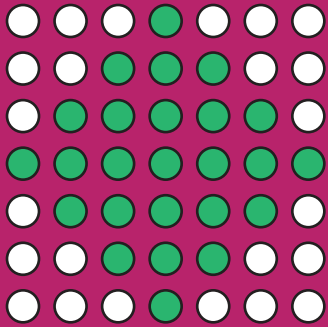


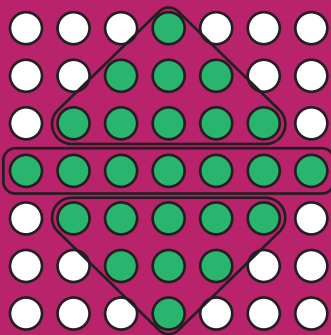
Chapter 2

Writing and Evaluating Expressions

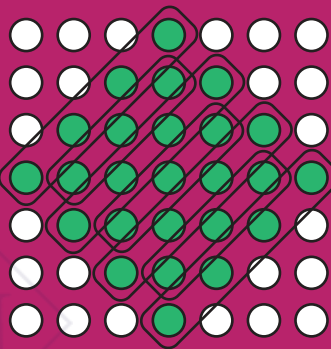
To find the total number of shaded dots without counting one by one, we can make groups and calculate the number of dots in each group.



2 groups of 9 plus 7 is...

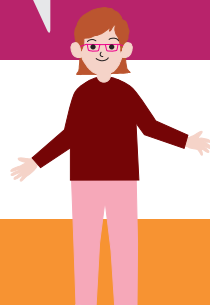


4 groups of 4 plus 3 groups of 3 is...

