

When to Use the Calculator

When to use a calculator and when not to

Generally, when you need to calculate something, you have these three choices:

1. Your mind (*i.e.*, mental math)
2. Paper and pencil calculations
3. A calculator

A calculator is NOT always the best tool. First of all, one may not be available. Second, finding it and punching the numbers in may be slower than mental math. Third, it is NOT errorless, because you may accidentally push the wrong buttons or the right buttons in the wrong order. Fourth, the person using the calculator needs to know exactly what he is doing and why, and also how to interpret the answer.

A good problem solver can decide WHICH tool is the best for solving a particular problem.

Examples:

A 250-g can of sardines costs \$1.50.

A 400-g can costs \$2.50.

Which is cheaper by weight?

The numbers are not difficult, so mental math works. Figure the cost of buying **2 kg** of each:

8 cans at \$1.50 cost \$12.

5 cans at \$2.50 cost \$12.50.

The smaller cans are cheaper by weight.

A 7-oz can of sardines costs \$1.50.

A 16-oz can costs \$2.75.

Which is cheaper by weight?

The numbers do not “go evenly,” so a calculator is better. Divide to find out the price per ounce:

$\$1.50 \div 7 = \0.214285714285714

$\$2.75 \div 16 = \0.171875

The bigger can is cheaper by weight.

Answers given as long decimals

Notice, in the second example above, that the answer from a calculator can be a *very long* decimal number! When you divide, the calculator does not give you a whole number and a remainder. Instead, it divides the dividend as long as it can, and gives you a decimal as an answer. *You* need to then round that decimal to a meaningful accuracy.

Let’s look at the calculations again:

$\$1.50 \div 7 = \0.214285714285714 and $\$2.75 \div 16 = \0.171875

Since they are money amounts, round them to two decimals:

$\$0.214285714285714$ per ounce \approx \$0.21 per ounce; and $\$0.171875$ per ounce \approx \$0.17 per ounce

Example. There were 5,859 surgeries performed in a certain hospital within one year. About how many surgeries were performed daily?

$5,859 \div 365 = 16.0520547945205$

We should round this to “whole surgeries”: $16.0520547945205 \approx 16$, or about 16 surgeries daily.

1. Solve the problems. Choose if you should use *mental math* or *a calculator*.
See the fact boxes on the right for some figures.



- a. If you wanted to travel around the earth in 40 days,
about how many kilometers should you travel each day?

I should use (calculator/mental math).

- b. If you wanted to travel around the earth in 80 days,
about how many kilometers should you travel each day?
(Hint: Use your answer from part a.)

I should use (calculator/mental math).

- c. A store ordered 2,500 kg of rice for \$1.75 per kg. What was the total price?

I should use (calculator/mental math).

- d. A spacecraft travels at the speed of 55,400 kilometers per hour.

How many kilometers does it travel in two hours?

I should use (calculator/mental math).

- e. How many hours will it take to travel to the Moon?

I should use (calculator/mental math).

- f. How many hours will it take to travel to the Sun?

I should use (calculator/mental math).

The distance around
the Earth's equator
is 40,075 km.

The average distance
from the Earth to the
Sun is 149,600,000 km.

The average distance
from the Earth to the
Moon is 384,400 km.

2. The city's public transportation system provided transportation for
3,525,942 passengers in one year. The system had 23 buses.



- a. About how many passengers were there each day?
b. About how many passengers per bus were there each day?

3. In 2006, the vehicles in the USA used 140,320,089,000 gallons of fuel (gasoline and
gasohol). If there were about 300 million people in the United States in 2006, find:



- a. About how many gallons of fuel were consumed per person?
b. About how many gallons of fuel were consumed in one hour?

Source: <http://www.fhwa.dot.gov>

4. It is estimated that on average, it costs about \$9,500 yearly to own, maintain, and drive a car
in the United States. Calculate how much money the average family spends on their car:



- a. during a 15-year period;
b. in one day.

Source: *Your Driving Costs*, 2007 edition, by the American Automobile Association, Inc. (AAA)