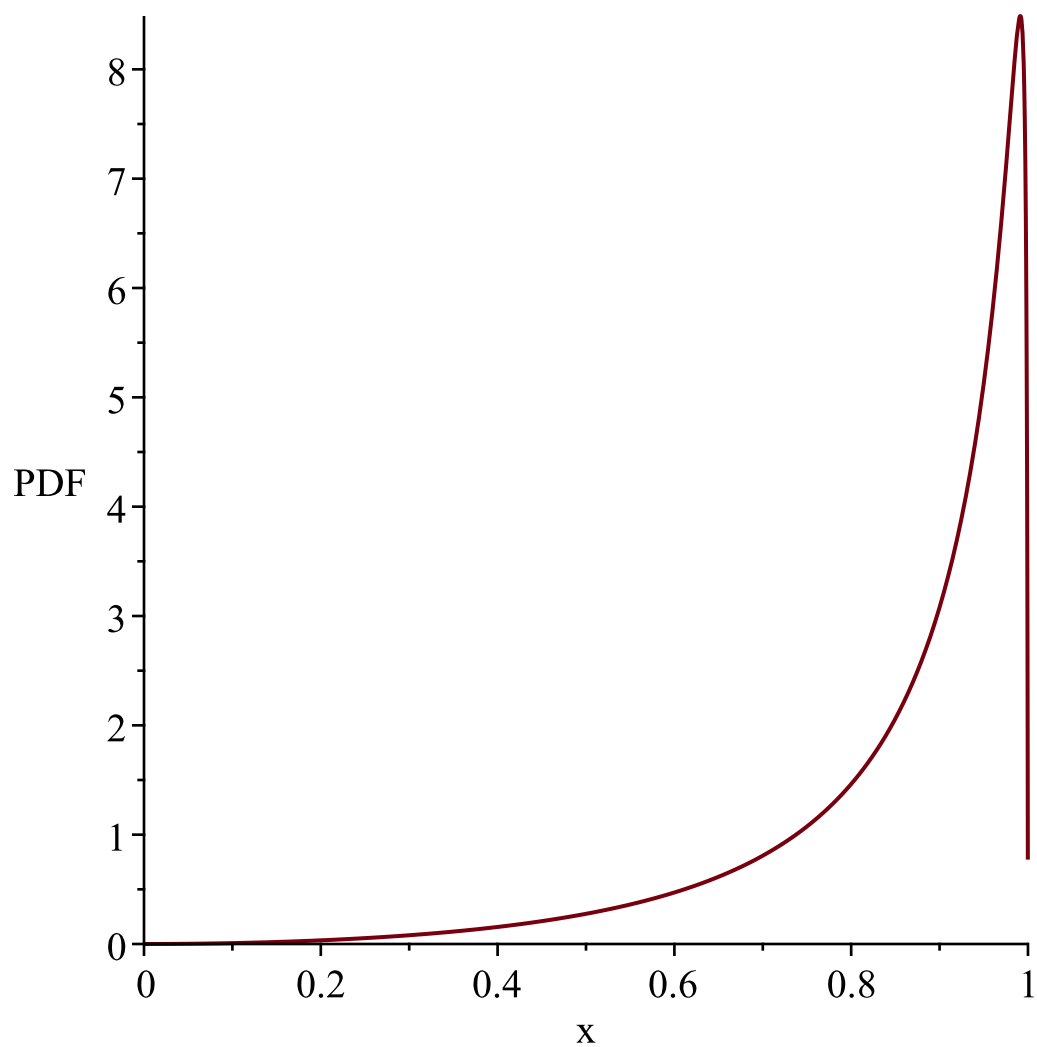


"i is", 11,  
 "-----"  
 "-----"

```

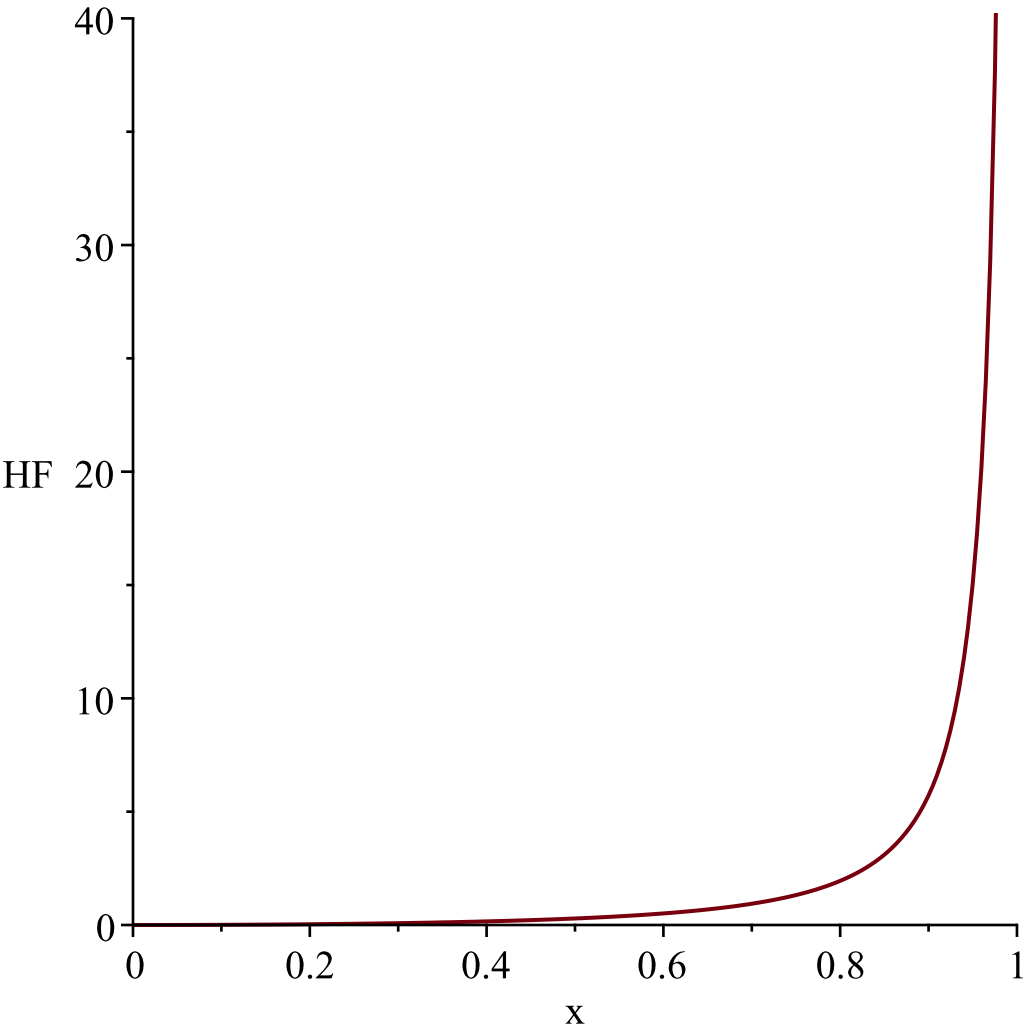
g := t→tanh(t)
l := 0
u := ∞
Temp := ⌊⌊
  y~→ -  $\frac{\operatorname{arctanh}(y\sim)^2 e^{-\frac{1}{2} \operatorname{arctanh}(y\sim)^2} \sqrt{2}}{\sqrt{\pi} (y\sim^2 - 1)}$ 
⌋, [0, 1], ["Continuous", "PDF"] ⌋
```

*WARNING(PlotDist): High value provided by user, 40  
 is greater than maximum support value of the random  
 variable, 1  
 Resetting high to RV's maximum support value*



