```
> 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 >= 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 := LomaxRV(a,b);
  bfname := "LomaxRV(a,b)";
```
Originally a, renamed a~:
  is assumed to be: RealRange(Open(0),infinity)

Originally b, renamed b~:
  is assumed to be: RealRange(Open(0),infinity)

$$bf := \left[ \left[ x \rightarrow b\sim a\sim (b\sim x + 1)^{-a\sim - 1} \right], [0, \infty], ["\text{Continuous}", "\text{PDF}"] \right]$$
$$bfname := "\text{LomaxRV(a,b)}" \tag{1}$$

```
> #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);
```
$$-\ln(y) \tag{2}$$

```
> # discarded  -ln(t + 1),  t-> csch(t),t->arccsch(t),t -> tan(t),
> #name of the file for latex output
  filename := "C:/Latex_Output_2/Lomax.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 latex file formatting
```

```
appendto(filename);
  printf("\\documentclass[12pt]{article} \n");
  printf("\\usepackage{amsfonts} \n");
  printf("\\begin{document} \n");
  print(bfname);
  printf("$$");
  latex(bf[1]);
  printf("$$");
writeto(terminal);

#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
  print( "l and u", l, u );
  print("g(x)", g(x), "base", base(x),bfname);
  print("f(x)", PDF(Temp, x));


  #latex output
  appendto(filename);
  printf("--------------------------------------------------------
------------------------------------  \\\\");
  printf("$$");
  latex(glist[i]);
  printf("$$");
  printf("Probability Distribution Function \n$$  f(x)=");
  latex(PDF(Temp,x));
  printf(" \\qquad");
  latex(Temp[2][1]);
  printf(" < x < ");
  latex(Temp[2][2]);
  printf("$$");


  writeto(terminal);


od;

#final latex output
appendto(filename);
printf("\\end{document}\n");
writeto(terminal);
```

$$filename := \text{"C:/Latex\_Output\_2/Lomax.tex"}$$

$$b{\sim}\, a{\sim}\, (b{\sim}\, x + 1)^{-a{\sim}\, -\, 1}$$

"i is", 1,

"  ----------------------------------------------------------------------------------------------------------
----------"

$$g := t \rightarrow t^2$$

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, $\infty$

"g(x)", $x^2$, "base", $b{\sim}\, a{\sim}\, (b{\sim}\, x + 1)^{-a{\sim}\, -\, 1}$, "LomaxRV(a,b)"

"f(x)", $\dfrac{1}{2}\, \dfrac{b{\sim}\, a{\sim}\, \left(b{\sim}\, \sqrt{x} + 1\right)^{-a{\sim}\, -\, 1}}{\sqrt{x}}$

"i is", 2,

"  ----------------------------------------------------------------------------------------------------------
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$$g := t \rightarrow \sqrt{t}$$

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, $\infty$

"g(x)", $\sqrt{x}$, "base", $b{\sim}\, a{\sim}\, (b{\sim}\, x + 1)^{-a{\sim}\, -\, 1}$, "LomaxRV(a,b)"

"f(x)", $2\, b{\sim}\, a{\sim}\, \left(b{\sim}\, x^2 + 1\right)^{-a{\sim}\, -\, 1}\, x$

"i is", 3,

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y{\sim} \rightarrow \frac{b{\sim}\, a{\sim}\, \left(\dfrac{b{\sim}\, +\, y{\sim}}{y{\sim}}\right)^{-a{\sim}}}{(b{\sim}\, +\, y{\sim})\, y{\sim}}\right],\, [0,\, \infty],\, [\text{"Continuous"},\, \text{"PDF"}]\right]$$

"l and u", 0, $\infty$

"g(x)", $\dfrac{1}{x}$, "base", $b{\sim}\, a{\sim}\, (b{\sim}\, x + 1)^{-a{\sim}\, -\, 1}$, "LomaxRV(a,b)"

$$\text{"f(x)"}, \; \frac{b\sim a\sim \left(\dfrac{b\sim + x}{x}\right)^{-a\sim}}{(b\sim + x)\, x}$$