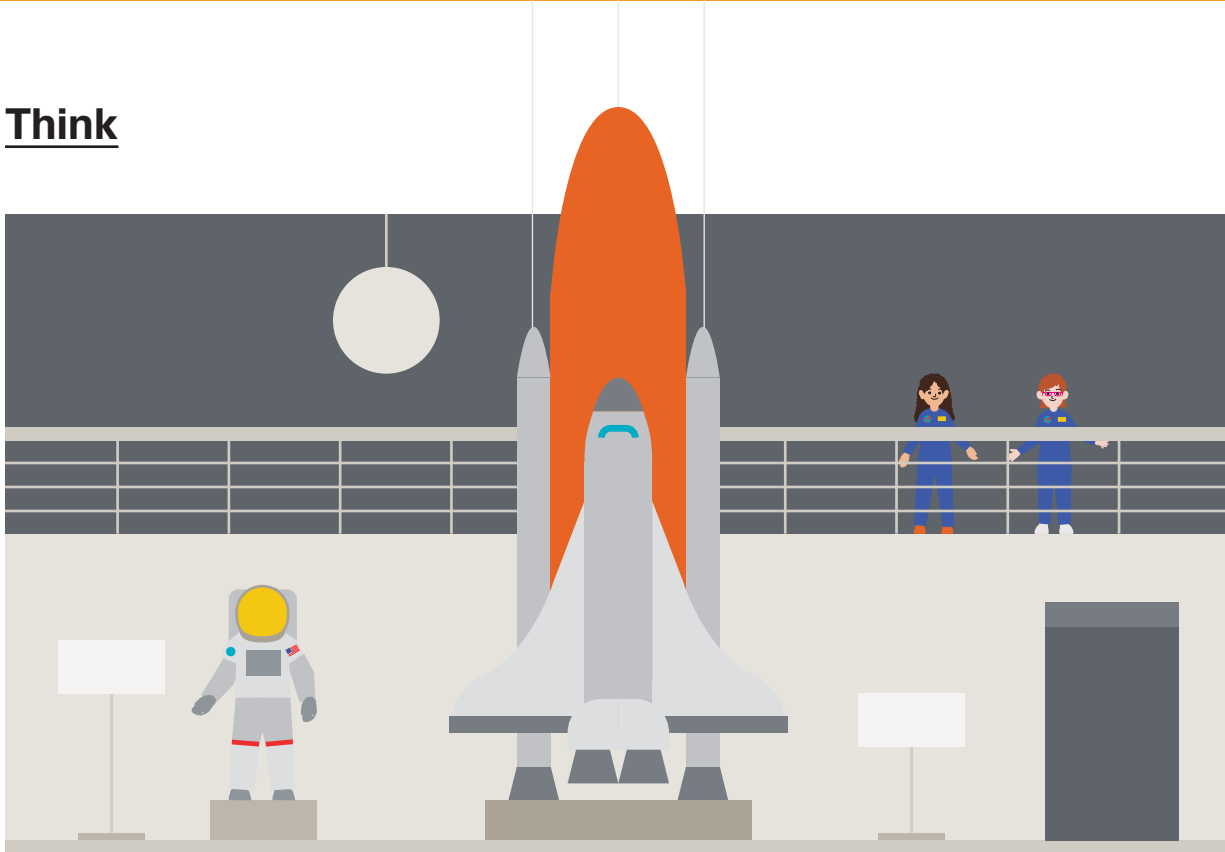


What expressions could we write for each method to find the total?

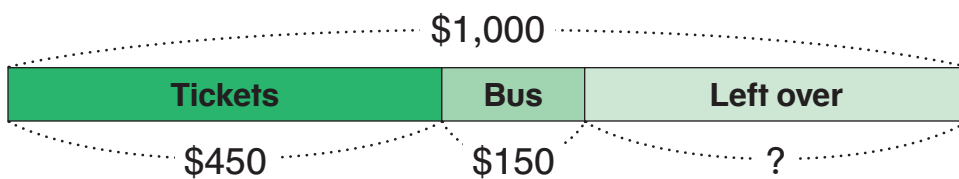
In what other ways can we group the dots?



Think



The Astronomy Club raised \$1,000. They spent \$450 on tickets to the space museum and paid \$150 for a bus rental. How much money do they have left?



What different math expressions can we write to find the answer?

I wonder if we could show all the steps in one expression.



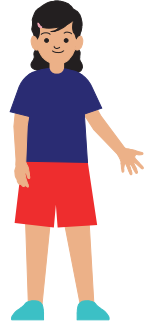
Learn

Method 1

$$1,000 - 450 = 550$$

$$550 - 150 = 400$$

I subtracted the amount spent on tickets first, then the amount spent on the bus rental.



We could show both subtractions in one expression and then calculate from left to right.

$$1,000 - 450 - 150 = 400$$



Method 2

$$450 + 150 = 600$$

$$1,000 - 600 = 400$$

I added the cost of the tickets and the bus rental together, and then subtracted that from the total.

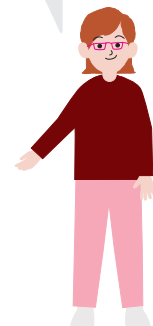


$$\begin{aligned} 1,000 - (450 + 150) \\ = 1,000 - 600 \\ = 400 \end{aligned}$$

If we use parentheses, we can show this method in one expression. Parentheses indicate which calculation to do first.

If I just write $1,000 - 450 + 150$, and calculate from left to right, will I get the correct answer?

They have \$_____ left.



Do

1 (a) $100 - 50 + 2$

= + 2

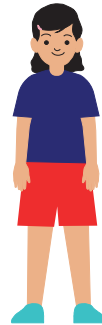
=

Calculate from left to right.
If there are parentheses, calculate
what is in parentheses first.

