Most important: import\import()

Always call this function when u create a new document (or create a template that has this function already loaded in it :))

To call the function, press 🕮->6->import->import.

After running this function, everything below should be loaded automatically, and you should be able to run all functions with 🕮->6->Current Problem. Alternatively, you can just type the function you want to evaluate into the command line.

Oh, also, **if you ever forget the arguments of the functions,** you **do not** need to consult this reference (especially not in an exam). There should be a tooltip displaying the arguments if you press 🕮->6->Current Problem. This reference is here for the purposes of saying what the functions do; it is not intended to be used as a 'hmm how do I use this again' guide.

Shortcuts

Calling **import\import()** automatically defines the following functions as shorthand for their proper counterparts:

bpdf(n,p,x)

bcdf(n,p,left,right)

npdf(x,μ,σ)

ncdf(left,right,μ,σ)

ni(area,μ,σ)

NOTE: the argument order is different for the normal and binomial distributions, because CAS is bad and their programmers cannot decide to be consistent.

The following derivative functions are also automatically defined (obviously the argument doesn't have to be x):

$\mathbf{da}(\mathbf{x}) := \mathbf{a}'(\mathbf{x})$
db(x)
dc(x)
dd(x)
…
dz(x)

df1(x)
df2(x)
dg1(x)
dg2(x)
dh1(x)
dh2(x)
dy1(x)
dy2(x)

$\mathbf{ddf}(\mathbf{x}) := \mathbf{df}'(\mathbf{x})$
ddg(x)

Scripted Math

Note: Stop being lazy. Go read http://scriptedmath.com/documentation/functionReference/byPackage/scriptedMeth.html.This is not a reference for the actual documentation; this is just a very very quick summary. I did not write Scripted Math, so I am not qualified to provide official documentation for it.

expec(expression,variable)

Gets the expected value of expression. **Only works for continuous distributions.** For discrete distributions use **expd**.

$\mathrm{f}(x) := \begin{cases} \frac{1}{x^3}, & x > 1 \end{cases}$	*Done*
$\mathrm{expec}(\mathrm{f}(x), x)$	2
$\mathrm{expec}\left(\frac{2}{3}\begin{cases} \sin(x), & 0 \le x \le \frac{\pi}{2} \\ 1 + \frac{\pi}{2} - x, & \frac{\pi}{2} < x \le \frac{\pi}{2} + 1 \end{cases}, x\right)$	1.30138

inv(function,point)

Finds the inverse of a function **in terms of x**, given that $x =$ **point** is part of the domain of the function.

$\mathrm{inv}(1 + x, 1)$	$x - 1$
$\mathrm{inv}(x^2, 2)$	$\sqrt{x}$
$\mathrm{inv}(\cos(x), 0)$	$\left\{ \begin{cases} \cos^{-1}(x), & -1 \le x \le 1 \end{cases}, \begin{cases} -\cos^{-1}(x), & -1 \le x \le 1 \end{cases} \right\}$
$\mathrm{inv}(\cos(x), 1)$	$\begin{cases} \cos^{-1}(x), & -1 \le x \le 1 \end{cases}$

mode(list,freqlist)

Never had to use this tbh.

$\mathrm{mode}(\{1, 2, 3\}, \_)$	"No unique mode"
$\mathrm{mode}(\{1, 2, 3, 3\}, \_)$	3
$\mathrm{mode}(\{1, 2, 3, 3\}, \{0.5, 4, 0.5, 0.6\})$	2

ns(equation,variable)

Finds non-negative integer solutions on a monotonic function. **USE THIS FOR BINOMIAL BSEARCH PLS.**

$ns(\text{binomCdf}(n, 0.5, 22, n) > 0.9, n)$
$n \geq 53$
$ns(n^2 = 25, n)$
$n = 5$

poi(func,var)

The coolest function in scriptedmath: gives you literally everything you need to know about a function.

