F-83 Scripting Manual

Fred Sheppard

January 19, 2023

1 Decimal to Binary

$$\frac{0}{y}+10^{x}\left(y-2\mathrm{Rnd}\left(\frac{y}{2}-0.5\right)\right)+ \tag{1}$$

$$0\mathrm{Pol}\left[(x+1)*\cos\left(\mathrm{Rnd}\left(\frac{y}{2}-0.5\right)\right),(x+1)*\sin\left(\mathrm{Rnd}\left(\frac{y}{2}-0.5\right)\right)\right]M+ \tag{2}$$

Variable	Start	End
x	0	?
y	10	0
M	0	1010

2 Binary to Decimal

$$\frac{0}{x-\mathrm{Rnd}\left(\log\left(A\right)+0.5\right)}+2^{x}\left[\mathrm{Rnd}\left(\frac{A}{10^{x}}-0.5\right)-10\mathrm{Rnd}\left(\frac{A}{10^{x+1}}-0.5\right)\right] \tag{3}$$

$$+0\mathrm{Rec}\left(x+1,0\right)M+ \tag{4}$$

Variable	Start	End
x	0	?
A	1011	0
M	0	11

3 Sum

$$\sum_{x=a}^{n}f\left(x\right)=f(x)+\frac{0\mathrm{Rec}\left(x+1,\ 0\right)}{x-n-2}M+ \tag{5}$$

Variable	Start	End
x	a	n
M	0	Σ

4 Sequences

$$Tn = A \cdot r^n \tag{6}$$

$$r = \frac{T_y}{T_x}^{(y-x)^{-1}} \tag{7}$$

$$A = \frac{T_x}{r^x} \tag{8}$$

$$Sn = \frac{Ar\left(1 - r^n\right)}{1 - r} \tag{9}$$

Where A is the starting value i.e. T_0 and r is the common ratio.

In 2009, the population was 2,000. By 2013, the population was 32,000. Find the general formula.

5 Probability

Venn Diagram

$$P\left(E \cup F\right) = P\left(E\right) + P\left(F\right) - P\left(E \cap F\right) \tag{10}$$

Conditional Events

$$P\left(F|G\right) = \frac{P\left(F \cap G\right)}{P\left(G\right)} \tag{11}$$

Mutually Exclusive Both events cannot occur simultaneously - Their intersection is an empty set.
Draw a single card that: Is black & is a Jack of Diamonds

$$P\left(E \cup F\right) = P\left(E\right) + P\left(F\right) \tag{12}$$

Independent Events The outcome of one event has no bearing on the other. Roll a die and flip a coin.

$$P\left(E \cap F\right) = P\left(E\right) \cdot P\left(F\right) \tag{13}$$

Selection: Order doesn't matter There are 23 balls in a box: 12 red, 6 blue and 5 green. 3 balls are chosen at random from the box. What is the probability they are all different colours?

$$P = \frac{\binom{12}{1}\binom{6}{1}\binom{5}{1}}{\binom{23}{3}} \tag{14}$$

What is the probability exactly two balls are red?

$$P = \frac{\binom{12}{2}\binom{11}{1}}{\binom{23}{3}} \tag{15}$$

The tops and bottoms of the numerator must sum to the tops and bottoms of the denominator.

Selection: Order Matters Four balls are selected from the box above. What is the probability that the first 3 will be red and the 4th will be any other colour?

$$P = \frac{{}^{12}\mathrm{P}_3 \cdot {}^{11}\mathrm{P}_1}{{}^{23}\mathrm{P}_4} \tag{16}$$