(b) $100 - (50 + 2)$

= $100 -$

=



2 (a) $56 \div 2 + 5$

= + 5

=

(b) $56 \div (2 + 5)$

= $56 \div$

=

3 Find the values.

(a) $40 - (5 + 5)$

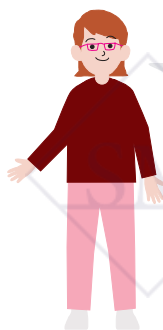
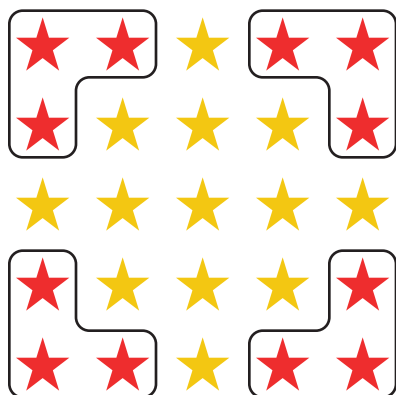
(b) $430 - (100 - 20)$

(c) $460 + (780 - 250)$

Think



Emma saw a poster with stars on it and thought of a way to find the total number of yellow stars without counting them one by one.



I found the total stars using multiplication and then subtracted 4 groups of 3 red stars.

$$5 \times 5 = 25$$

$$4 \times 3 = 12$$

$$25 - 12 = 13$$

Write one math expression that shows all the steps in her solution.

Learn

$$(5 \times 5) - (4 \times 3)$$

$$= 25 - 12$$

$$= 13$$

We learned that we can use parentheses to show which calculation to do first.



We can also write the expression without parentheses if we know that we should multiply 5×5 and 4×3 first before subtracting.



$$5 \times 5 - 4 \times 3$$

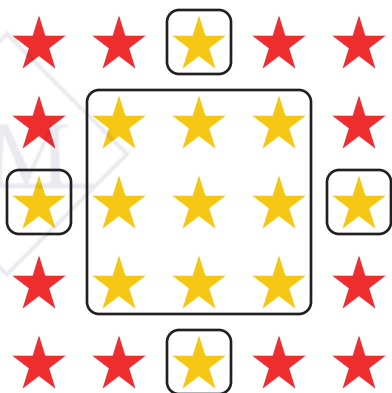
$$= 25 - 12$$

$$= 13$$

Order of operations

Do multiplication and/or division from left to right, then addition and/or subtraction from left to right.

What other ways can you find? Combine your steps in a single expression.



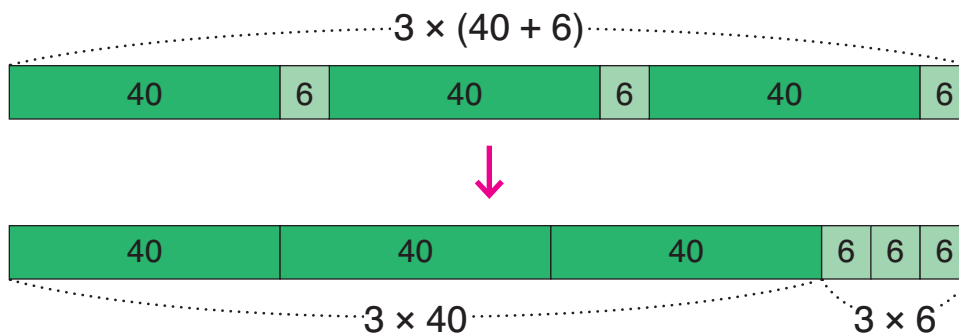
I saw 4 stars on the edges and then 3 groups of 3 stars in the middle.

$$\begin{aligned} &4 + 3 \times 3 \\ &= 4 + 9 \\ &= 13 \end{aligned}$$



Do

- 1 Write an expression to show the number that is 3 times as much as the sum of 40 and 6. Then, find the value.



$$3 \times (40 + 6) = 3 \times 40 + 3 \times 6$$

$$= \boxed{} + \boxed{}$$

$$= \boxed{}$$



We can use this idea to mentally calculate 3×46 .