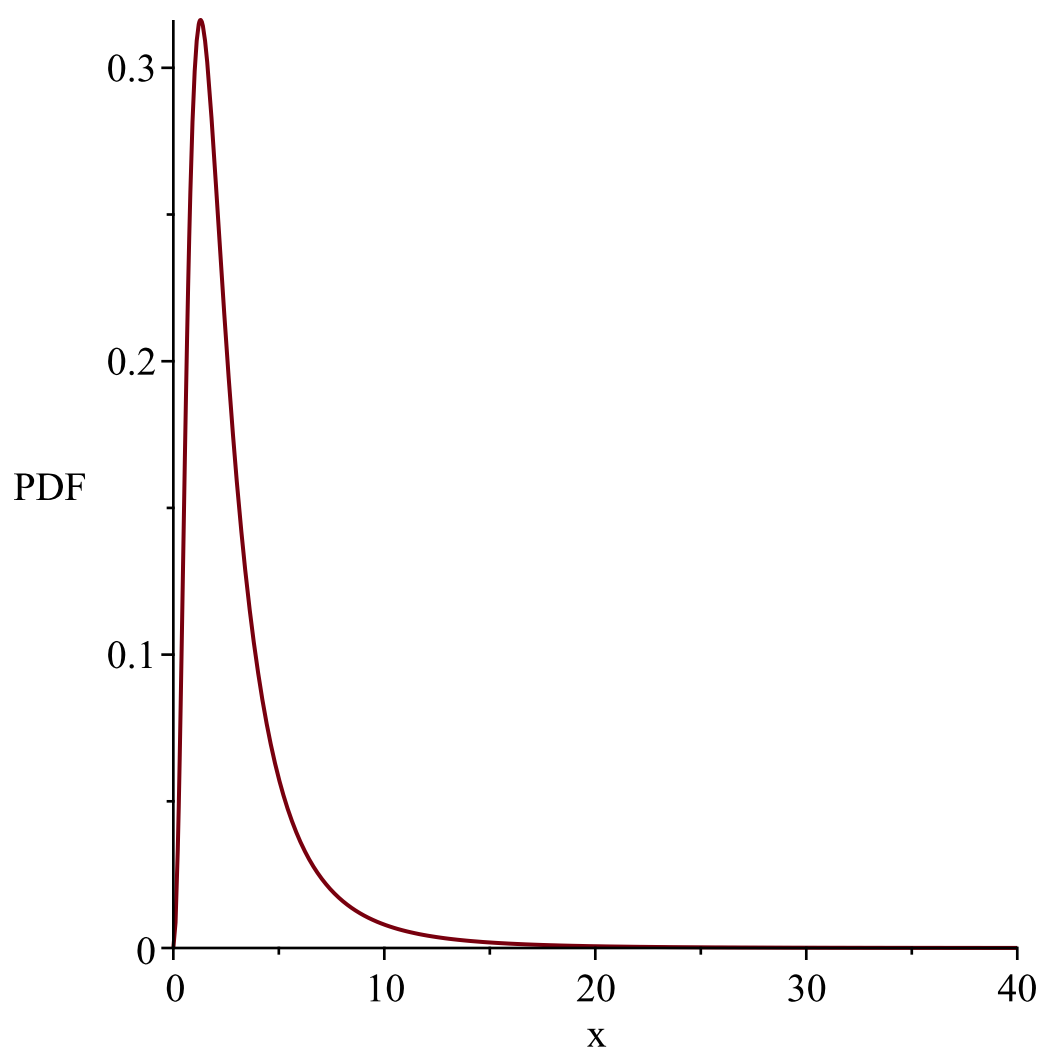
*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable, 1  
Resetting high to RV's maximum support value*

