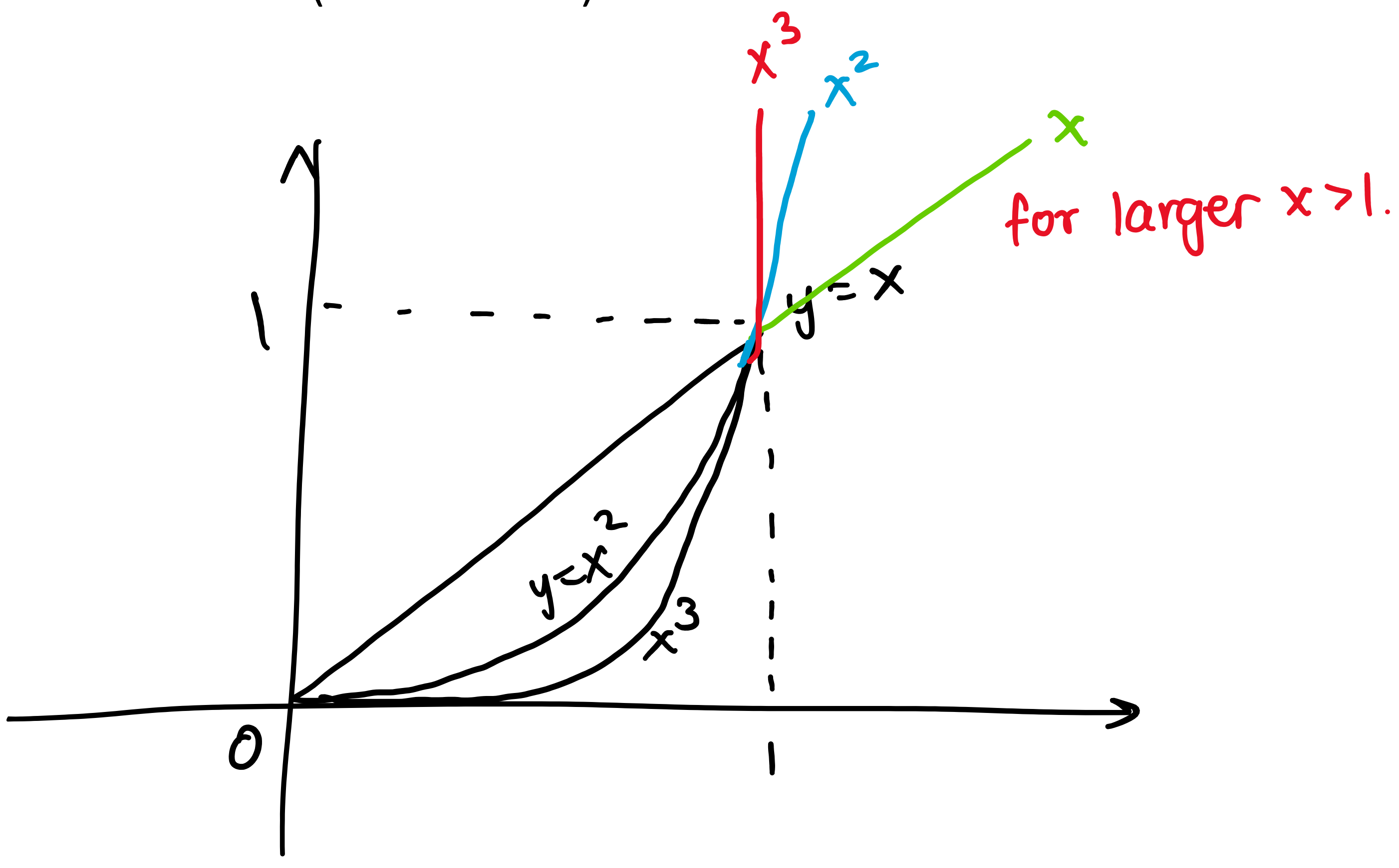
Comparing power, exponential, and log functions (sec. 11.6)

Monday, December 7, 2020 6:27 PM

For polynomials: $\boxed{0 \le x \le 1}$
(power functions)



