

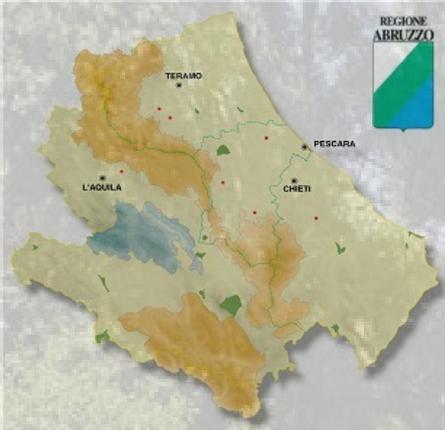
Erasmus+

Erasmus + *Colourful* Number 2020–2022 Mathematics and Nature

RATIO AND BIODIVERSITY



ABRUZZO: THE GREEN HEART OF EUROPE



Abruzzo ranks 1st in Italy
by percentage of protected areas:
37% of the regional territory

https://it.wikipedia.org/wiki/Aree_naturali_protette_dell%27Abruzzo



Europe

In Abruzzo **1/3** of the territory
is represented by **protected areas**:
3 National Parks
1 Regional Park
over 30 Natural Reserves



Not only is the region a cultural and civil leader in terms of environment protection, but it also ranks as the largest naturalistic area in Europe, the true green heart of the Mediterranean

<https://abruzzoturismo.it/>

37%

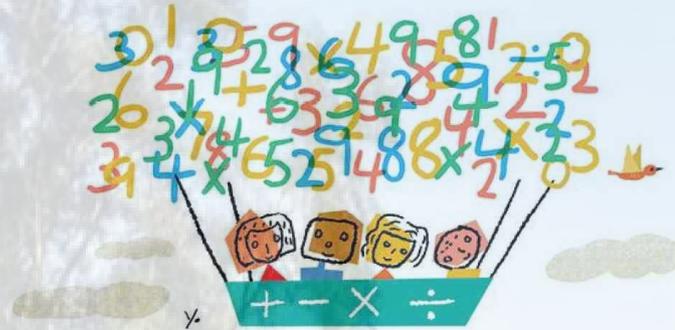
$1/3$

What do these numbers stand for?

Which one is right?



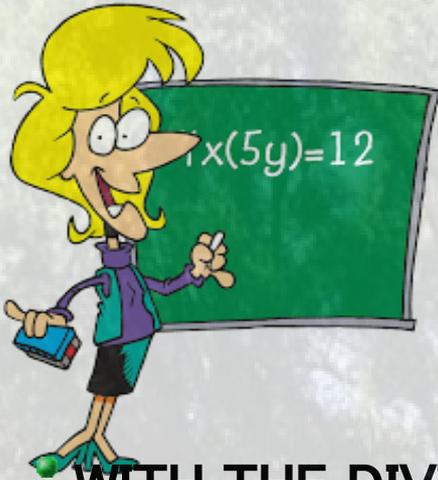
Let's use some math!



The ratio between two physical quantities
is the quotient between the first
and the second physical quantity

physical quantity is a characteristic of an object
measured and compared

that can be



How can a ratio be indicated?

There are three ways:

• WITH THE DIVISION eg.:

1

3

• WITH THE FRACTION eg.:

