Ideas for math complexity experiment

March 24, 2014

Contents

$$\sin x$$
$$\sin(x)$$
$$\sin x$$
$$\sin x$$

$$\sin x$$
$$\sin(x)$$
$$sinx$$
$$\sin(\,x)$$

$$\sin(x+y)$$
$$\sin x + y$$

1

$$xmody$$
$$\sin x$$
$$\sin x + \sin y$$

$$xy$$
$$x + y$$
$$x + y + z$$
$$(x + y)z$$
$$x(y + z)$$
$$(x + y)(z + t)$$
$$(x + y + z)t$$
$$xy + zt$$

2 Single unary operators

$$\neg A$$
$$\nabla B$$
$$n!$$
$$x^2$$
$$f(x)$$
$$\sqrt{y}$$
$$\exp(z)$$
$$e^x$$

$$\ln(\alpha)$$

$$\arctan(\theta)$$

$$1/x$$

$$\sin(\text{alpha})$$

$$\coth z$$

$$\arctan x$$

$$\oint A$$

$$\int f$$

$$\max A$$

$$\ker B$$

(Whether $1/x$, x^2 or $2x$ are unary is debatable)

3 Single binary operators

$$x + y$$
$$xy$$
$$x/y$$
$$x \bmod y$$
$$\mathrm{alpha} - \mathrm{beta}$$
$$(x + y)$$
$$\alpha \oplus \beta$$
$$A \cup B$$
$$A \vee B$$
$$A \otimes B$$
$$f(x, y)$$
$$\Gamma(a, b)$$
$$\mathcal{V}(z, \tau)$$

4 Composition of two unary operators

$$f \circ g(x)$$
$$f(g(x))$$
$$1/\ln x$$
$$\log n!$$
$$\sqrt{x^3}$$
$$1/\sqrt{x}$$
$$\sin\left(1/x\right)$$
$$\coth\left(\log x\right)$$

5   One unary and one binary operator

$$\sin(\theta + \phi)$$
$$1/(x + y)$$
$$x.\cos(y)$$
$$f(x + y)$$
$$\nabla(A \otimes B)$$
$$(a + b)^2$$
$$\exp(\omega t)$$
$$\sqrt{1 + x}$$

$$x + 1/y$$
$$A \vee (\neg B)$$

6 Two unary and one binary

$$\sin \alpha + \cos \beta$$
$$1/x + 1/y$$
$$1/x + z^2$$
$$\sqrt{(1 + 1/x)}$$
$$\nabla A \times \nabla B$$
$$\sqrt{x} + \sqrt{y}$$
$$f(x)g(y)$$
$$a^2 + b^2$$

7   Two binary

$$x * (y + z)$$
$$(x + y) * z$$
$$x + yz$$
$$(x + y)z$$
$$f(x + y, z)$$

$$(A \cup B) \cap C$$
$$A \cup (B \cap C)$$

8 Only binary operators

$$x + y$$
$$x + y + z$$
$$x + y + z + t$$

$$(x + y + z)$$
$$x * (y + z)$$
$$(x + y) * z$$
$$x + yz$$
$$(x + y)z$$
$$(x + y)(z + t)$$
$$xy(z + t)$$

9 Bestiary

$$\text{alpha} + \text{beta}$$
$$\text{alpha} - (x + y)$$
$$\text{beta} - xy$$
$$\alpha + 1/(x + y)$$

$$1/x + 1/y$$
$$1/(x + y)$$

$$\sin(\phi) + \cos(\theta)$$

$$\sin(\text{alpha} + \text{beta})$$

$$1/\sin(\alpha + \beta)$$

$$\sin a + \cos b$$
$$\sin(a) + \cos(b)$$
$$\ln(1 + x)$$
$$\ln(x) + 1$$
$$\log(x)$$
$$\ln x$$
$$\exp(\text{omega}))$$

$$\tan^{-1} b$$

$$\arctan b + c$$

$$a + b + c + d$$

$$a. \arctan b$$

$$(a + b)(c + d)$$

$$(ab)\sin(c)$$

$$2ab + b^2 c$$

$$\mathrm{e}^{1 - x^2}$$

$$\frac{1}{x} + \frac{1}{y}$$

$$\frac{1}{x+y}$$

$$\cos^2\theta - \sin^2\theta$$

$$\sqrt{1 + x + x^2}$$

$$\sqrt{1} + \sqrt{x} + \sqrt{x^2}$$

$$A \oplus (C \oplus D)$$

$$X \cup B \cap D$$

$$\int y \, \mathrm{d}x$$

$$\forall x \in X, \exists y \leq \epsilon$$

alpha
beta
gamma
delta
epsilon
theta
kappa

lambda
mu

α
β
γ
δ
ϵ
θ
κ
λ
μ
ν
π
ρ
σ
τ
ϕ
χ
ψ
ω

10 Variable or constant names

$$n$$

$$x$$

$$y$$

$$z$$

$$A$$

$$B$$

$$\rho$$

$$\theta$$

alpha

beta

$$1$$

$$\pi$$