

1. Find exact values if possible:

A. $\log_4\left(\frac{1}{64}\right)$

$$= \log_4 4^{-3}$$

$$= -3$$

B. $\log_2(-4)$

undefined

C. $\ln(e^\pi)$

π

D. $\log_9(3)$

$$\log_9 9^{\frac{1}{2}}$$

$$\frac{1}{2}$$

2. Derive the tripling time formula for $P = P_0 a^{nt}$. What does this tripling time depend on? Do we need to make any assumptions about a and n ?

Formula $3P_0 = P_0 a^{nt}$

$3 = a^{nt}$

$\log 3 = \log a^{nt}$

$\log 3 = nt \log a$

$t = \frac{\log 3}{n \log a}$

$a > 1$

$n > 0$

or could
use natural
logs3. Let $S(D) = 0.159 + 0.118 \log(D)$ where S is the slope of a beach and D is the average diameter (in mm) of the sand particles on the beach. Suppose a particular beach rises 9 meters for every 100 meters inland. What size sand would you expect to find on that beach?

$S(D) = 0.159 + 0.118 \log(D)$

$0.09 = 0.159 + 0.118 \log(D)$

$-0.069 = 0.118 \log(D)$

$\log(D) = \frac{-0.069}{0.118}$

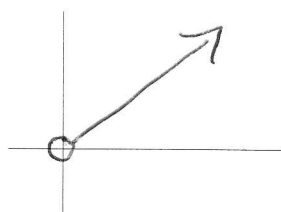
$D = 10^{\frac{-0.069}{0.118}}$

≈ 0.260

The size of the
sand on this beach is
expected to be about
0.26 mm diameter.

4. Sketch a graph of each function. Include the domain.

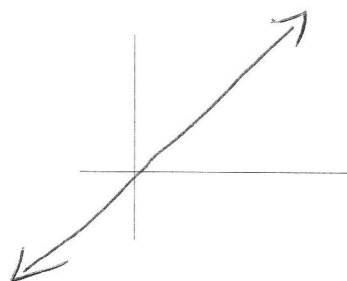
A. $y = 7^{\log_7 x}$



$y = x, x > 0$

$D: \{x \mid x > 0\}$

B. $y = \ln e^x$



$y = x$