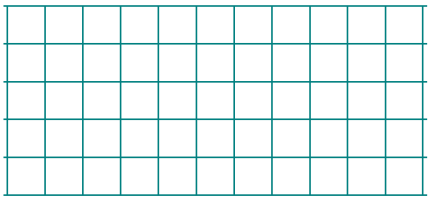
Lesson № 19

1 Solve the word problems

A. A machine packs together a red pencil, a yellow pencil, and a green one. How many such packs can it make out of 12 red, 8 yellow, and 7 green pencils?



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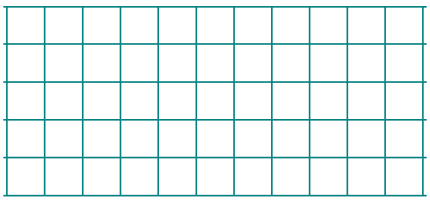
B. A machine packs together 2 red pencils, a yellow pencil, and a green one. How many packs can it make out of 12 red, 8 yellow, and 7 green pencils?



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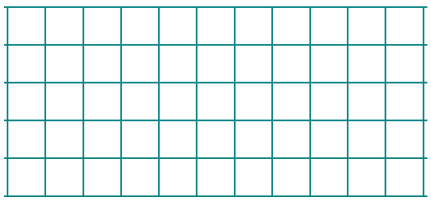
C. A boy packs fruit baskets placing 3 apples and 2 pears in each basket. He has 36 apples and 30 pears. How many baskets can he pack?



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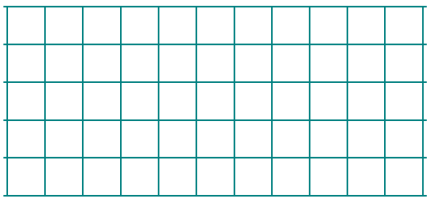
D. A boy packs fruit baskets placing 3 apples and 2 pears in each basket. He has 36 apples and 30 pears. Which fruit will be left and how many?



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2 Find the answer without cumbersome calculations:

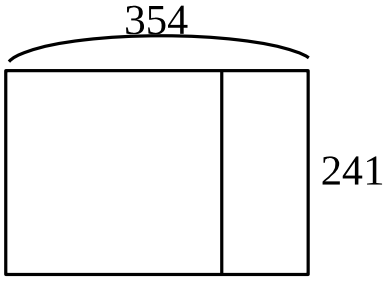
284 + 532 – 7 + 9 – 533 + 1 – 282 = _____

60 : 5 : 4 × 8 × 5 : 8 × 4 : 10 = _____

631 – 346 + ***x*** + 285 + 346 – ***x*** – 630 – 284 = _____

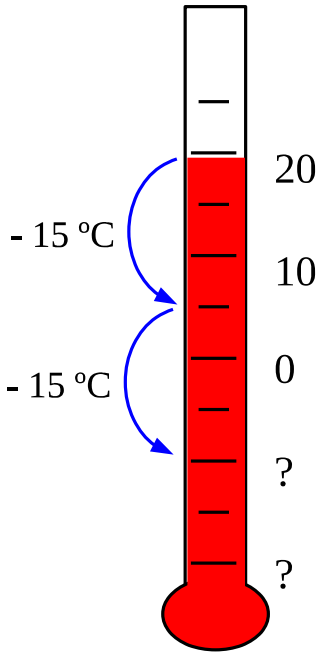
72 : 9 × 3 × 7 : 3 × 9 : 7 × 11 : 11 = _____

241× 354 – 241 × 300 – 241 × 54 = _____



Introduction to Negative Numbers

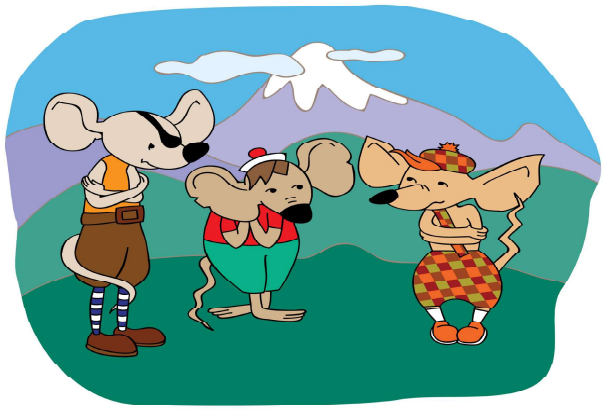
Claus was listening to the weather channel. The temperature outside was 20ºC. What did the temperature become after it dropped 15ºC?

