October 13, 2010

Note Title 10/13/2010

Exponential Functions

$$f(x) = b^x \qquad b > 0, \quad b \neq 1.$$

Examples

$h(x) = 10^{x-2}$

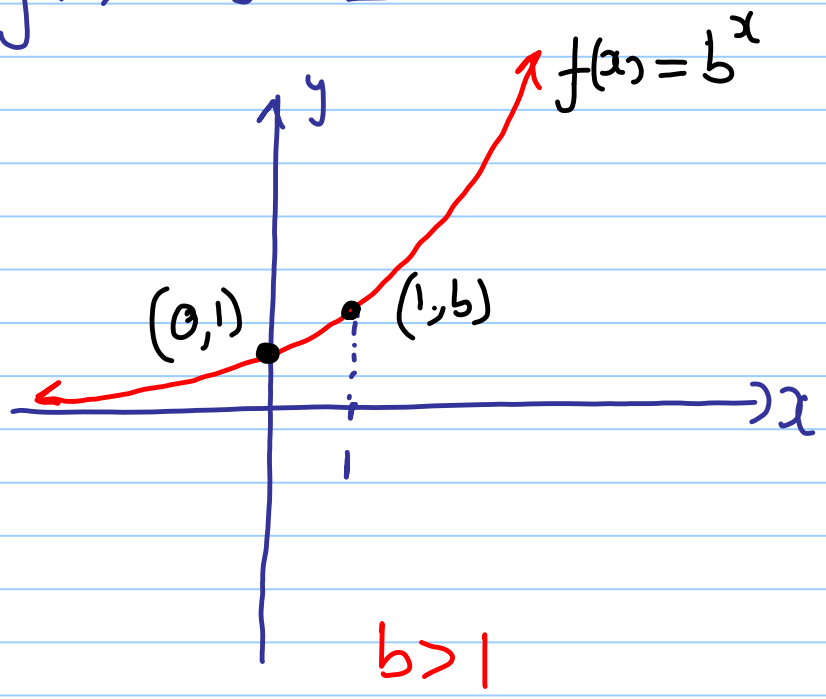
$h(2.3) = 10^{2.3-2}$

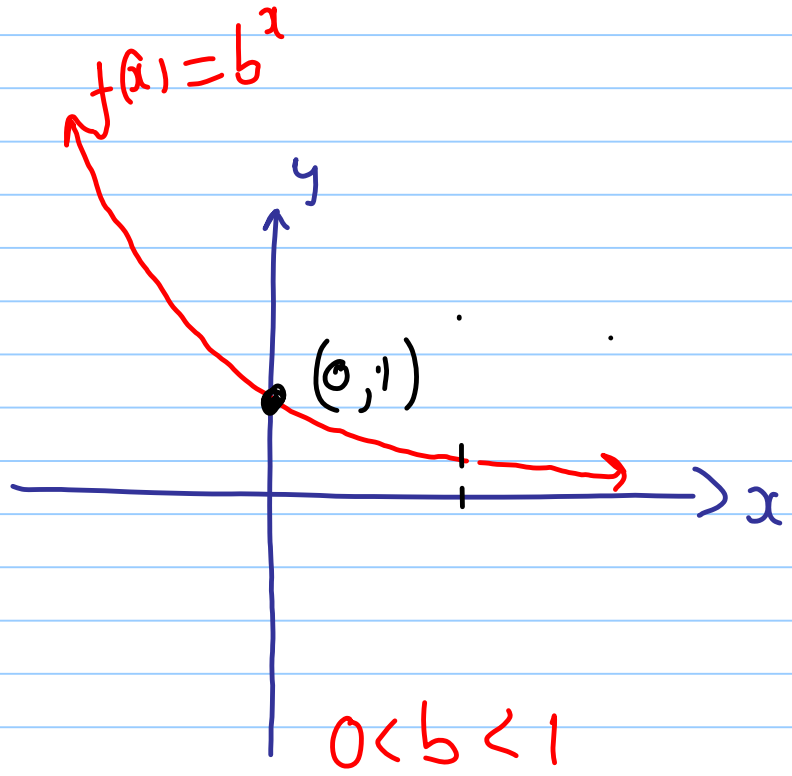
$= 10^{0.3} = 0.001$

$\exp(0.3) = 0.001$

$f(x) = 3^x$

$f(0) = 3^0 = 1$





Example

$f(x) = 5^x$

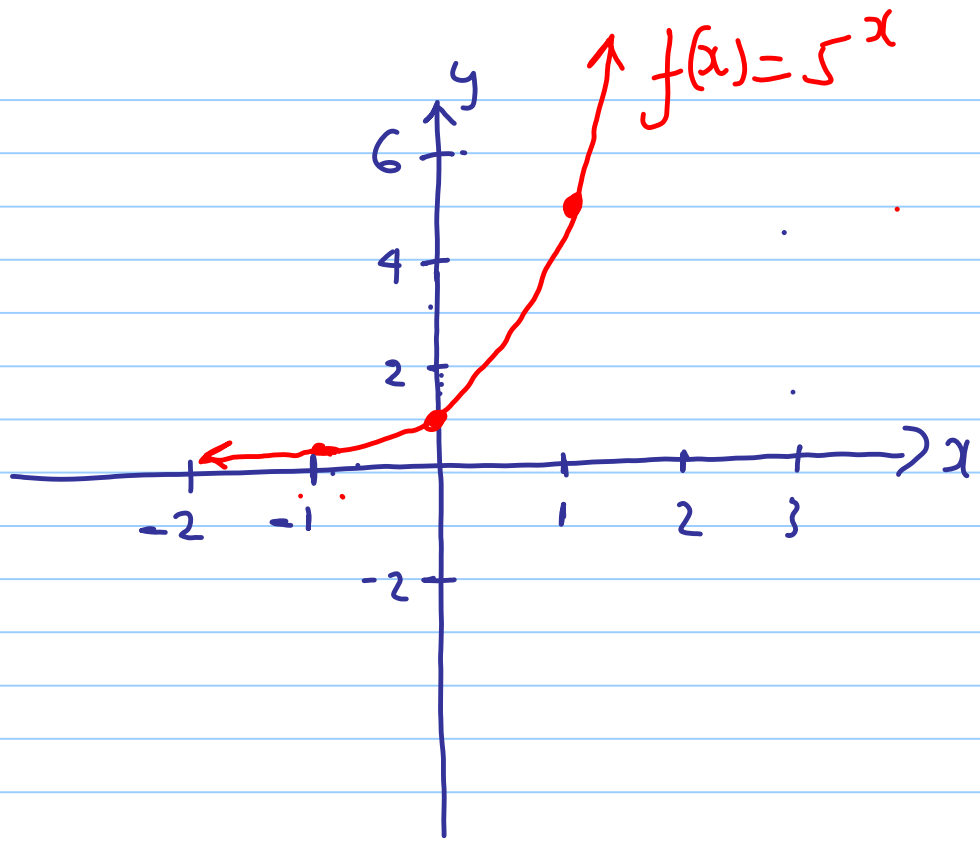
$b = 5$

y-intercept $(0,1)$