- 2 Write an expression to find the number that is 4 times as much as the difference between 50 and 1. Then, find the value.

$$4 \times (50 - 1) = 4 \times 50 - 4 \times 1$$

$$= \boxed{} - \boxed{}$$

$$= \boxed{}$$

Is this the same as 4×49 ?

$$\begin{array}{r} 49 \\ \times 4 \\ \hline \end{array}$$



Lesson 5

Divide a 2-digit Number by a 2-digit Number

5

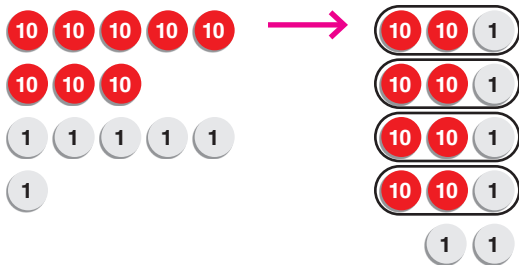
Think



The friends are preparing snack bags for the horses. Sofia has 86 apples. She wants to put 21 apples in each bag. How many bags of apples can she make? How many apples will be left over?

Learn

Divide 86 into groups of 21.



How many groups of 21 can we make with 86?



$$\begin{array}{r} 4 \\ 21 \overline{)86} \\ \underline{84} \leftarrow 21 \times 4 \\ 2 \leftarrow 86 - 84 \end{array}$$

$86 \div 21 \approx 80 \div 20 = 4$
Try 4. 21×4 is close to but not greater than 86.



Check: $4 \times 21 + 2 =$

She can make _____ bags of apples. _____ apples will be left over.

Method 1

$$\begin{aligned}1\frac{1}{2} + \frac{2}{3} &= 1\frac{3}{6} + \frac{4}{6} \\ &= 1\frac{7}{6} \\ &= 2\frac{1}{6}\end{aligned}$$

$$1\frac{7}{6} = 1 + \frac{6}{6} + \frac{1}{6} = 2 + \frac{1}{6} = 2\frac{1}{6}$$

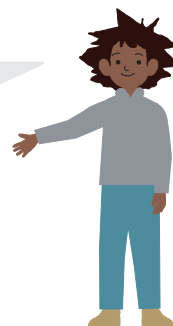


Method 2

$$\begin{aligned}1\frac{1}{2} + \frac{2}{3} &= 1\frac{3}{6} + \frac{4}{6} \\ &= 1\frac{3}{6} + \frac{3}{6} + \frac{1}{6} \\ &= 2 + \frac{1}{6} \\ &= 2\frac{1}{6}\end{aligned}$$

I made the next whole number first.

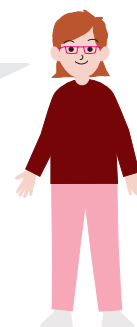
$$\begin{array}{r}1\frac{3}{6} + \frac{4}{6} \\ \swarrow \quad \searrow \\ \frac{3}{6} \quad \frac{1}{6}\end{array}$$



Method 3

$$\begin{aligned}1\frac{1}{2} + \frac{2}{3} &= \frac{3}{2} + \frac{2}{3} \\ &= \frac{9}{6} + \frac{4}{6} \\ &= \frac{13}{6} \\ &= 2\frac{1}{6}\end{aligned}$$

I expressed the mixed number as an improper fraction first.

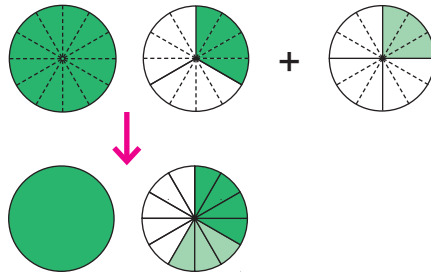


She needs _____ cups of chopped nuts.

