4(g)

$$f(x) = e^{1/x^2} + 1/e^{(x^2)}$$

$$\frac{1}{x^2} : x^{-2} \qquad \frac{1}{a^b} = a^{-b}$$

$$f(x) = e^{(x^{-2})} + e^{(-x^2)}$$

$$f'(x) = e^{(x^{-2})} \cdot (-2x^{-3}) + e^{(-x^2)}(-2x)$$

$$exp(x) = e^x$$

$$exp'(x) = exp(x)$$

$$Sq(x) = x^2 \qquad Sq'(x) = 2x$$

$$POW(x,y) = x^y \Rightarrow$$

$pow(x,y) = x^y$

$pow(x, 1/3) = x^{1/3}$

ASCII 65: A 66: B ....

Unicode

$pow(2,x) = 2^x$

$pow(2,3) = 8$

$pow(3,2) = 9$

$e^{x^2} \Rightarrow e^{(x^2)}$ not $(e^x)^2 = e^{2x}$

$a^{b^c} = (a^b)^c \neq a^{(b^c)}$

2^{3^2} $(2^3)^2 = 2^6$ $2^{(3^2)} = 2^9$

$$pow(\underline{x}, \underline{n}) = x^n$$

$$pow_x(x, n) = n x^{n-1}$$
$$= n \circ pow(x, n-1)$$

pow_x

$$\frac{\partial}{\partial x} pow(x, y) = y\ pow(x, y-1)$$
$$y\ x^{y-1}$$

$$pow(a, y) = a^y$$

$$\frac{\partial}{\partial y} pow(a, y) = a^y \cdot \ln(a)$$
$$= pow(a, y) * \ln(a)$$