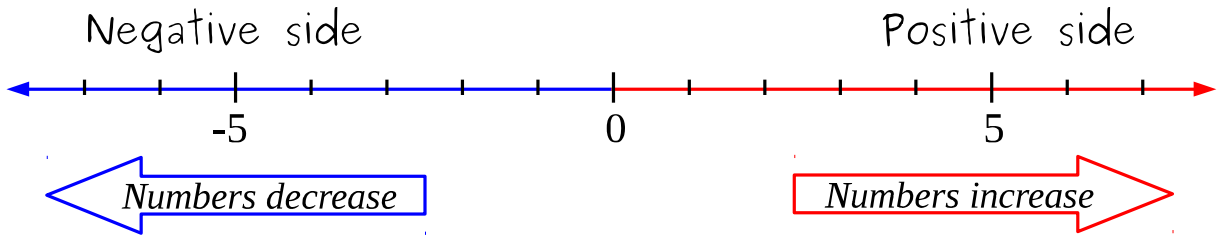


At night the temperature dropped another 15ºC. What did the temperature become at night?

Numbers can be Positive or Negative:

Not only temperatures can be negative. Consider elevations that are calculated with respect to the sea level. Most of the land is located above the sea level. For example, the elevation of mountain Everest is 8, 848 m. Contrary to that, the coastline of Caspian Sea is 28 meters below the sea level. Its elevation is negative: –28 m. Many places in Netherlands also have negative elevation.





Comparing negative numbers.

Notice the arrowhead on the far right end of the number line above. That arrow tells you the direction in which the numbers are getting bigger. In particular, that arrow also tells you that the negatives are getting *smaller* as they move off to the left. That is, –5 is *smaller* than –4.

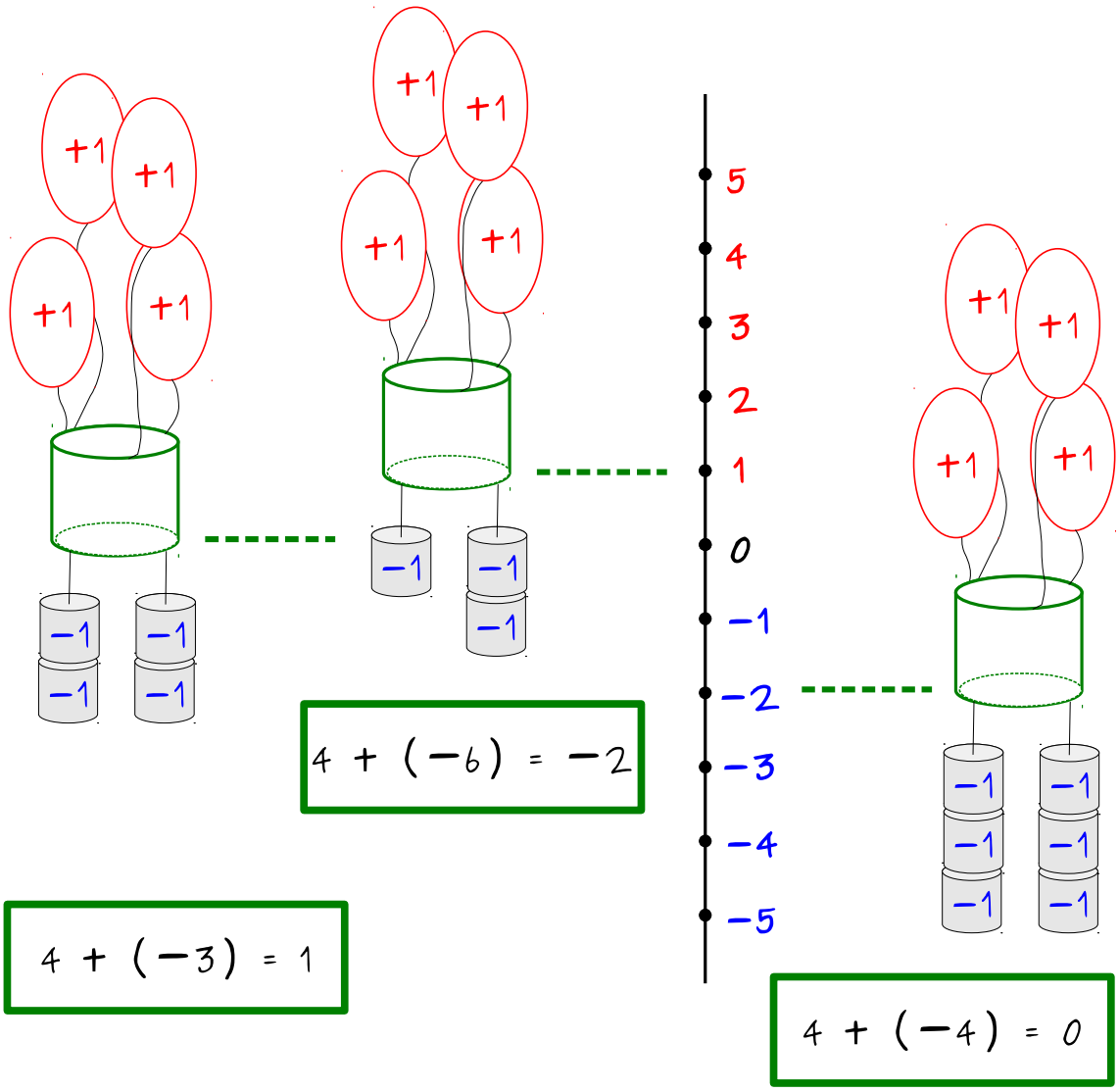
Visualizing Positive and Negative Numbers via a Balloon Model.