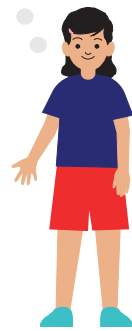
Do

1 Add $1\frac{1}{3}$ and $\frac{1}{4}$.

$$\begin{aligned}
 1\frac{1}{3} + \frac{1}{4} &= \frac{4}{3} + \frac{1}{4} \\
 &= \frac{\square}{12} + \frac{\square}{12} \\
 &= \frac{\square}{12} \\
 &= 1\frac{\square}{12}
 \end{aligned}$$

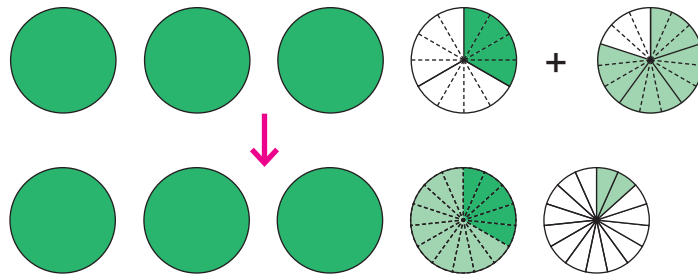


$$1\frac{1}{3} = \frac{4}{3}$$



2 Add $3\frac{1}{3}$ and $\frac{4}{5}$.

$$\begin{aligned}
 3\frac{1}{3} + \frac{4}{5} &= 3\frac{\square}{15} + \frac{\square}{15} \\
 &= 3\frac{\square}{15} \\
 &= 4\frac{\square}{15}
 \end{aligned}$$