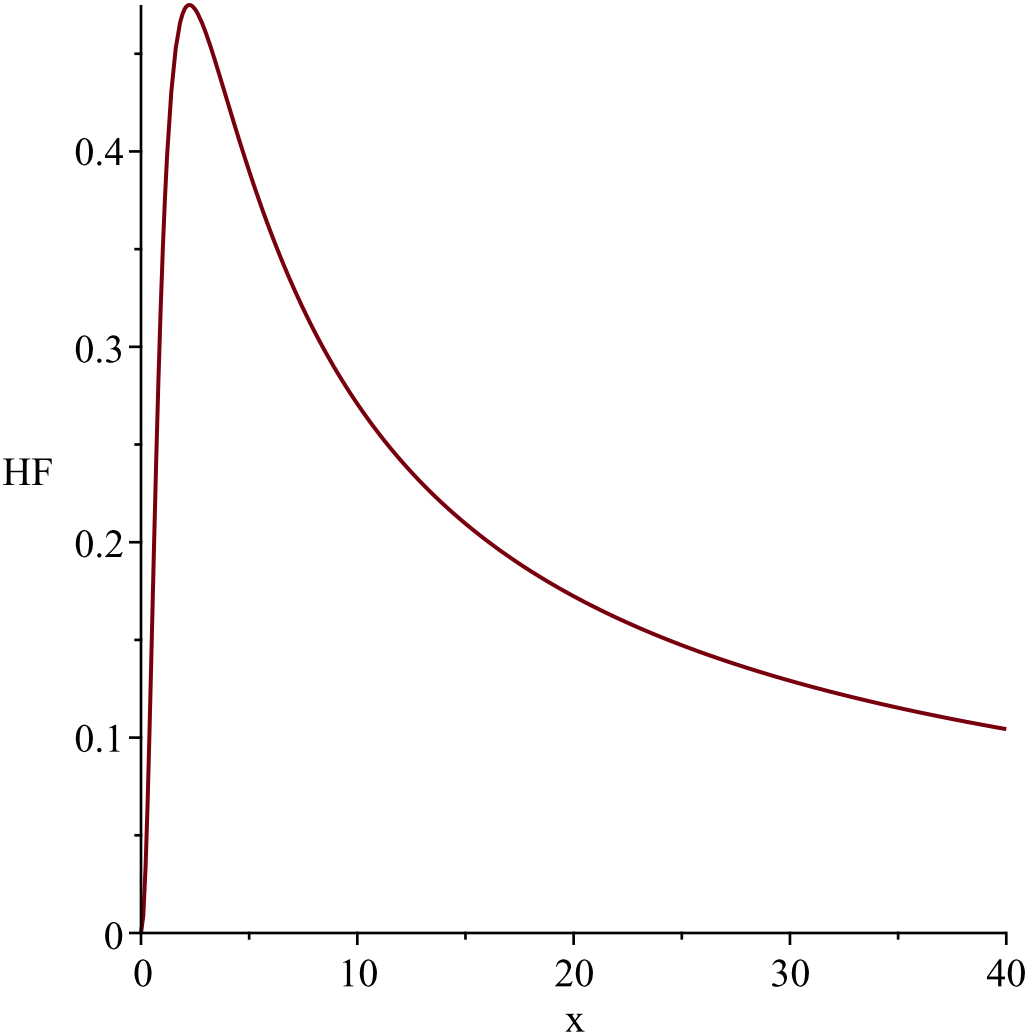




"i is", 12,  
"-----"  
-----"

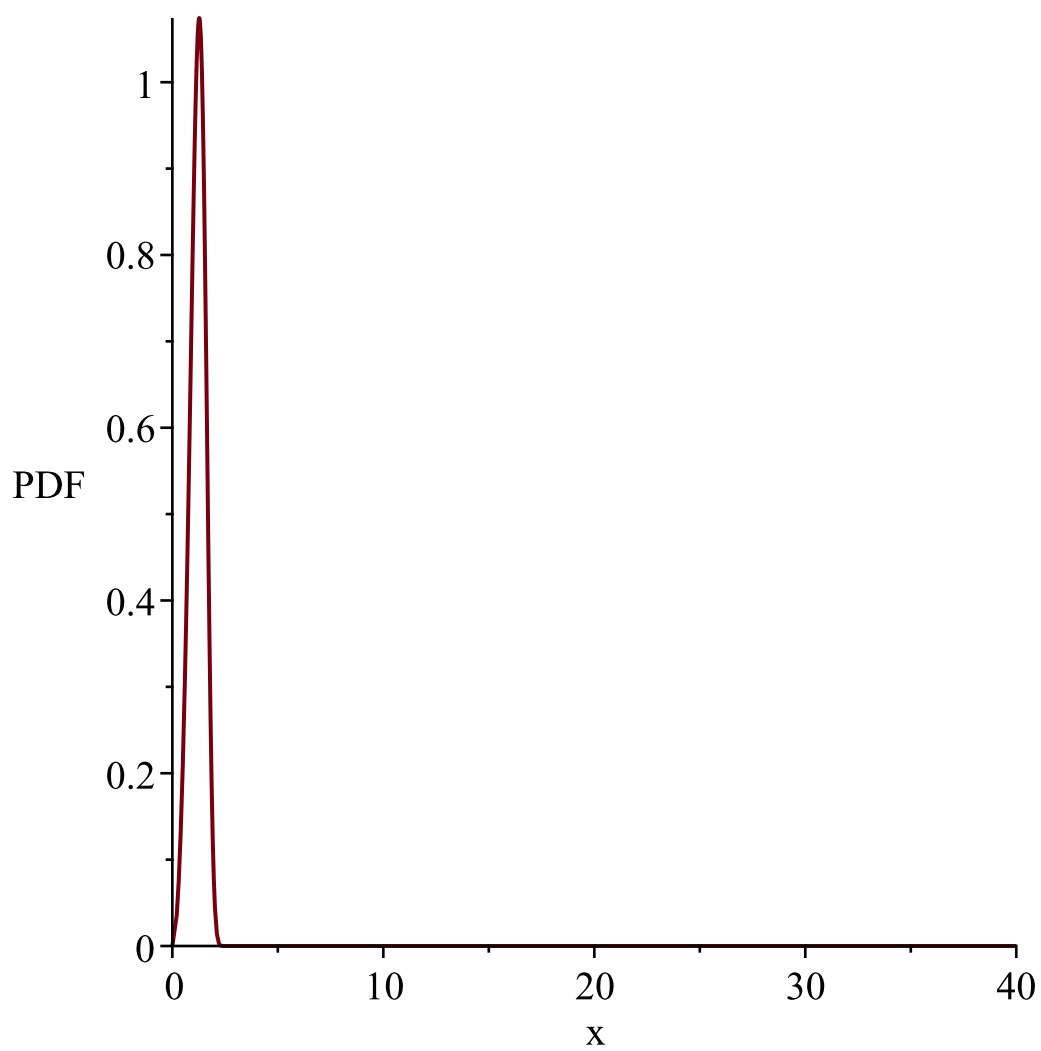
$$\begin{array}{l} g := t \rightarrow \sinh(t) \\ l := 0 \\ u := \infty \\ Temp := \left[ \left[ y \rightsquigarrow \frac{\operatorname{arcsinh}(y)^2 e^{-\frac{1}{2} \operatorname{arcsinh}(y)^2} \sqrt{2}}{\sqrt{\pi} \sqrt{y^2 + 1}} \right], [0, \infty], ["Continuous", "PDF"] \right] \end{array}$$

