

Math Diversion Problem 95

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You cannot read mathematics the way you read a
novel. If you zip through a page in less than an
hour, you are probably going too fast.

— Sheldon Axler
(from *Linear Algebra Done Right*)

The YouTube video is found at:

Source: <https://www.youtube.com/watch?v=Xw8VBHXX81M>

Title: Nice Exponential Math Problem |
Harvard Entrance Exam Question

Presenter: SchoolClass Math

1 The Problem

Given the relation

$$20^k \cdot 50^k = 8, \tag{1}$$

find the values of k .

2 The Solution

There are many ways to continue from here. I chose this way. The given relation becomes

$$(20 \cdot 50)^k = (1000)^k = 8. \tag{2}$$

Take the logarithm base 10 of both sides.

$$k \log 1000 = k \log 10^3 = 3k = \log 8. \tag{3}$$

From this we get

$$k = \log 8^{1/3} = \log 2. \tag{4}$$