"i is", 4,

" ----------------------------------------------------------------------------------------------------------------
---------"

$$g := t \rightarrow \arctan(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \rightarrow b\sim a\sim (b\sim \tan(y\sim) + 1)^{-a\sim - 1}\,(1 + \tan(y\sim)^2)\right],\; \left[0, \frac{1}{2}\pi\right],\; [\text{"Continuous"},$$

$$\text{"PDF"}]\Big]$$

"l and u", 0, $\infty$

$$\text{"g(x)"}, \arctan(x), \text{"base"}, b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$
$$\text{"f(x)"}, b\sim a\sim (b\sim \tan(x) + 1)^{-a\sim - 1}\,(1 + \tan(x)^2)$$

"i is", 5,

" ----------------------------------------------------------------------------------------------------------------
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$$g := t \rightarrow e^t$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \rightarrow \frac{b\sim a\sim (b\sim \ln(y\sim) + 1)^{-a\sim - 1}}{y\sim}\right],\; [1,\, \infty],\; [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, $\infty$

$$\text{"g(x)"}, e^x, \text{"base"}, b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$
$$\text{"f(x)"}, \frac{b\sim a\sim (b\sim \ln(x) + 1)^{-a\sim - 1}}{x}$$

"i is", 6,

" ----------------------------------------------------------------------------------------------------------------
---------"

$$g := t \rightarrow \ln(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \rightarrow b\sim a\sim \left(b\sim e^{y\sim} + 1\right)^{-a\sim - 1} e^{y\sim}\right],\; [-\infty,\, \infty],\; [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, $\infty$

$$\text{"g(x)"}, \ln(x), \text{"base"}, b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$
$$\text{"f(x)"}, b\sim a\sim \left(b\sim e^{x} + 1\right)^{-a\sim - 1} e^{x}$$

"i is", 7,

" ----------------------------------------------------------------------------------------------------------------
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$$g := t \rightarrow e^{-t}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{b\sim a\sim (-b\sim \ln(y\sim) + 1)^{-a\sim - 1}}{y\sim}\right], [0, 1], [\text{"Continuous", "PDF"}]\right]$$

"l and u", 0, $\infty$

"g(x)", $e^{-x}$, "base", $b\sim a\sim (b\sim x + 1)^{-a\sim - 1}$, "LomaxRV(a,b)"

"f(x)", $\dfrac{b\sim a\sim (-b\sim \ln(x) + 1)^{-a\sim - 1}}{x}$

"i is", 8,

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$$g := t \rightarrow -\ln(t)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow b\sim a\sim (b\sim e^{-y\sim} + 1)^{-a\sim - 1} e^{-y\sim}\right], [-\infty, \infty], [\text{"Continuous", "PDF"}]\right]$$

"l and u", 0, $\infty$

"g(x)", $-\ln(x)$, "base", $b\sim a\sim (b\sim x + 1)^{-a\sim - 1}$, "LomaxRV(a,b)"

"f(x)", $b\sim a\sim (b\sim e^{-x} + 1)^{-a\sim - 1} e^{-x}$

"i is", 9,

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, $\infty$

"g(x)", $\ln(x + 1)$, "base", $b\sim a\sim (b\sim x + 1)^{-a\sim - 1}$, "LomaxRV(a,b)"

"f(x)", $b\sim a\sim (b\sim e^{x} - b\sim + 1)^{-a\sim - 1} e^{x}$

"i is", 10,

"   ----------------------------------------------------------------------------------------------------------------------
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$$g := t \rightarrow \frac{1}{\ln(t + 2)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{b\sim a\sim \left(b\sim e^{\frac{1}{y\sim}} - 2 b\sim + 1\right)^{-a\sim - 1} e^{\frac{1}{y\sim}}}{y\sim^{2}}\right], \left[0, \frac{1}{\ln(2)}\right], [\text{"Continuous",}\right.$$