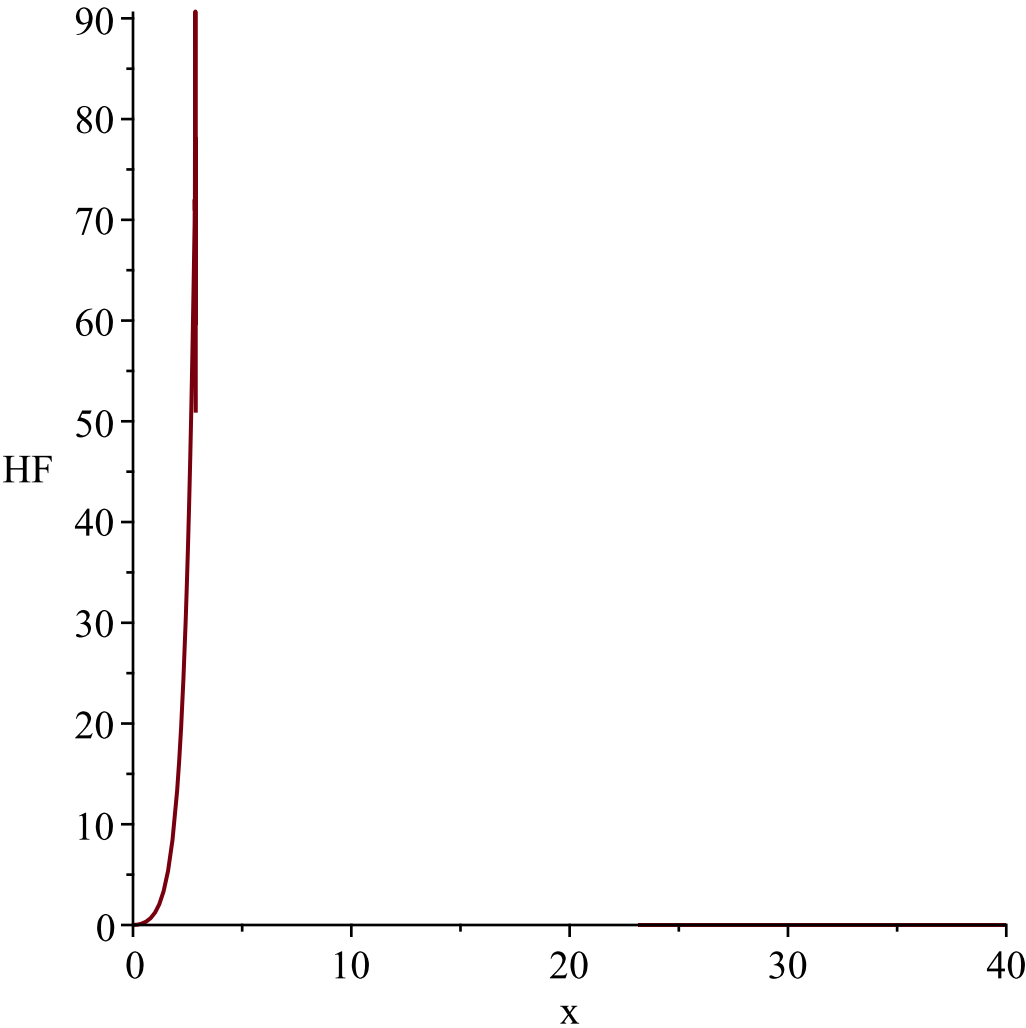




"i is", 13,  
 " \_\_\_\_\_"  
 "\_\_\_\_\_"

