

Correction Test1

$$x = 2$$

$$y = -1$$

$$z = 2$$

Forward:

$$a = x^z = \log(x) \exp(z \log(x)) = 4$$

$$b = 3y = -3$$

$$c = a - b = 7$$

$$d = 3x = 6$$

$$e = \max(d, y) = 6$$

$$g = |y| = 1$$

$$h = e + g + 4 = 11$$

$$f = c/h = 7/11$$

Backward:

$$df/df = 1$$

$$df/dc = 1/h = 1/11$$

$$df/dh = -\frac{c}{h^2} = -7/121$$

$$df/da = df/dc * dc/da = 1/11$$

$$df/db = df/dc * dc/db = -1/11$$

$$df/de = df/dh * dh/de = -7/121$$

$$df/dg = df/dh * dh/dg = -7/121$$

$$df/dd = df/de * de/dd = -7/121$$

$$df/dz = df/da * da/dz = 1/11 * \log(x)x^z = 4/11 \log 2$$

$$df/dx = df/da * da/dx + df/dd * dd/dx = 4/11 - 21/121 = 23/121$$

$$df/dy = df/db * db/dy + df/de * de/dy + df/dg * dg/dy = -3/11 - 7/121 * 0 - 7/121 * (-1) = (7-33)/121 = -26/121$$

$$\begin{aligned}
 x &= 1 \\
 y &= -2 \\
 z &= 2
 \end{aligned}$$

Forward:

$$\begin{aligned}
 a &= x^z = \log(x) \exp(z \log(x)) = 1 \\
 b &= a - y = 3 \\
 c &= 2y = -4 \\
 d &= 3x = 3 \\
 e &= \max(d, c) = 3 \\
 g &= |y| = 2 \\
 h &= e + g + 1 = 6 \\
 f &= b/h = 1/2
 \end{aligned}$$

Backward:

$$\begin{aligned}
 df/df &= 1 \\
 df/db &= 1/h = 1/6 \\
 df/dh &= -\frac{b}{h^2} = -3/36 = -1/12 \\
 df/da &= df/db * db/da = 1/6
 \end{aligned}$$

$$\begin{aligned}
 df/de &= df/dh * dh/de = -1/12 \\
 df/dg &= df/dh * dh/dg = -1/12 \\
 df/dd &= df/de * de/dd = -1/12
 \end{aligned}$$

$$\begin{aligned}
 df/dz &= df/da * da/dz = 1/6 * \log(x)x^z = 1 \log 1 = 0 \\
 df/dx &= df/da * da/dx + df/dd * dd/dx = 1/6 * 2 - 1/12 * 3 = 1/12 \\
 df/dy &= df/db * db/dy + df/dg * dg/dy = -1/6 - 1/12 * (-1) = -1/12
 \end{aligned}$$