"PDF"]

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \frac{1}{\ln(x+2)}, \text{"base", } b\!\sim a\!\sim (b\!\sim x + 1)^{-a\sim\, -\, 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } \frac{b\!\sim a\!\sim \left(b\!\sim \mathrm{e}^{\frac{1}{x}} - 2\, b\!\sim + 1\right)^{-a\sim\, -\, 1} \mathrm{e}^{\frac{1}{x}}}{x^2}$$

"i is", 11,

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

$$Temp := \left[\left[y\!\sim\, \rightarrow\, -\frac{b\!\sim a\!\sim (b\!\sim \operatorname{arctanh}(y\!\sim) + 1)^{-a\sim\, -\, 1}}{y\!\sim^2 - 1}\right], [0, 1], [\text{"Continuous", "PDF"}]\right]$$

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \tanh(x), \text{"base", } b\!\sim a\!\sim (b\!\sim x + 1)^{-a\sim\, -\, 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } -\frac{b\!\sim a\!\sim (b\!\sim \operatorname{arctanh}(x) + 1)^{-a\sim\, -\, 1}}{x^2 - 1}$$

"i is", 12,

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

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

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \sinh(x), \text{"base", } b\!\sim a\!\sim (b\!\sim x + 1)^{-a\sim\, -\, 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } \frac{b\!\sim a\!\sim (b\!\sim \operatorname{arcsinh}(x) + 1)^{-a\sim\, -\, 1}}{\sqrt{x^2 + 1}}$$

"i is", 13,

"  -----------------------------------------------------------------------------------------------------------------------
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$$g := t \rightarrow \operatorname{arcsinh}(t)$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y\!\sim\, \rightarrow\, b\!\sim a\!\sim (b\!\sim \sinh(y\!\sim) + 1)^{-a\sim\, -\, 1} \cosh(y\!\sim)\right], [0, \infty], [\text{"Continuous", "PDF"}]\right]$$

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", arcsinh}(x), \text{"base", } b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } b\sim a\sim (b\sim \sinh(x) + 1)^{-a\sim - 1} \cosh(x)$$

$$\text{"i is", } 14,$$

$$\text{"} \text{----------------------------------------------------------------------------------------------------------------------} \text{---------"}$$

$$g := t \rightarrow \operatorname{csch}(t + 1)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[ \left[ y\sim \rightarrow \frac{b\sim a\sim (b\sim \operatorname{arccsch}(y\sim) - b\sim + 1)^{-a\sim - 1}}{\sqrt{y\sim^2 + 1}\ |y\sim|} \right], \left[ 0, \frac{2}{e - e^{-1}} \right], [\text{"Continuous",}$$

$$\text{"PDF"}] \right]$$

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \operatorname{csch}(x + 1), \text{"base", } b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } \frac{b\sim a\sim (b\sim \operatorname{arccsch}(x) - b\sim + 1)^{-a\sim - 1}}{\sqrt{x^2 + 1}\ |x|}$$

$$\text{"i is", } 15,$$

$$\text{"} \text{----------------------------------------------------------------------------------------------------------------------} \text{---------"}$$

$$g := t \rightarrow \operatorname{arccsch}(t + 1)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[ \left[ y\sim \rightarrow - \frac{b\sim a\sim \left( - \dfrac{b\sim \sinh(y\sim) - \sinh(y\sim) - b\sim}{\sinh(y\sim)} \right)^{-a\sim} \cosh(y\sim)}{(b\sim \sinh(y\sim) - \sinh(y\sim) - b\sim) \sinh(y\sim)} \right], \left[ 0, \ln\left(1 \right. \right. \right.$$