$$\begin{array}{l}
 g:=t\rightarrow\operatorname{arcsinh}(t)\\
 l:=0\\
 u:=\infty\\
 Temp:=\left[\left[y\rightsquigarrow\frac{\sinh(y\sim)^2\,\mathrm{e}^{-\frac{1}{2}\sinh(y\sim)^2}\sqrt{2}\cosh(y\sim)}{\sqrt{\pi}}\right],\left[0,\infty\right],\left["Continuous","PDF"\right]\right]
 \end{array}$$

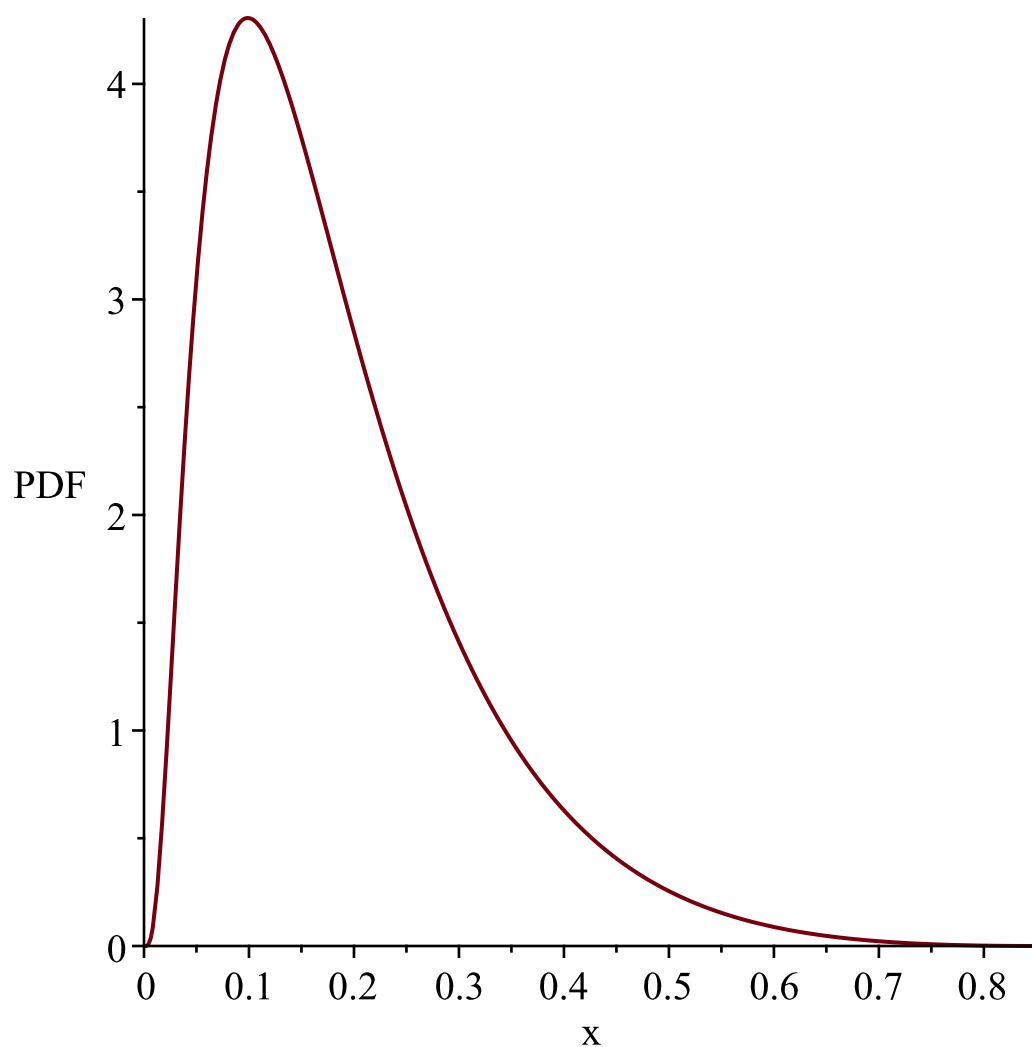




"i is", 14,  
"-----"  
"-----"

$$g := t \rightarrow \operatorname{csch}(t + 1)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[ \left[ y \sim \rightarrow \frac{(-1 + \operatorname{arccsch}(y \sim))^2 e^{-\frac{1}{2} (-1 + \operatorname{arccsch}(y \sim))^2} \sqrt{2}}{\sqrt{\pi} \sqrt{y \sim^2 + 1} |y \sim|} \right], \left[ 0, \frac{2}{e - e^{-1}} \right], \right. \\ \left. ["Continuous", "PDF"] \right]$$