additional points

$(1, f(1)) = (1, b) = (1, 5)$

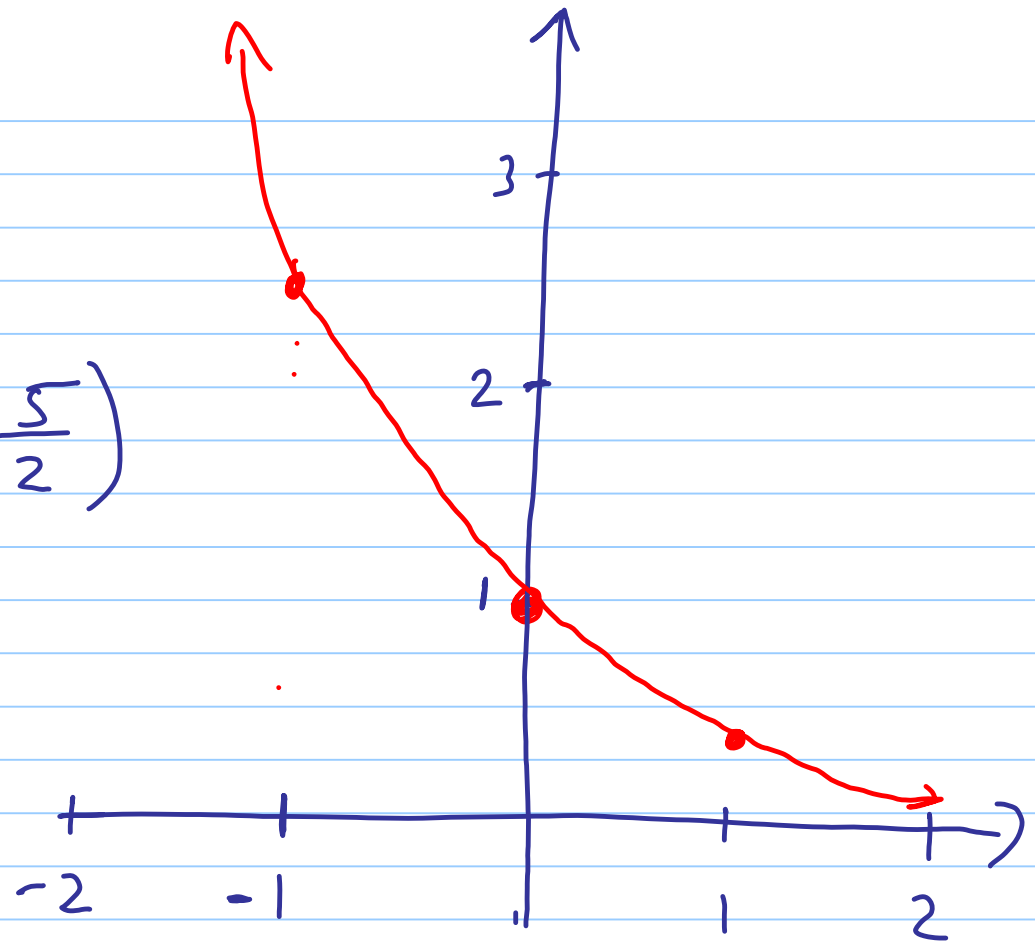
$(-1, f(-1)) = (-1, \frac{1}{5})$



$$f(x) = \left(\frac{2}{5}\right)^x$$

pontos: $(1, f(1)) = \left(1, \frac{2}{5}\right)$

$$(-1, f(-1)) = \left(-1, \frac{5}{2}\right)$$



Example

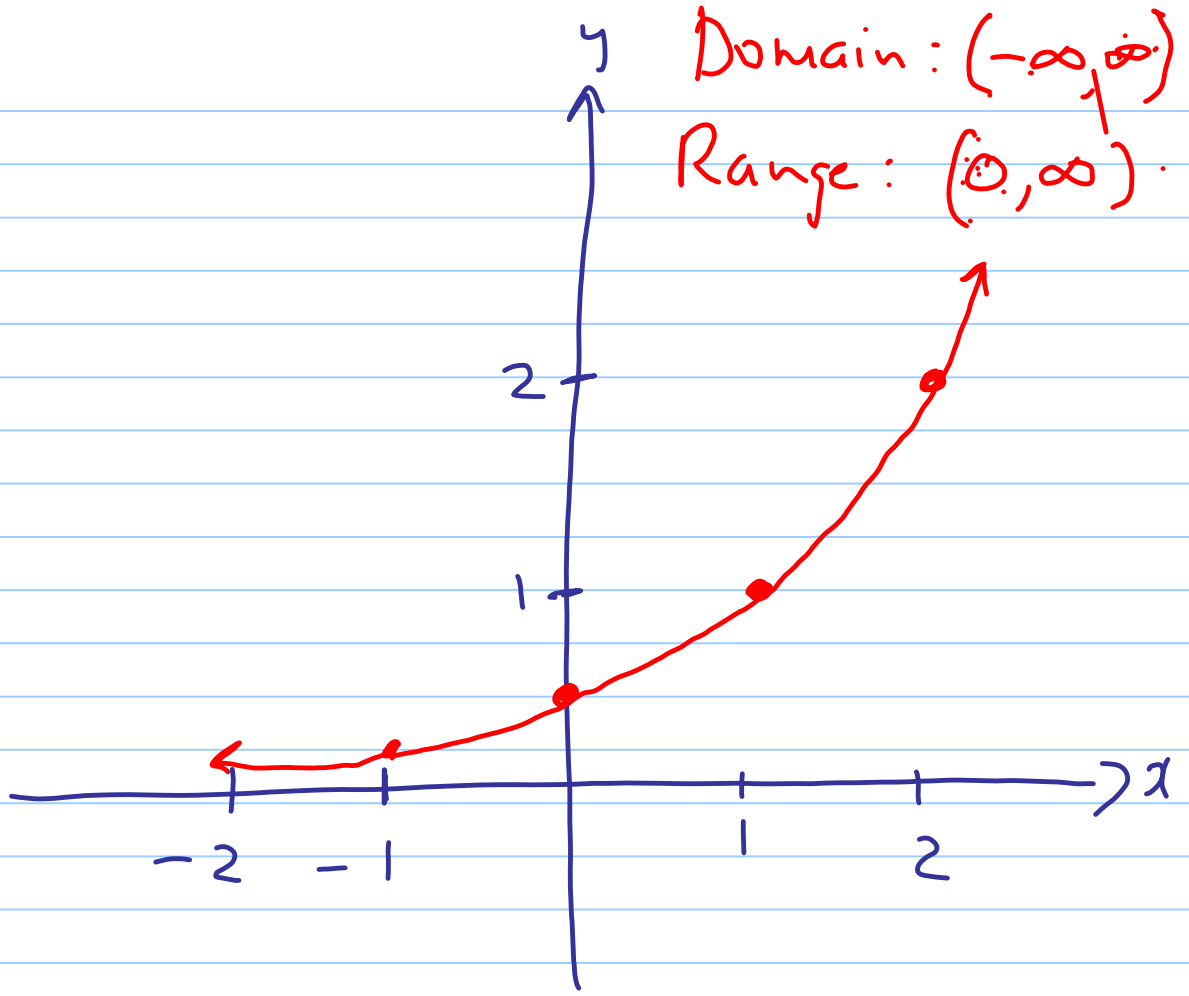
$F(x) = 2^{x-1}$

$f(0) = 2^{0-1} = 2^{-1} = \frac{1}{2}$

$f(1) = 2^{0} = 1$

$f(-1) = \frac{1}{4}$

$f(2) = 2$



Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

Example

$$P = P_0 2^{t/d}$$

$P_0 = 15$ million

$t = 20$ years

$d = 30$ double.

$$P(20) = 15\left(2^{\frac{20}{30}}\right) = 15\left(2^{2/3}\right) \simeq 23.81$$

The population of Kha will be approx. 24 million

Half life

$$A = A_0 \left(\frac{1}{2}\right)^{\frac{t}{h}}$$

$$A(24) = 500 \left(\frac{1}{2}\right)^{\frac{24}{12.36}}$$

$$\approx 130 \text{ mg}$$