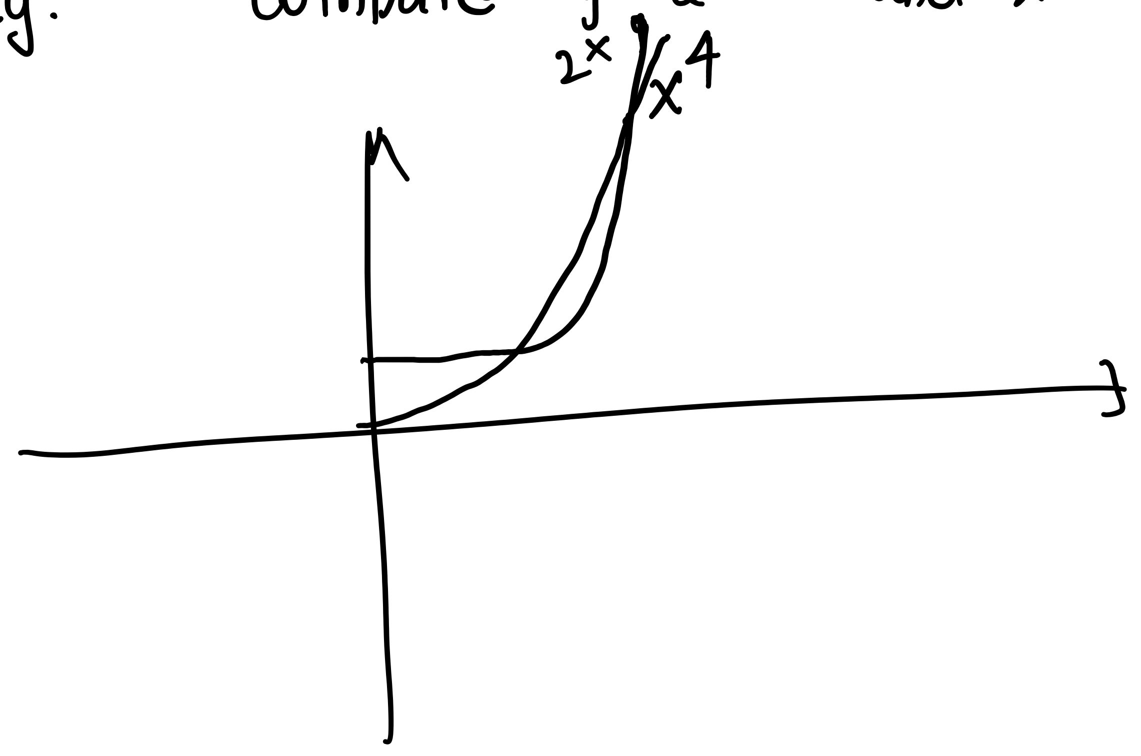
For large x, when you are comparing power function with positive coefficients, the ones with the higher power dominate.

★ Comparing power functions to exponential functions

Any positive increasing exponential function eventually (for large enough x) grows faster than any power function.

Reminder: $y = ab^x$ exponential function (variable in exponent)
$y = x^n$ power function (variable in base)

e.g. Compare $y = 2^x$ and x^4

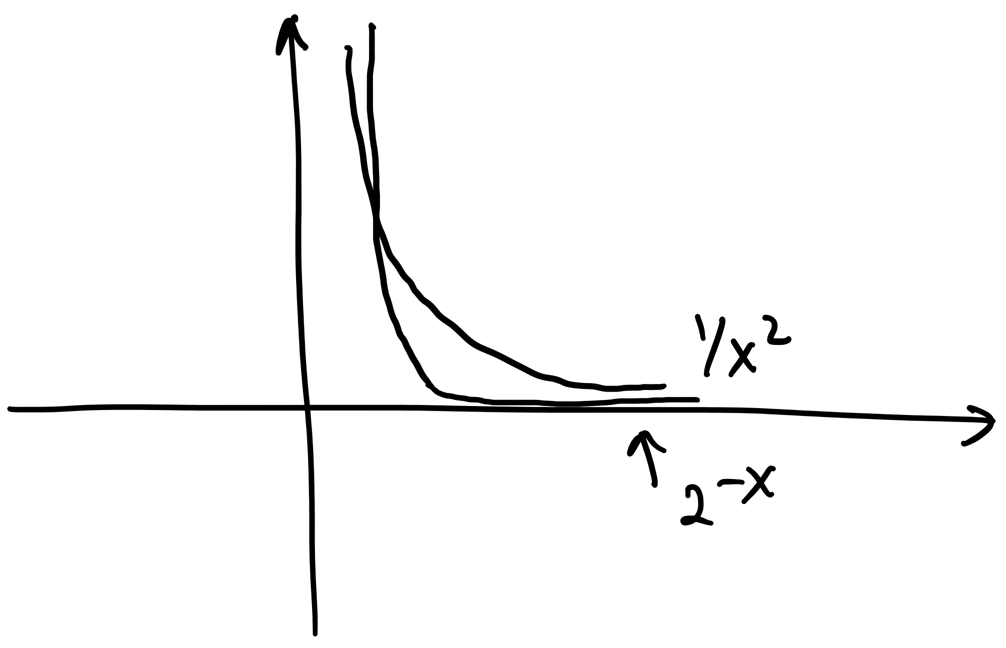


For large x, 2^x dominates x^4.

- Any positive decreasing exponential function eventually (for large enough x) approaches the horizontal axis faster than any decreasing, positive power function.

e.g. $y = 2^{-x}$ (decreasing, i.e. $\frac{1}{2^x}$)

and $y = x^{-2} = \frac{1}{x^2}$



Comparing log and power functions

Any positive increasing power function eventually grows faster than $y = \log x$ and $y = \ln(x)$.

Summary: (least dominant) logs < power < exponential (most dominant)