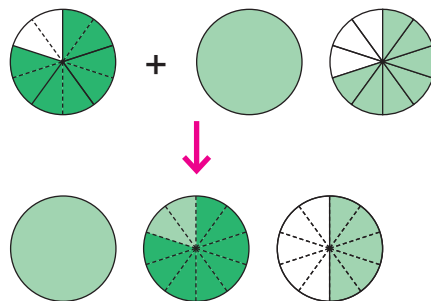


$$3\frac{17}{15} = 3 + \frac{15}{15} + \frac{2}{15} = 4 + \frac{2}{15}$$

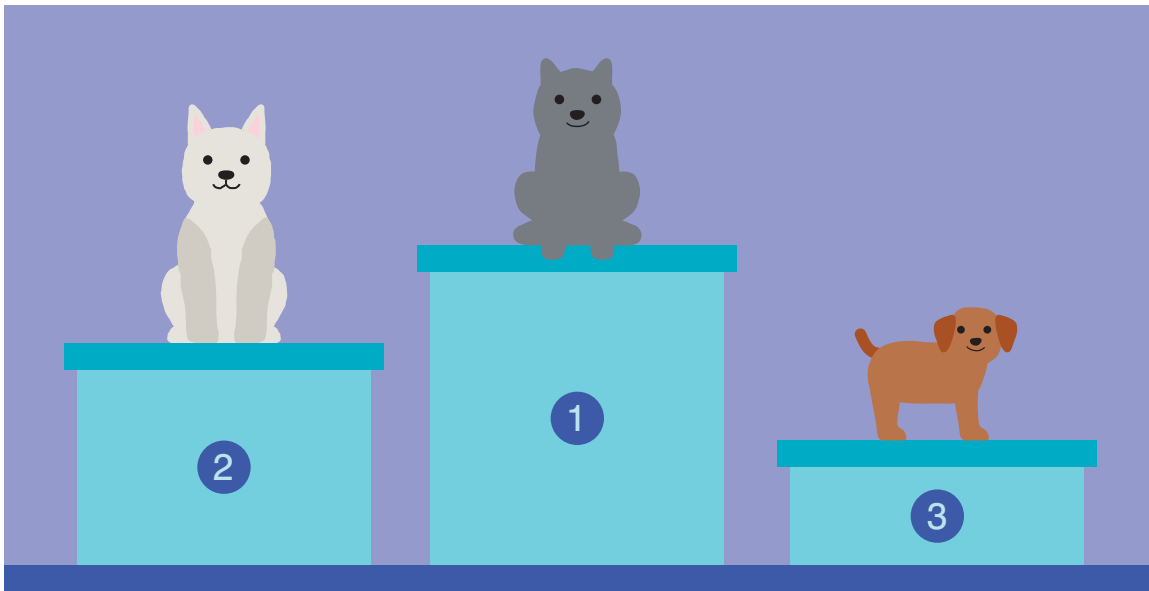


3 Add $\frac{4}{5}$ and $1\frac{7}{10}$.

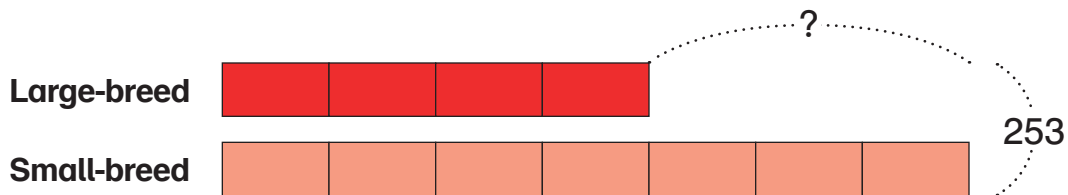
$$\begin{aligned}
 \frac{4}{5} + 1\frac{7}{10} &= \frac{\square}{10} + 1\frac{7}{10} \\
 &= 1\frac{\square}{10} \\
 &= 2\frac{\square}{10} \\
 &= 2\frac{\square}{2}
 \end{aligned}$$



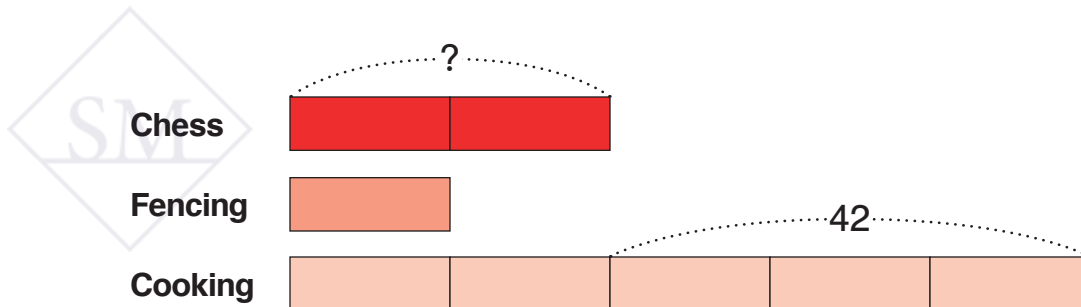
3



There are 253 dogs at a dog show. There are $\frac{4}{7}$ as many large-breed dogs as small-breed dogs. How many more small-breed dogs are there than large-breed dogs?



4 Twice as many students are in the chess club as in the fencing club. The number of students in the fencing club is $\frac{1}{5}$ the number of students in the cooking club. There are 42 more students in the cooking club than in the chess club. How many students are in the chess club?



Lesson 5

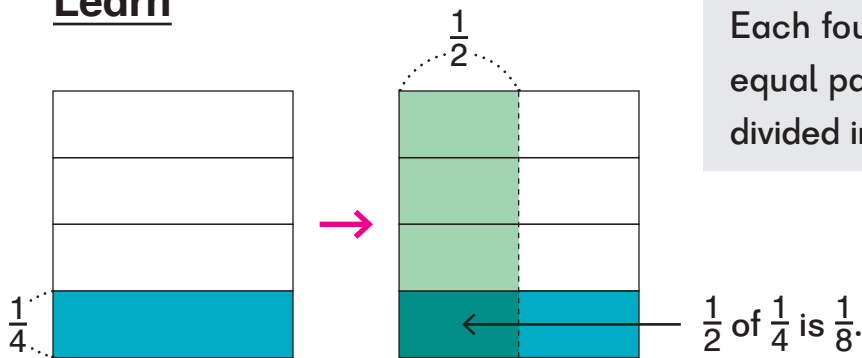
Multiplying a Fraction by a Unit Fraction

5

Think

Fold a rectangular paper in fourths horizontally and shade $\frac{1}{4}$ of the paper one color. Then fold the paper in half vertically and shade $\frac{1}{2}$ of the paper another color. What fraction of the paper has been shaded with both colors? What is $\frac{1}{2}$ of $\frac{1}{4}$?

