

### 1.3 Tracking the Tortoise

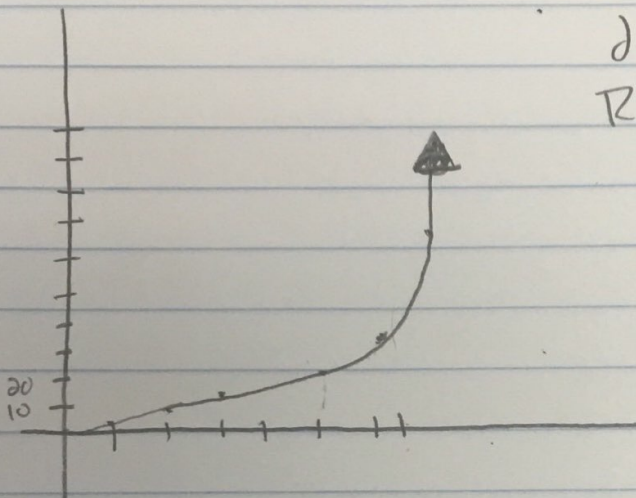
$$d(t) = 2^t \quad (d \text{ in meters and } t \text{ in seconds})$$

$$d(10) = 2^{10}$$

$$d(20) = 2^{20}$$

$$d(10) = 1024 \text{ meters}$$

$$d(20) = 1,048,576 \text{ meters}$$



$x$	$y$
1	2
2	4
3	8
4	16
5	32
6	64

Continuous exponential increasing  $[0, \infty)$   
 minimum  $y = 1$

$$64 = 2^6$$

Example of an exponential function

Answer  $\rightarrow 8 = 2^3$  ← exponent  
 ↙ base

Example of a logarithm

$\log_2 8 = 3$   
 ↖ base      ↗ answer

$$1024 = 2^x \rightarrow \log_2 1024 = x$$

$$64 = 4^x \rightarrow \log_4 64 = x$$

$$220 = 2^x \rightarrow \log_2 220 = x$$

Inverse

$$f(x) = 2^x \quad - \quad f^{-1}(x) = \log_2 x$$

logarithmic

$$\textcircled{1} \quad 2^x = 48 \rightarrow \log_2 48 = x$$

$$\textcircled{2} \quad 3^x = 125 \rightarrow \log_3 125 = x$$

$$\textcircled{3} \quad \log_5 50 = x \rightarrow 5_x = 50$$

$$\textcircled{4} \quad \log_7 49 = x \rightarrow 7_x = 49$$