$\text{f}(x) := x + \mathbf{e}^{-x} - 5 \vert x > -1$
Done
$\text{poi}(\text{f}(x), x)$
Stationary Points $\begin{bmatrix} \text{"Nature"} & \text{"x"} & \text{"y"} \\ \text{"MINIMUM"} & 0 & -4 \end{bmatrix}$ Intercepts $\begin{bmatrix} \text{"type"} & \text{"x"} & \text{"y"} \\ \text{"y"} & 0 & -4 \end{bmatrix}$ Intercepts[1] $\begin{bmatrix} \text{"type"} & \text{"x"} & \text{"y"} \\ \text{"x"} & 4.99322 & 0. \end{bmatrix}$ Asymptotes $\begin{bmatrix} \text{"type"} & \text{"equation"} \\ \text{"oblique"} & y = x - 5 \end{bmatrix}$ Endpoints $\begin{bmatrix} \text{"type"} & \text{"x"} & \text{"y"} \\ \text{"open circle"} & -1 & \mathbf{e} - 6 \end{bmatrix}$ [1]Approximation was used.
$\text{poi}(\sin(x), x)$
Stationary Points $\begin{bmatrix} \text{"Nature"} & \text{"x"} & \text{"y"} \\ \text{"MINIMUM"} & \frac{(4 \cdot \mathbf{n44} - 1) \cdot \pi}{2} & -1 \\ \text{"MAXIMUM"} & \frac{(4 \cdot \mathbf{n44} + 1) \cdot \pi}{2} & 1 \end{bmatrix}$ Intercepts $\begin{bmatrix} \text{"type"} & \text{"x"} & \text{"y"} \\ \text{"x"} & \mathbf{n50} \cdot \pi & 0 \end{bmatrix}$

sd(expression or list,variable or frequency list)

Gets standard deviation of a continuous or discrete distribution.

$\text{f}(x) := (\vert x \vert + 1)^{-5}$
Done
$\text{sd}(\text{f}(x), x)$
0.577350
$\text{sd}(\{1, 2, 3\}, \_)$
$\frac{\sqrt{6}}{3}$
$\text{sd}(\{1, 2, 3\}, \{3, 0.5, 4\})$
$\frac{\sqrt{206}}{15}$

trans(function,transformation,point)

Transforms a function in terms of x by a transformation, given $x =$ **point** is in the domain of the function. Assumes IV and DV are x and y, respectively.

$\text{trans}\left(\frac{1}{2}x, y\_ = y \text{ and } x\_ = -x, 0\right)$
$\frac{-x}{2}$

var(expression or list,variable or frequency list)

Gets variance of a continuous or discrete distribution.

$\text{f}(x) := (\lvert x \rvert + 1)^{-5}$
Done
$\text{var}(\text{f}(x), x)$
0.333333
$\text{var}(\{1, 2, 3\}, \_)$
$\frac{2}{3}$
$\text{var}(\{1, 2, 3\}, \{3, 0.5, 4\})$
$\frac{206}{225}$

The Cooler Functions

I haven't put screenshots of how to use these functions because

1. My CAS transfer cable is not working.
2. I can't be bothered.
3. I wrote them personally, so I can actually explain them.
4. They should be pretty intuitive.

bs(func,var,left,right)

Binary searches for **roots** in the range [left,right]. I.e., **do not put an equation as the func parameter.**

This function assumes that the function has **different signs at x = left and x = right**. It is best not to let any of left or right be roots themselves.

If multiple solutions exist, the function will output one of them.

expd(vals,probabilities,var,func)

Given a discrete distribution, calculate the expected value of a function of the variable.

For example, to calculate $E(X^2)$ of the following distribution:

x	-1	0	2
$Pr(X = x)$	0.5	0.2	0.3

$\text{expd}(\{-1,0,2\}, \{0.5,0.2,0.3\}, x, x^2) = 1.7$

graph(func,var,l,r,step)

A graphing helper! Evaluates the function over the range [l,r], taking steps of **step** each time.

hpmf(balls,red balls,sample size,target red)

Stands for **h**ypergeometric **p**robability **m**ass **f**unction. Essentially solves the following problem:

There are **balls** balls in a jar, of which **red balls** of them are red. I randomly pick a sample of **sample size** of them, without replacement. What is the probability that exactly **target red** of them are red?

ms(x1,p1,x2,p2)

Given $X \sim N(\mu, \sigma^2)$, and the pair of simultaneous equations

$$\Pr(X < x1) = p1$$
$$\Pr\,(X < x2) = p2,$$

solves for μ and σ.

nm(func,var,initial val,iterations)

Should be pretty intuitive. Given a function and an initial value, runs Newton's method for the specific number of iterations. It is recommended to use this function in approximation mode (i.e., ctrl+enter).

trap(func,var,l,r,width)

Uses the trapezium rule to approximate the signed area under **func** in the range [l..r], using trapeziums of width **width**.