Learn

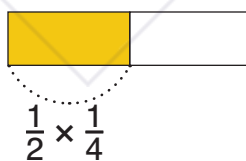
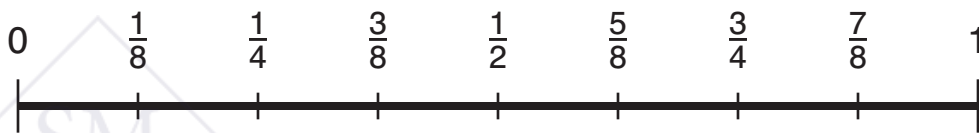


Each fourth is divided into two equal parts. The whole paper is divided into $2 \times 4 = 8$ equal parts.

$\frac{1}{2}$ of $\frac{1}{4}$ is the number that is $\frac{1}{2}$ times as much as $\frac{1}{4}$.

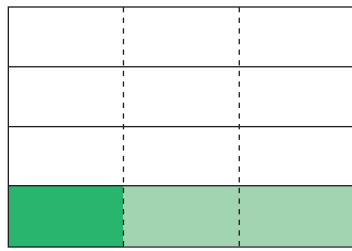
We can write $\frac{1}{2}$ of $\frac{1}{4}$ as $\frac{1}{2} \times \frac{1}{4}$.

$$\frac{1}{2} \times \frac{1}{4} = \frac{1 \times 1}{2 \times 4} = \frac{1}{8}$$



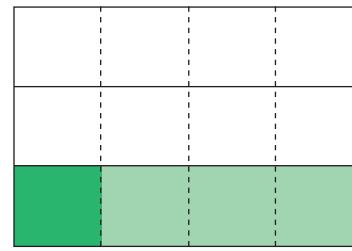
Do

1 (a) Find $\frac{1}{3}$ of $\frac{1}{4}$.



$$\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$$

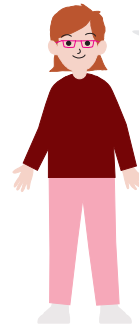
(b) Find $\frac{1}{4}$ of $\frac{1}{3}$.



$$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$$



The number of parts in the whole rectangle is $3 \times 4 = 12$.



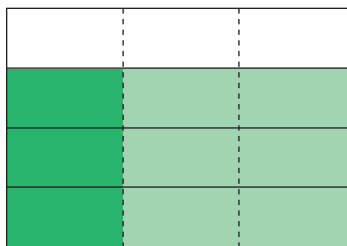
$$\frac{1}{4} \times \frac{1}{3} = \frac{1 \times 1}{4 \times 3}$$

2 $\frac{3}{4}$ of a garden is planted with roses. $\frac{1}{3}$ of the rose section is planted with white roses. What fraction of the garden is planted with white roses?

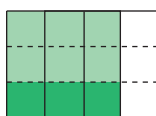
$$\frac{1}{3} \times \frac{3}{4} = \frac{1 \times 3}{3 \times 4}$$

$$= \frac{3}{12}$$

$$= \frac{1}{4}$$



We could also show it this way.