When people fly air baskets with air balloons they not only need to fill these balloons with hot air but also to have some weights for balance.

If one attaches both several weights and several balloons then the air basket will go up or down depending on how many balloons and weights are attached.

Positive numbers act like the air balloons. They pull the basket up.

Negative numbers act like the weights. They drag the basket down.

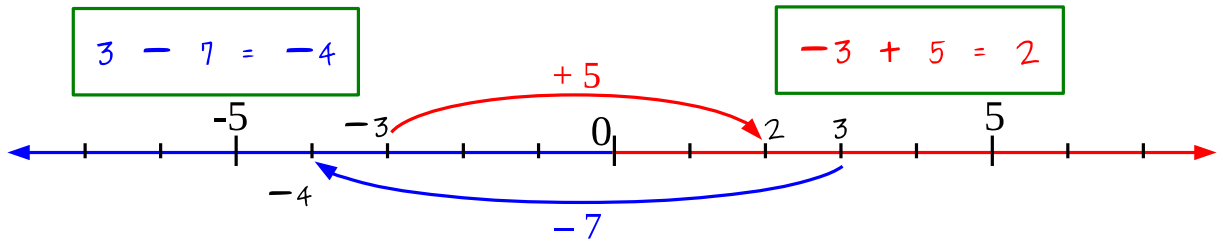


3 Try to match the expressions with negative numbers and the pictures to evaluate these expressions.

4 Compare the integers by writing > or <.

–6 ☐ 4	–5 ☐ 9	–2 ☐ –10	3 ☐ –3
12 ☐ 10	–2 ☐ 10	–10 ☐ 3	–4 ☐ 6
–2 ☐ –12	–10 ☐ 8	–3 ☐ –2	–12 ☐ 2
–2 ☐ 1	–2 ☐ –7	–1 ☐ 0	0 ☐ –6

5 Use the example to solve these problems:



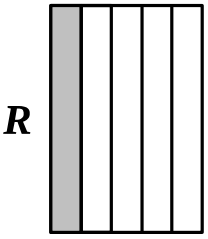
3 + 1 =	3 – 1 =	3 + (–1) =	3 – (–1) =
–3 + 1 =	–3 – 1 =	–3 + (–1) =	–3 – (–1) =

6 **Dividing into a Fraction.**

The drawing demonstrates that $1 : 5 = \frac{1}{5}$

Use the drawing to find out how many time $\frac{1}{5}$ fits into 1.

$1 : \frac{1}{5} = \square$



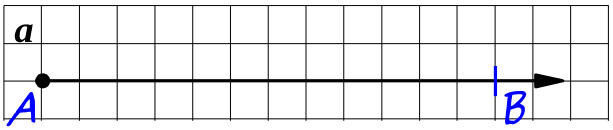
7 Calculate:

$1 : 3 =$	$1 : 5 =$	$1 : 7 =$	$1 : n =$
$1 : \frac{1}{3} =$	$1 : \frac{1}{5} =$	$1 : \frac{1}{7} =$	$1 : \frac{1}{n} =$
$\frac{1}{3} \times 3 =$	$\frac{1}{5} \times 5 =$	$\frac{1}{7} \times 7 =$	$\frac{1}{n} \times n =$
$3 \times \frac{1}{3} =$	$5 \times \frac{1}{5} =$	$7 \times \frac{1}{7} =$	$n \times \frac{1}{n} =$