$\frac{1}{3}$

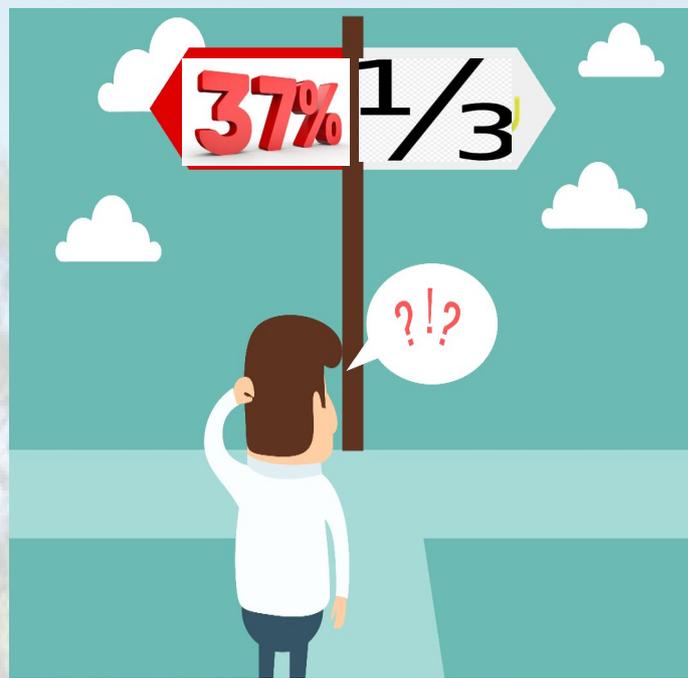
• WITH THE RESULT OF THE DIVISION eg.:

0,333...

If this quotient is multiplied by 100, we get the percentage or percentage ratio (e.g. 33%)

widely used





... so 37% and $1/3$ are both writings used
to refer to a ratio...

however, what is the correct value in this case?

... to find out I have to calculate the ratio
between protected areas and area of Abruzzo

PROTECTED AREAS IN ABRUZZO:

- ▶ Abruzzo, Lazio and Molise National Park
505 km²
- ▶ Gran Sasso and Monti della Laga National Park
1490 km²
- ▶ Majella National Park 740 km²
- ▶ Sirente Velino Regional Park 544 km²
- ▶ State and Regional Reserves 282 km²

ABRUZZO AREA:

10832 km²



Ratio: protected areas / total area = $3561 \text{ km}^2 : 10832 \text{ km}^2 = 0.33$

It means that 33% of the Abruzzo territory is protected



$$3561 \text{ km}^2 : 10832 \text{ km}^2 = 0,33$$

...What about the unit of measurement?

The ratio between the value of two homogeneous physical quantities always leads to "a pure number"

a number that doesn't go with
the unit of measurement

Homogeneous quantities → quantities that can be measured with the same unit of measurement

Non-homogeneous quantities → quantities that cannot be measured with the same unit of measurement

What if I have a ratio with non-homogeneous quantities?

The ratio results in a number accompanied
by both initial units of measurement

a "dimensioned" number

Eg. Average density of wolves in a territory:

Number of species / Area

In the Apennines: (approx.) 1600 wolves/80800 km²

0,02 wolves/km²

2 wolves / 100 km²





How come are there so many protected areas in Abruzzo?

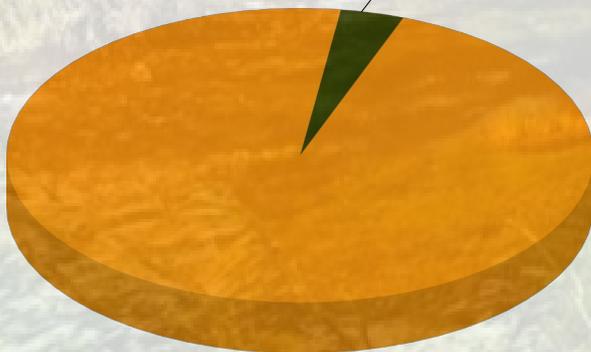


Abruzzo Area/Italy Area

$$10832/302073 \text{ km}^2 = 0,035 \quad 3,5 \%$$



ABRUZZO AREA



...because there is a high



VASCULAR PLANTS:

Europe 20000–25000

Italy 8195

Abruzzo 3260

VERTEBRATES ANIMALS:

Europe 2630

Italy 1258

Abruzzo 453



Now it's your turn!

Try to calculate the various ratios

- Number of vascular plants in Abruzzo/ number of vascular plants in Italy
- Number of vascular plants in Abruzzo/ number of vascular plants in Europe
- Number of vertebrates in Abruzzo/ Number of vertebrates in Italy
- Number of vertebrates in Abruzzo/ Number of vertebrates in Europe
- Abruzzo area/ Europe area



Thank you

for your attention!