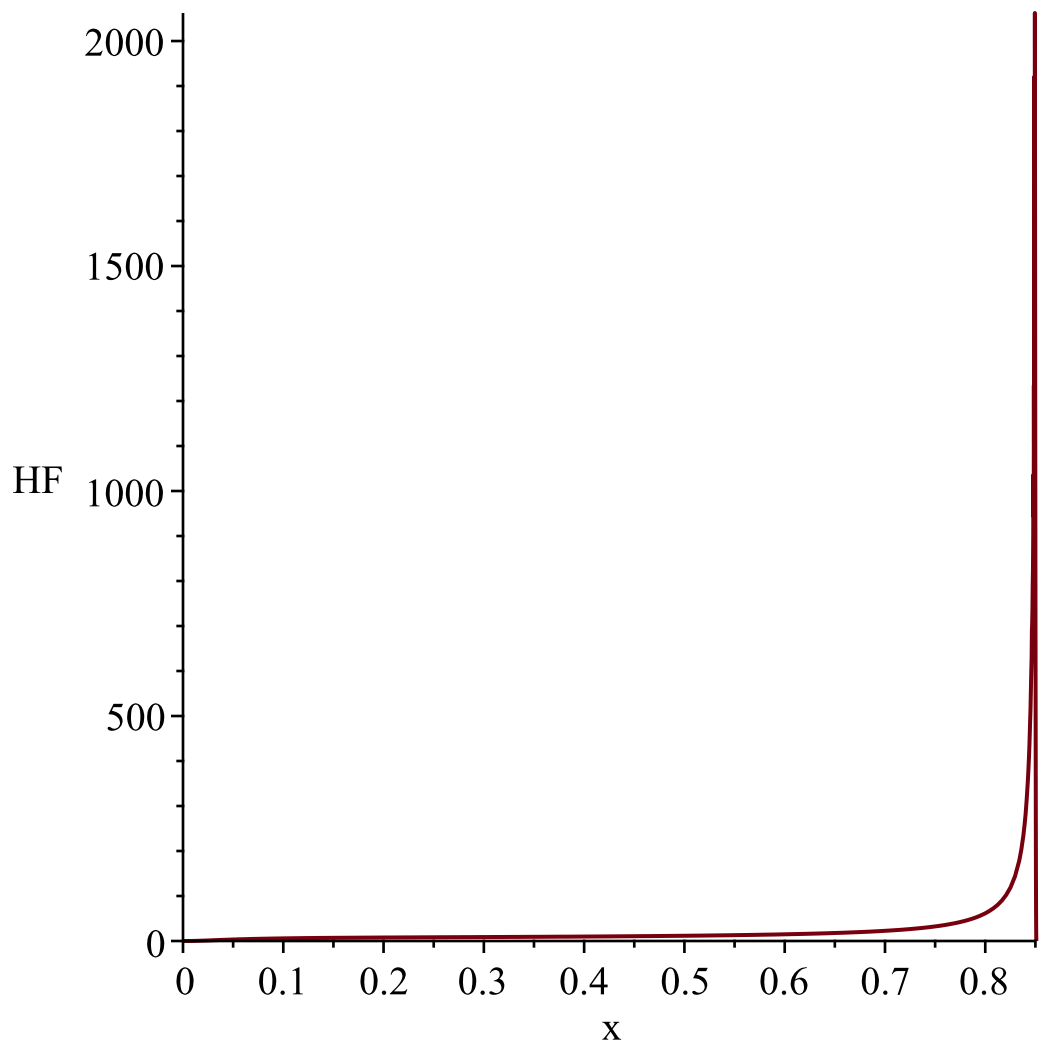
*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable,  $\frac{2}{e - e^{-1}}$   
Resetting high to RV's maximum support value*