$$\left. + \sqrt{2} \right) \Big], [\text{"Continuous", "PDF"}] \Big]$$

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \operatorname{arccsch}(x + 1), \text{"base", } b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } - \frac{b\sim a\sim \left( - \dfrac{b\sim \sinh(x) - \sinh(x) - b\sim}{\sinh(x)} \right)^{-a\sim} \cosh(x)}{(b\sim \sinh(x) - \sinh(x) - b\sim) \sinh(x)}$$

$$\text{"i is", } 16,$$

$$\text{"} \text{----------------------------------------------------------------------------------------------------------------------} \text{---------"}$$

$$g := t \rightarrow \frac{1}{\tanh(t + 1)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[ y\sim \rightarrow \frac{b\sim a\sim \left( b\sim \operatorname{arctanh}\left(\dfrac{1}{y\sim}\right) - b\sim + 1 \right)^{-a\sim - 1}}{y\sim^2 - 1} \right], \left[ 1,\ \frac{e + e^{-1}}{e - e^{-1}} \right], [\text{"Continuous"},$$

$$\text{"PDF"}\right]$$

$$\text{"l and u"},\ 0,\ \infty$$

$$\text{"g(x)"},\ \frac{1}{\tanh(x + 1)},\ \text{"base"},\ b\sim a\sim (b\sim x + 1)^{-a\sim - 1},\ \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)"},\ \frac{b\sim a\sim \left( b\sim \operatorname{arctanh}\left(\dfrac{1}{x}\right) - b\sim + 1 \right)^{-a\sim - 1}}{x^2 - 1}$$

$$\text{"i is"},\ 17,$$

$$\text{"} \text{-------------------------------------------------------------------------------------------------------} \\ \text{---------"}$$

$$g := t \rightarrow \frac{1}{\sinh(t + 1)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[ y\sim \rightarrow \frac{b\sim a\sim \left( b\sim \operatorname{arcsinh}\left(\dfrac{1}{y\sim}\right) - b\sim + 1 \right)^{-a\sim - 1}}{\sqrt{y\sim^2 + 1}\ |y\sim|} \right], \left[ 0,\ \frac{2}{e - e^{-1}} \right], [\text{"Continuous"},$$

$$\text{"PDF"}\right]$$

$$\text{"l and u"},\ 0,\ \infty$$

$$\text{"g(x)"},\ \frac{1}{\sinh(x + 1)},\ \text{"base"},\ b\sim a\sim (b\sim x + 1)^{-a\sim - 1},\ \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)"},\ \frac{b\sim a\sim \left( b\sim \operatorname{arcsinh}\left(\dfrac{1}{x}\right) - b\sim + 1 \right)^{-a\sim - 1}}{\sqrt{x^2 + 1}\ |x|}$$

$$\text{"i is"},\ 18,$$

$$\text{"} \text{-------------------------------------------------------------------------------------------------------} \\ \text{---------"}$$

$$g := t \rightarrow \frac{1}{\operatorname{arcsinh}(t + 1)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{b\sim a\sim \left(b\sim \sinh\left(\frac{1}{y\sim}\right) - b\sim + 1\right)^{-a\sim - 1} \cosh\left(\frac{1}{y\sim}\right)}{y\sim^2}\right], \left[0, \frac{1}{\ln\left(1 + \sqrt{2}\right)}\right],\right.$$

$$\left["Continuous", "PDF"\right]\right]$$

$$"l \text{ and } u", 0, \infty$$

$$"g(x)", \frac{1}{\text{arcsinh}(x+1)}, "base", b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, "LomaxRV(a,b)"$$

$$"f(x)", \frac{b\sim a\sim \left(b\sim \sinh\left(\frac{1}{x}\right) - b\sim + 1\right)^{-a\sim - 1} \cosh\left(\frac{1}{x}\right)}{x^2}$$

$$"i \text{ is}", 19,$$

$$" \text{ -----------------------------------------------------------------------------------------------------} \text{ ---------}"$$