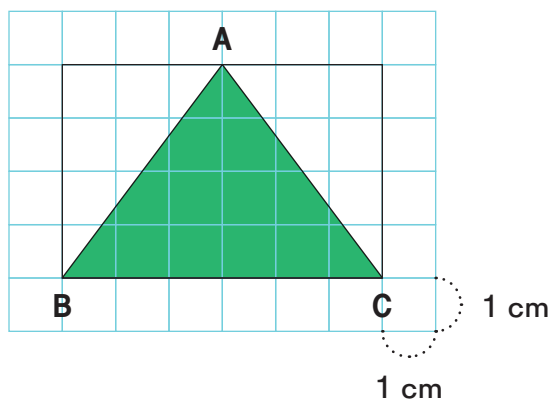
Lesson 4

Area of a Triangle — Part 1

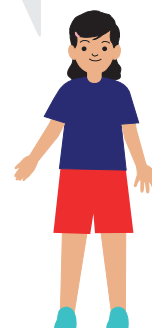
4

Think

Triangle ABC is drawn inside a rectangle with a length of 6 cm and a width of 4 cm. Find the area of Triangle ABC.

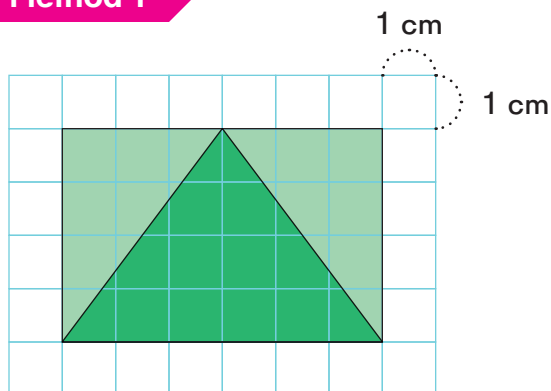


How can we use the area of the rectangle to find the area of the triangle?



Learn

Method 1



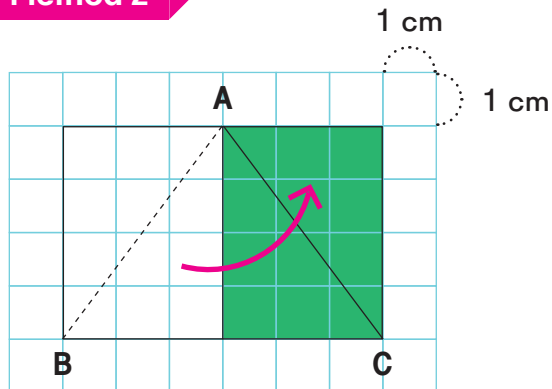
The areas inside and outside of the triangle are the same.



$$\text{Area of Triangle ABC} = \frac{1}{2} \times (6 \times 4) = 12 \text{ cm}^2$$

$$\text{Area of Triangle ABC} = \frac{1}{2} \times (\text{Length} \times \text{Width})$$

Method 2



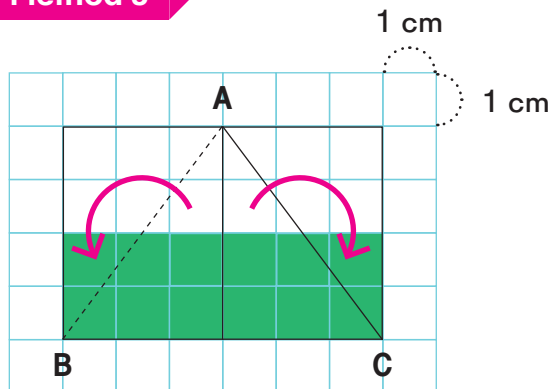
I cut the triangle halfway along the length, then flipped and moved one piece to make the smaller rectangle.



$$\text{Area of Triangle ABC} = \left(\frac{1}{2} \times 6\right) \times 4 = 12 \text{ cm}^2$$

$$\text{Area of Triangle ABC} = \left(\frac{1}{2} \times \text{Length}\right) \times \text{Width}$$

Method 3



I cut the triangle halfway along the width of the rectangle, and moved the pieces to make the smaller rectangle.



$$\text{Area of Triangle ABC} = \left(\frac{1}{2} \times 4\right) \times 6 = 12 \text{ cm}^2$$

$$\text{Area of Triangle ABC} = \left(\frac{1}{2} \times \text{Width}\right) \times \text{Length}$$

The area of Triangle ABC is _____ cm^2 .