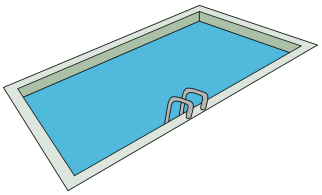

Problem of the Week
Problem E and Solution
Hosers

Problem

Nine large hoses can fill a swimming pool in four hours and six small hoses can fill the same swimming pool in eight hours. How long will it take four large hoses and eight small hoses working together to fill the swimming pool?

Solution

Solution 1

9 large hoses can fill 1 swimming pool in 4 hours.

$\therefore$ 9 large hoses can fill $\frac{1}{4}$ of the swimming pool in 1 hour.

$\therefore$ 1 large hose can fill $\frac{1}{9} \times \frac{1}{4} = \frac{1}{36}$ of the swimming pool in 1 hour.

6 small hoses can fill 1 swimming pool in 8 hours.

$\therefore$ 6 small hoses can fill $\frac{1}{8}$ of the swimming pool in 1 hour.

$\therefore$ 1 small hose can fill $\frac{1}{6} \times \frac{1}{8} = \frac{1}{48}$ of the swimming pool in 1 hour.

In one hour, 4 large hoses and 8 small hoses fill

$4\left(\frac{1}{36}\right) + 8\left(\frac{1}{48}\right) = \frac{1}{9} + \frac{1}{6} = \frac{2}{18} + \frac{3}{18} = \frac{5}{18}$ of the pool.

Since it is $\frac{5}{18}$ full in 1 hour,

the pool will be completely full in $\frac{18}{5} = 3\frac{3}{5}$ hours or 3 hours and 36 minutes.

Solution 2

9 large hoses can fill 1 swimming pool in 4 hours.

$\therefore$ 1 large hose can fill $\frac{1}{9}$ of the swimming pool in 4 hours.

$\therefore$ 4 large hoses can fill $\frac{1}{9}$ of the swimming pool in 1 hour.

6 small hoses can fill 1 swimming pool in 8 hours.

$\therefore$ 1 small hose can fill $\frac{1}{6}$ of the swimming pool in 8 hours.

$\therefore$ 8 small hoses can fill $\frac{1}{6}$ of the swimming pool in 1 hour.

Together in one hour, 4 large hoses and 8 small hoses fill

$\frac{1}{9} + \frac{1}{6} = \frac{2}{18} + \frac{3}{18} = \frac{5}{18}$ of the pool.

Since it is $\frac{5}{18}$ full in 1 hour,

the pool will be completely full in $\frac{18}{5} = 3\frac{3}{5}$ hours or 3 hours and 36 minutes.

$\therefore$ with four large hoses and eight small hoses the pool can be filled in 3 hours and 36 minutes.