

EXPONENTIAL FUNCTIONS

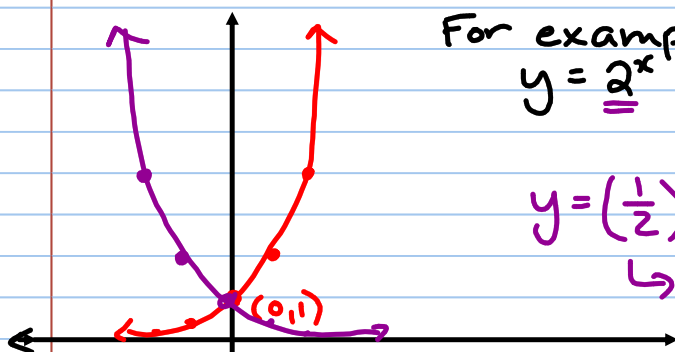
$$y = a^x \quad a > 0 \text{ and } a \neq 1$$

For example:

$$y = \underline{2^x} \quad (\text{is an INCREASING FN})$$

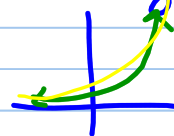
$$y = \left(\frac{1}{2}\right)^x = (2^{-1})^x = 2^{-x}$$

↳ is decreasing

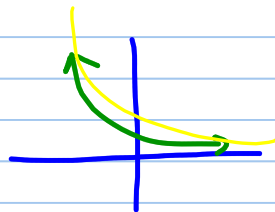


↳ the y-axis is an asymptote

So: If $a > 1$, the fn is increasing as $x \rightarrow \infty$



If $0 < a < 1$, the fn is decreasing as $x \rightarrow \infty$



Ex A flu virus is spreading through Corvallis.
 $N = 2^t$ where N is the # of infected students and t is the time in days.

(a) How many days until 256 kids are sick?

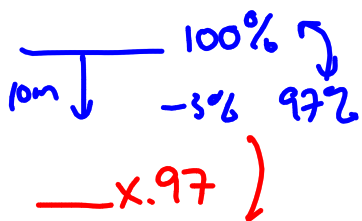
$$256 = 2^t \quad t = 8 \text{ days}$$

(b) How many kids will be sick in 12 days?

$$N = 2^{12} \\ = \underline{\underline{4096}}$$

Scuba diving: The light decreases by 3% every 10m.

Determine an equation to model this.



$$L(d) = (.97)^{\frac{d}{10}}$$

$$\begin{aligned} L(100) &= (.97)^{\frac{100}{10}} \\ &= (.97)^{10} \\ &= \underline{\underline{73.7\%}} \end{aligned}$$