8 Use a **red** pencil to plot and trace line segment ***AC*** such that

a). $AC = \frac{1}{3}\ AB$ b). $AC = \frac{1}{2}\ AB$ c). $AC = \frac{1}{6}\ AB$ d). $AC = \frac{1}{4}\ AB$

a

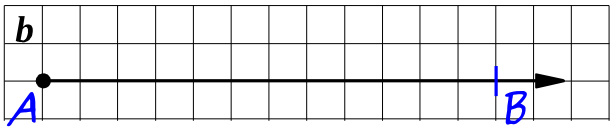


AC = ____ cells = ____ cm

$\frac{1}{3}$ of 12 equals ☐ = 12 : ☐ =

$\frac{1}{3}$ of 6 equals ☐ = 6 : ☐ =

b

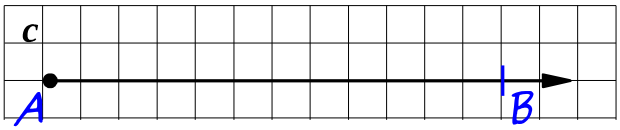


AC = ____ cells = ____ cm

$\frac{1}{2}$ of 12 equals ☐ = 12 : ☐ =

$\frac{1}{2}$ of 6 equals ☐ = 6 : ☐ =

c

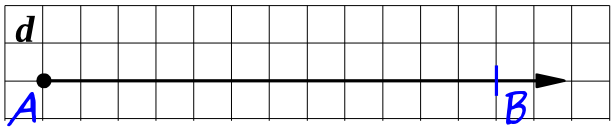


AC = ____ cells = ____ cm

$\frac{1}{6}$ of 12 equals ☐ = 12 : ☐ =

$\frac{1}{6}$ of 6 equals ☐ = 6 : ☐ =

d



AC = ____ cells = ____ cm

$\frac{1}{4}$ of 12 equals ☐ = 12 : ☐ =

$\frac{1}{4}$ of 6 equals ☐ = 6 : ☐ =

$\frac{1}{n}$ of a number

To find one ***n-th*** ($\frac{1}{n}$) of a number one should divide this number by ***n***.

$$\frac{1}{n}w = w : n$$

9

A class has 30 students. One fifth of the students went to the movie night. How many students went to the movie night?

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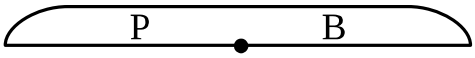
Lisa wrapped one third of 18 presents into gift paper and placed the rest into gift boxes. How many gift boxes did she use?



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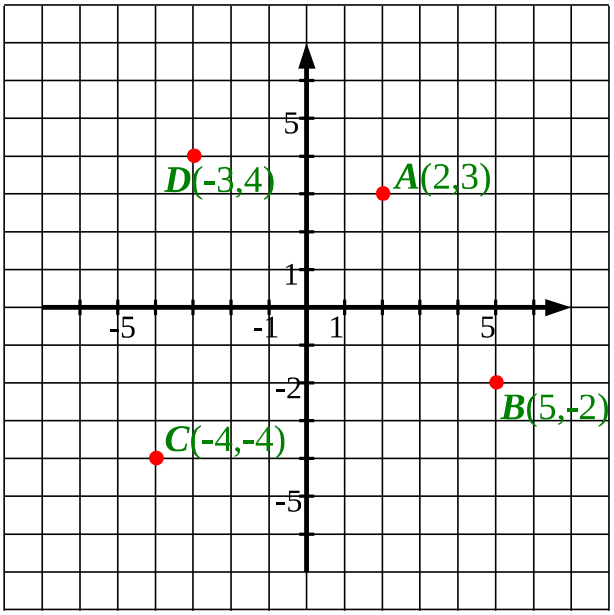
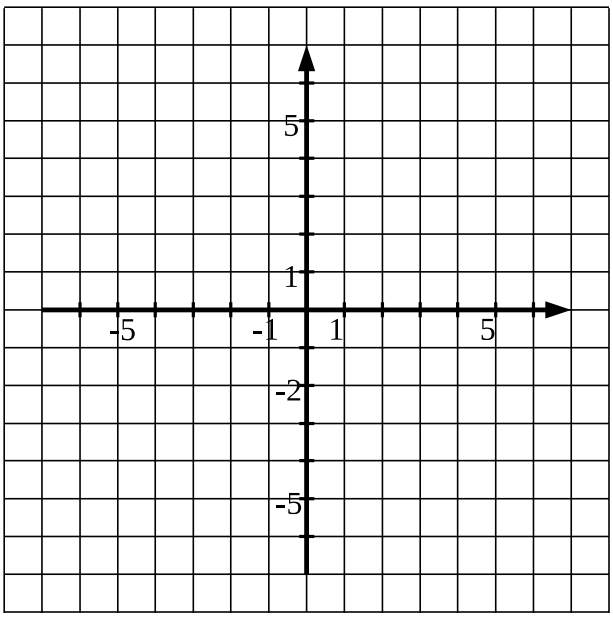
Revisit Coordinates.

The first coordinate (x) tells the position of the object along the number line.
The second coordinate (y) tells how far the object is above or below the number line.





10 Plot the following points in the blank coordinate system:

A(3, 4) ***B***(–3, 2) ***C***(1, –1) ***D***(–2, 5) ***F***(–5, 1)