

Name _____ Date _____

Example 1.1A

Solve the following problem. Show your working clearly.

When the first 21 whole numbers are added together, what is the total sum?

$$1 + 2 + 3 + \dots + 18 + 19 + 20 + 21$$

Solution

$$1 + 2 + 3 + \dots + 18 + 19 + 20 + \textcircled{21}$$

Pairs of 21

$$1 + 20 = 21$$

$$2 + 19 = 21$$

$$3 + 18 = 21$$

⋮

Each pair adds up to 21.

There are 10 pairs of 21 and one extra 21.

Total sum

$$= 10 \times 21 + 21$$

$$= 210 + 21$$

$$= 231$$

The total sum is 231.

Think Mathematically

Since there are 21 numbers, one of them cannot be paired. Leave out the last number (21) first.

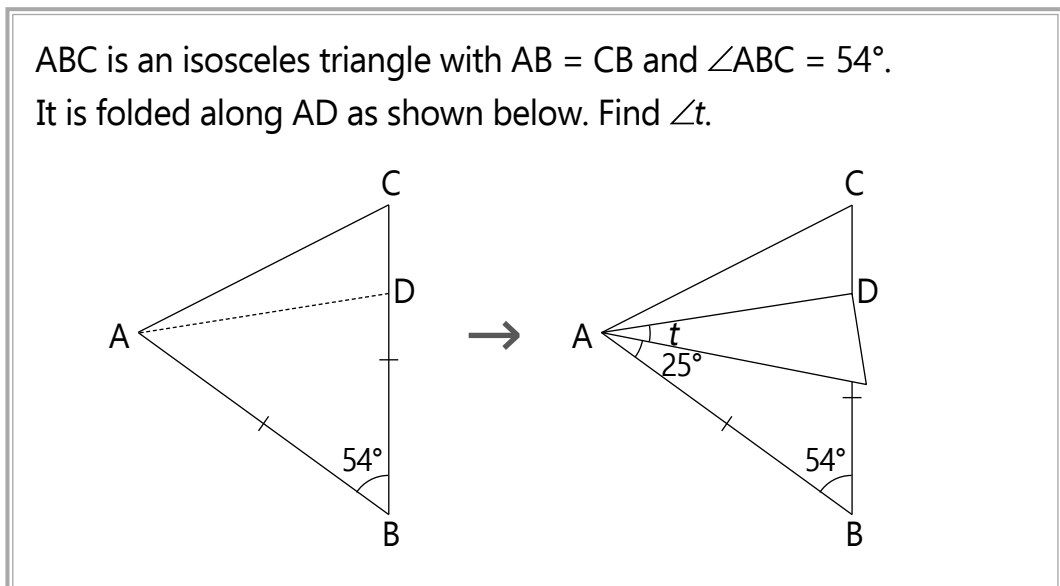
Pair the 1st number with the 2nd-last number, the 2nd number with the 3rd-last number, and so on.

Each pair has the same sum. Multiply the number of pairs by the sum of each pair, then add the number (21) that is left out.

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Example 8.2

Solve the following problem. Show your working clearly.



Solution

$$\begin{aligned}\angle CAB &= (180^\circ - 54^\circ) \div 2 \\ &= 126^\circ \div 2 \\ &= 63^\circ\end{aligned}$$

$$\begin{aligned}\angle t &= (63^\circ - 25^\circ) \div 2 \\ &= 38^\circ \div 2 \\ &= 19^\circ \\ \angle t \text{ is } 19^\circ.\end{aligned}$$

Think Mathematically

Folding the triangle at corner A creates three angles: one is 25° and the other two are equal and marked as t .

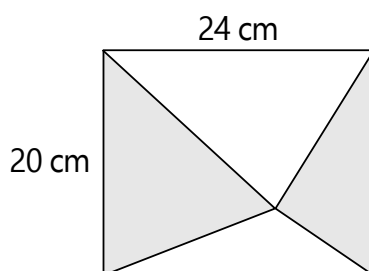
First, use the property of an isosceles triangle to find $\angle CAB$.

Then subtract 25° from $\angle CAB$ and divide the result by 2 to find $\angle t$.

Example 7.1B

Solve the following problem. Show your working clearly.

A rectangular mat has a length of 24 cm and a breadth of 20 cm. Two triangular sections are coloured, as shown below. What is the total area of the coloured parts?



Solution

$$\begin{aligned} & \text{Total area of coloured parts} \\ &= \text{area of 1st triangle} + \text{area of 2nd triangle} \\ &= \frac{1}{2} \times 20 \times \text{height of 1st triangle} \\ & \quad + \frac{1}{2} \times 20 \times \text{height of 2nd triangle} \\ &= \frac{1}{2} \times 20 \times \text{sum of both heights} \\ &= \frac{1}{2} \times 20 \times 24 \\ &= 240 \text{ cm}^2 \end{aligned}$$

The total area of the coloured parts is 240 cm^2 .

Think Mathematically

Both coloured sections are triangles with the same base, the breadth of the mat (20 cm).

The triangles have different heights, but their combined height equals the length of the mat (24 cm).

As the individual heights are not given, use the total height to find the total area of the two coloured triangles.