Written test 01

Exercise 1

Three cousins, Zoé, Luc, and Serge, have a combined age of 60.

What is the age of each, knowing that Luc is three times the age of Zoé, and Serge is ten years younger than Luc?

Solution

Let x be the age of Zoé. We know than Luc is $3x$ and Serge is $3x - 10$.
Adding their ages, whe get 60, which leads to the following equation

$$x + 3x + 3x - 10 = 60$$

which simplifies to

$$7x - 10 = 60$$

So, adding ten on both sides, we get

$$7x = 70$$

and we conclude that $x = 10$ by dividing both sides by 10.

Thus, Zoé's 10, Luc is 30 and Serge is 20.

Exercise 2

The wheels of my bike have the same diameter. When they make a complete turn, I move forward by approximately 230 cm.

What's their diameter (you can provide an approximate value) ?

Solution

Let d be the wheels' diameter. We know their perimeter is 230 cm, so we have

$$\pi \times d = 230$$

which leads to $d = \frac{230}{\pi} \simeq 73.2$ rounded to the nearest millimeter, and that's the diameter of my wheels.

Remark

This is the diameter of a 29" (29 inches) wheel on a mountain bike.

Exercise 3

Pierre is half the age his father had 12 years ago.
He was born when his father was celebrating his 25^{th} birthday.

What is Pierre's age?

Solution

Let x be Pierre's age and y his father's.
From the first sentence we derive a first equation :

$$x = \frac{y - 12}{2}$$

And the second sentences implies that Pierre's father's 25 years older than him, hence

$$y = x + 25$$

So we have to solve the following system

$$\begin{cases} x &= \dfrac{y - 12}{2} \\ y &= x + 25 \end{cases}$$

which is really easy since we can substitute the value of y into the first equation, getting

$$x = \frac{x + 25 - 12}{2}$$

which is equivalent, by multiplying both sides by 2, to

$$2x = x + 13$$

which gives us $x = 13$ by subtracting x to both sides.

Thus Pierre's 13 and his father's $25 + 13 = 37$.