Power Laws and Their Properties

$\boxed{y = f(x) = Ax^r}$ Scale $\boxed{x \longrightarrow \lambda x}$

$\therefore \boxed{f(x) \longrightarrow f(\lambda x) = A(\lambda x)^r = A\lambda^r x^r = y\lambda^r}$

$\Rightarrow$ y is scaled as $\boxed{y\lambda^r}$ (Scale invariance)

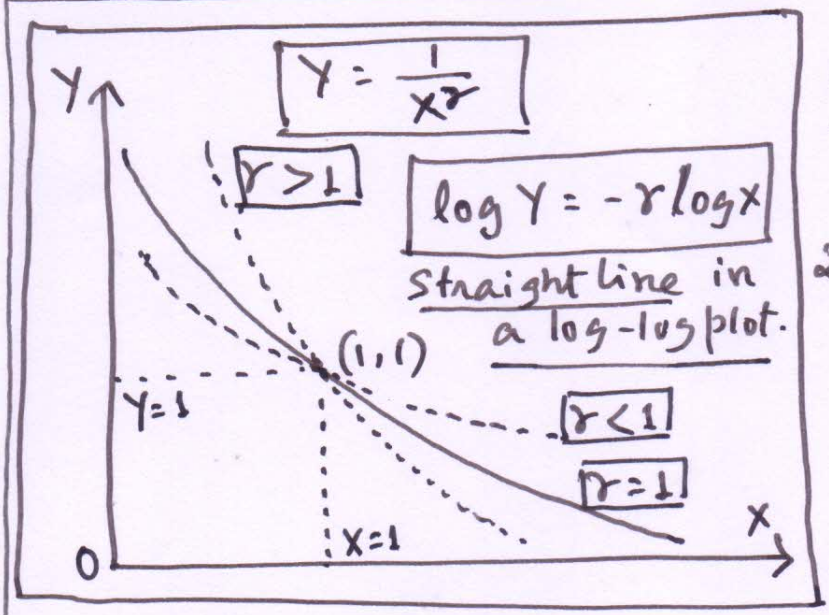
Inverse Power-Laws

$\boxed{y^m x^n = c} \Rightarrow \boxed{y x^{n/m} = c^{1/m} = a \text{ (say)}}$

$\Rightarrow \boxed{\frac{y}{a} x^{n/m} = 1}$ Rescale $\boxed{Y = y/a}$, $\boxed{X = x}$

and $\boxed{r = n/m}$, $(r \geq 0)$.

$\Rightarrow \boxed{YX^r = 1}$ (as in $\boxed{pV^r = \text{Constant}}$).



1/ All the curves pass through (1,1).

2/. As $x \longrightarrow \infty$, the decay is faster for higher values of r.

3/. For finite values of X and Y, no curve touches $\boxed{X=0}$ or $\boxed{Y=0}$.

4/. Any part of a curve is self-similar to any other part — scale-invariant.