*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random*

*variable,  $\frac{2}{e - e^{-1}}$*

*Resetting high to RV's maximum support value*

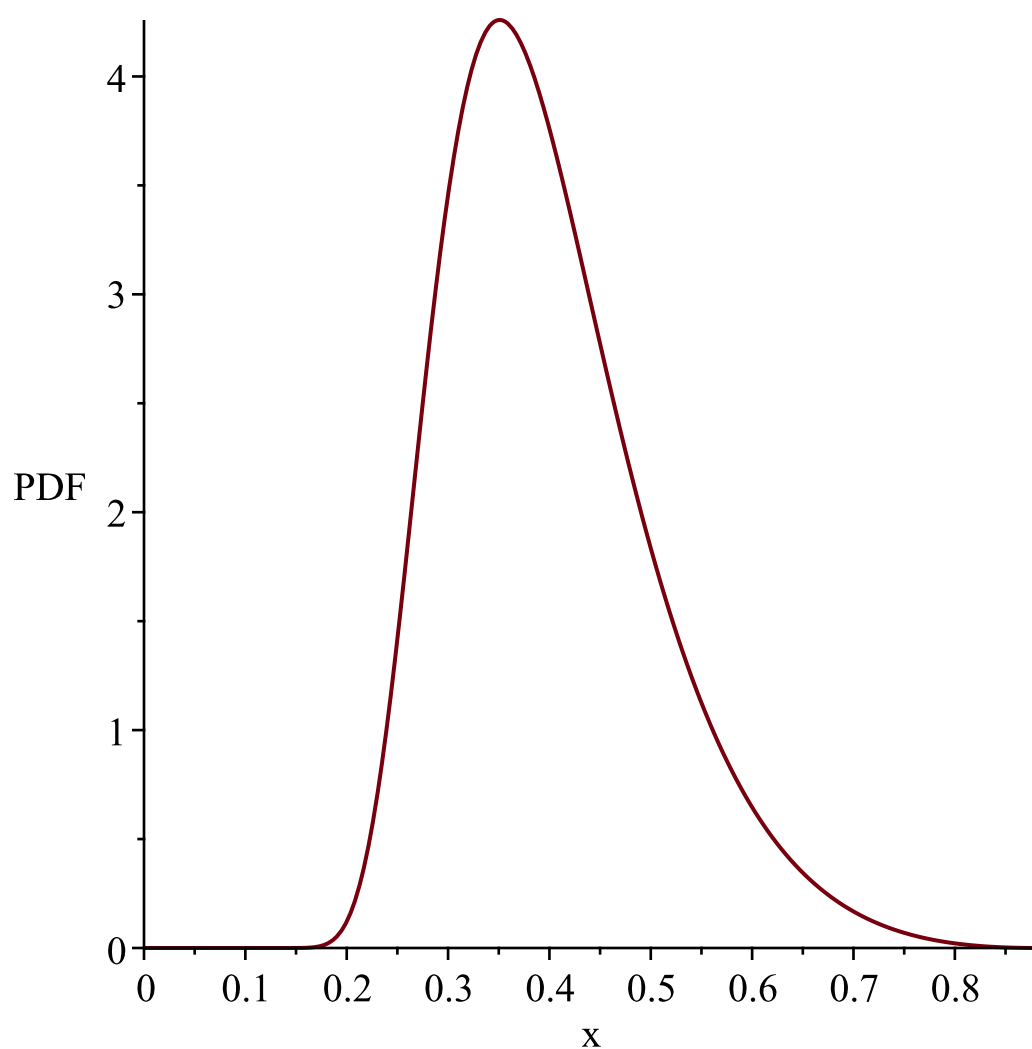


"i is", 15,  
 "-----"  
 "-----"

```
g := t→arccsch(t + 1)
l := 0
u := ∞
```

$$Temp := \left[ \left[ y \rightarrow - \frac{\sqrt{2} \left( -\cosh(y)^2 + 2 \sinh(y) \right) e^{-\frac{1}{2} \frac{(\sinh(y) - 1)^2}{\sinh(y)^2}} \cosh(y)}{\sqrt{\pi} \sinh(y)^4} \right], [0, \ln(1 + \sqrt{2})] \right], ["Continuous", "PDF"]$$

*WARNING(PlotDist): High value provided by user, 40 is greater than maximum support value of the random variable,  $\ln(1 + \sqrt{2})$   
 Resetting high to RV's maximum support value*



*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable,  $\ln(1 + \sqrt{2})$*

*Resetting high to RV's maximum support value*

Warning, computation interrupted