x^y

x^2 x^3

Power $\frac{1}{2}$

power y fixed $\frac{2}{3}$

$$\frac{(x+h)^y - x^y}{h} \to y x^{y-1}$$

$h \to 0$

Exponential

Base fixed

$y+h$ y

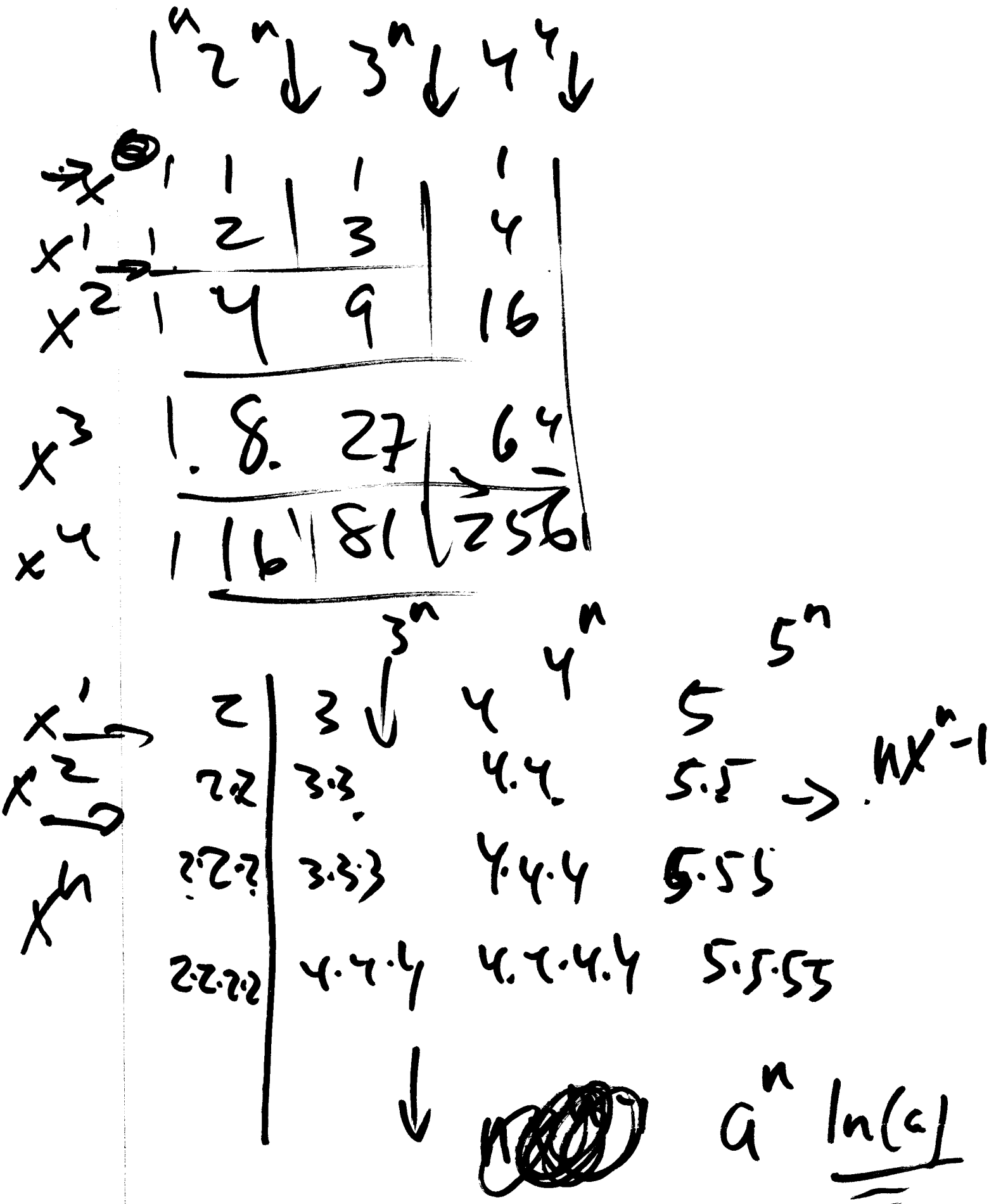
$x \quad - x$

h

$h \to 0$

$x^y \cdot \ln x$

2^y, e^y


1^n 2^n 3^n 4^n
x^0 1 1 1 1
x^1 1 2 3 4
x^2 1 4 9 16
x^3 1 8 27 64
x^4 1 16 81 256
3^n 4^n 5^n
x^1 2 3 4 5
x^2 2.2 3.3 4.4 5.5 → nx^n-1
x^4 2.2.2 3.3.3 4.4.4 5.5.5
2.2.2.2 4.4.4.4 4.4.4.4 5.5.5.5
a^n ln(a)

$y(x)^3 + 100y = (e^x+1)^2$

$y^3 + 100y = (e^x+1)^2$

at $(0, -10)$

$(-10)^3 + 100(-10) = (e^0+1)^2 = 4$ ✓

$y - (-10) = \_\_(x-0)$

Remember $y^2 + x^2 = 1 \quad y^2 = 1 - x^2$

$y = \left((e^x+1)^2 - 100y\right)^{1/3}$

$y' = \frac{1}{3}(\quad)^{-2/3} \cdot 2(e^x+1)e^x$

$x=0 \quad \frac{1}{3}\left(-10\right)^{-2} \cdot 2 \cdot 2 \cdot 1 =$

$3y(x)^2 \cdot y'(x) + 0 = 2(e^x+1)e^x$

$\Rightarrow y' = 2(e^x+1)e^x / 3y^2 : \frac{2 \cdot 2 \cdot 1}{3(-10)^2}$

$$y^3 + 100y = (e^x + 1)^2$$

Imp. $3y^2 y' = 2(e^x+1)e^x$

$$y' = \frac{2(e^x+1)e^x}{3y^2}$$

$x = 0 \quad y = -10$

$$y' = \frac{2 \cdot (1+1)(1)}{3(-10)^2} = \frac{4}{300}$$

$$y - (-10) = \frac{4}{300}(x - 0)$$

$$\frac{1}{75}$$

$$y = \frac{4}{300}(x) - 10$$

$$\ln\left(r^7 s^5 \sqrt[6]{r^2 s^2}\right)$$

$$= \ln\left(r^7 s^5 (r^2 s^2)^{1/6}\right)$$

$$(xy)^n = x^n y^n$$

$$= \ln\left(r^7 s^5 (r^2)^{1/6} (s^2)^{1/6}\right)$$

$$= \ln\left(r^7 s^5 r^{2/6} s^{2/6}\right)$$

$$= \ln\left(r^{7\frac{1}{3}-\frac{22}{3}} s^{5\frac{1}{3}=\frac{16}{3}}\right)$$

$$= \frac{22}{3}\ln r + \frac{16}{3}\ln s$$

$$(a^x)^y = a^{xy}$$

$$a^x a^y = a^{x+y}$$

$$\ln(a^y) = y\ln(a)$$

$$\ln(xy) = \ln x + \ln y$$

$$r^{\frac{2}{6}} = \frac{2}{6} = \frac{1}{3}$$

$$r^{2 \cdot \frac{1}{6}} = r^{1/3}$$

$$r^7 r^{1/3} = r^{7+\frac{1}{3}}$$

$$(-8)^{1/3} = -2$$

$$(-8)^{2/6} = \left((-8)^2\right)^{1/6} =$$

$$= (64)^{1/6} = 2$$

$$f(x) = 5\sqrt{x}\ln(x)$$

$$f(x) = 5\left[x^{\frac{1}{2}} \cdot \ln x\right]$$

(Constants out, rad. als as powers)

$$f'(x) = 5\left[\frac{1}{2}x^{-\frac{1}{2}}\ln x + x^{\frac{1}{2}} \cdot \frac{1}{x}\right]$$

$$x^{\frac{1}{2}} \cdot x^{-1} = x^{-\frac{1}{2}} \cdot \frac{\sqrt{x}}{x}$$

$$\frac{\sqrt{x}}{\sqrt{x}\sqrt{x}}$$