'Plausible Estimation' Estimates for a Million Tasks - Set #1

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The aim of this assessment is to provide the opportunity for you to:

- develop a chain of reasoning that will enable you to estimate quantities to an appropriate degree of accuracy
- choose suitable units for your estimate
- communicate the assumptions upon which your estimate is based.

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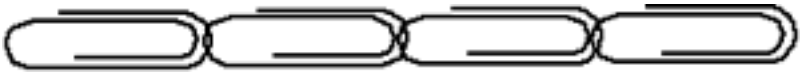
1. Breathing
How many days would it take you to breathe a million times?

Solution:

Assumptions You breathe once every 4 seconds.
Reasoning Calculation: 4,000,000 seconds is about 46 days. *Answer: About 50 days.*

2. Paper Clips
Suppose a chain is made from a million paper clips. How far will it stretch? Choose suitable units for your answer.



Solution:

Assumptions Each paper clip is about 4 cm in length.
Reasoning Calculation: 4,000,000 cm = 40 km (or about 25 miles) *Answer: About 40 kilometres or 25 miles.*

3. The brick wall

Suppose you use a million household bricks to build a wall four feet high. How long would the wall be?

Solution:

Assumptions A brick is about 3 inches high and 9 inches long.

Reasoning Calculation: The wall will be (4 feet ÷ 3 inches) = 16 bricks high This means that the wall will be (1 million ÷ 16) 62,500 bricks in length = 62,500 x 9 inches = 8.9 miles. *Answer: Just under 9 miles.* (Maybe with mortar it would be just over 9 miles)

4. The dripping faucet

A faucet drips a million times. How many buckets will it fill?

Solution:

Assumptions A bucket holds about 8 liters. A drip has a diameter of 2 mm
Reasoning Calculation: The volume of a drip is given by

$^4/_3 \pi (1)^3 \quad 4\ mm^3$

A million drips will therefore have a volume of
$4 \times 10^6\ mm^3 = 4$ liters

Answer: About one half a bucket.

5. Writing a million

How long would it take you to write out all the numbers, from one to a million?

Remember that some numbers have more digits than others!

Solution:

Assumptions

You can write down 2 digits per second

Reasoning

Most (90%) of the numbers have 6 digits.

So we need to write down nearly six million digits.

This would take nearly 3 million seconds = 35 days (approx)

Answer: 35 days, working day and night.