Chapter 7.1, Problem 18E

Problem

Find exact values for each of the following quantities. Do not use a calculator.

a. log3 81

b. log2 1024

c. $\log_3\left(\frac{1}{27}\right)$

d. log2 1

e. $\log_{10}\left(\frac{1}{10}\right)$

f. log3 3

g. log2(2*k*)

Step-by-step solution

Step 1 of 7

(a) $\log_3 81 = \log_3 3^4$

$= 4\log_3 3$

$= 4(1) = 4$

Step 2 of 7

(b) $\log_2 1024 = \log_2 2^{10}$

$= 10\log_2 2$

$= 10(1) = 10$

Step 3 of 7

(c) $\log_3\left(\frac{1}{27}\right) = \log_3 27^{-1}$

$= \log_3 3^{-3}$

$= -3(\log_3 3)$

$= -3\times 1 = -3$

Step 4 of 7

(d) $\log_2 1 = 0$ since log 1 = 0

Step 5 of 7

(e) $\log_{10}\left(\frac{1}{10}\right)=\log_{10}10^{-1}$

$=-1.\log_{10}10$

$=-1\times1=-1$

Step 6 of 7

(f) $\log_3 3=1$

Step 7 of 7

(g) $\log_2\left(2^k\right)=k\left(\log_2 2\right)$

$=k(1)$

$=k$