$$g := t \to \frac{1}{\text{csch}(t)} + 1$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{b\sim a\sim \left(b\sim \text{arccsch}\left(\frac{1}{y\sim - 1}\right) + 1\right)^{-a\sim - 1}}{\sqrt{y\sim^2 - 2 y\sim + 2}}\right], [1, \infty], \left["Continuous", "PDF"\right]\right]$$

$$"l \text{ and } u", 0, \infty$$

$$"g(x)", \frac{1}{\text{csch}(x)} + 1, "base", b\sim a\sim (b\sim x + 1)^{-a\sim - 1}, "LomaxRV(a,b)"$$

$$"f(x)", \frac{b\sim a\sim \left(b\sim \text{arccsch}\left(\frac{1}{x - 1}\right) + 1\right)^{-a\sim - 1}}{\sqrt{x^2 - 2 x + 2}}$$

$$"i \text{ is}", 20,$$

$$" \text{ -----------------------------------------------------------------------------------------------------} \text{ ---------}"$$

$$g := t \to \tanh\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to -\frac{b\sim a\sim \left(\frac{b\sim + \text{arctanh}(y\sim)}{\text{arctanh}(y\sim)}\right)^{-a\sim}}{(b\sim + \text{arctanh}(y\sim))\, \text{arctanh}(y\sim)\, \left(y\sim^2 - 1\right)}\right], [0, 1], \left["Continuous",\right.\right.$$

"PDF"]

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \tanh\!\left(\frac{1}{x}\right), \text{"base", } b\!\sim a\!\sim (b\!\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } -\frac{b\!\sim a\!\sim \left(\dfrac{b\!\sim +\, \operatorname{arctanh}(x)}{\operatorname{arctanh}(x)}\right)^{-a\sim}}{(b\!\sim +\, \operatorname{arctanh}(x))\,\operatorname{arctanh}(x)\,(x^2 - 1)}$$

"i is", 21,

$$\text{"} \text{-----------------------------------------------------------------------------------------------------------------} \text{"}$$

$$g := t \to \operatorname{csch}\!\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\!\sim \to \frac{b\!\sim a\!\sim \left(\dfrac{b\!\sim +\, \operatorname{arccsch}(y\!\sim)}{\operatorname{arccsch}(y\!\sim)}\right)^{-a\sim}}{(b\!\sim +\, \operatorname{arccsch}(y\!\sim))\,\operatorname{arccsch}(y\!\sim)\,\sqrt{y\!\sim^2 + 1}\ |y\!\sim|}\right], [0, \infty], [\text{"Continuous",}\right.$$

"PDF"]

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \operatorname{csch}\!\left(\frac{1}{x}\right), \text{"base", } b\!\sim a\!\sim (b\!\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } \frac{b\!\sim a\!\sim \left(\dfrac{b\!\sim +\, \operatorname{arccsch}(x)}{\operatorname{arccsch}(x)}\right)^{-a\sim}}{(b\!\sim +\, \operatorname{arccsch}(x))\,\operatorname{arccsch}(x)\,\sqrt{x^2 + 1}\ |x|}$$

"i is", 22,

$$\text{"} \text{-----------------------------------------------------------------------------------------------------------------} \text{"}$$

$$g := t \to \operatorname{arccsch}\!\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\!\sim \to b\!\sim a\!\sim (b\!\sim \sinh(y\!\sim) + 1)^{-a\sim - 1} \cosh(y\!\sim)\right], [0, \infty], [\text{"Continuous", "PDF"}]\right]$$

$$\text{"l and u", } 0, \infty$$

$$\text{"g(x)", } \operatorname{arccsch}\!\left(\frac{1}{x}\right), \text{"base", } b\!\sim a\!\sim (b\!\sim x + 1)^{-a\sim - 1}, \text{"LomaxRV(a,b)"}$$

$$\text{"f(x)", } b\!\sim a\!\sim (b\!\sim \sinh(x) + 1)^{-a\sim - 1} \cosh(x)$$

**(3)**