


# Multiply Fractions by Integers

## Reasoning and Problem Solving

There are 9 lamp posts on a road. There is  $4\frac{3}{8}$  of a metre between each lamp post.

What is the distance between the first and last lamp post?

Use pattern blocks, if  is equal to 1 whole, work out what fraction the other shapes represent.

Use this to calculate the multiplications. Give your answers in their simplest form.

$$\triangle \times 5 =$$

$$\parallel \times 5 =$$

$$\nabla \times 5 =$$

$$8 \times 4\frac{3}{8} = 8 \times \frac{35}{8}$$

$$= \frac{280}{8} = 35$$

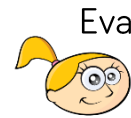
The distance between the first and last lamp post is 35 metres.

$$\triangle \times 5 = \frac{5}{6}$$

$$\parallel \times 5 = \frac{5}{3} = 1\frac{2}{3}$$

$$\nabla \times 5 = \frac{5}{2} = 2\frac{1}{2}$$

Eva and Amir both work on a homework project.



I spent  $4\frac{1}{4}$  hours a week for 4 weeks doing my project.

I spent  $2\frac{3}{4}$  hours a week for 5 weeks doing my project.



Who spent the most time on their project?

Explain your reasoning.

$$4 \times 4\frac{1}{4} = \frac{68}{4}$$

$$= 17 \text{ hours}$$

$$5 \times 2\frac{3}{4} = \frac{55}{4}$$

$$= 13\frac{3}{4} \text{ hours}$$

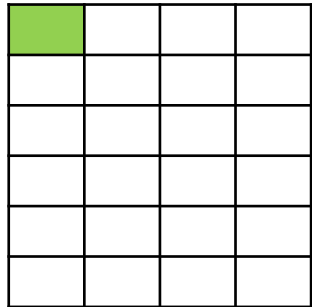
Eva spent  $3\frac{1}{4}$  hours longer on her project than Amir did.

# Multiply Fractions by Fractions

## Reasoning and Problem Solving

The shaded square in the grid below is the answer to a multiplying fractions question.

What was the question?



How many ways can you complete the missing digits?

$$\begin{array}{r} \text{purple spider} \\ \times \text{blue spider} \\ \hline \end{array} \times \frac{3}{\text{blue spider}} = \frac{6}{12}$$

$$\begin{array}{r} \times \\ \hline \end{array} = \frac{\text{green spider}}{2}$$

$$\frac{1}{6} \times \frac{1}{4}$$

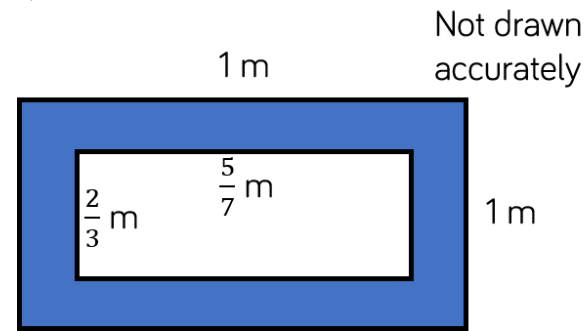
Possible answers:

$$\frac{2}{3} \times \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$$

$$\frac{2}{2} \times \frac{3}{6} = \frac{6}{12} = \frac{1}{2}$$

Children could also use improper fractions.

Find the area of the shaded part of the shape.



$$1 \times 1 = 1$$

$$\frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$$

$$1 - \frac{10}{21} = \frac{11}{21}$$

The shaded area is  $\frac{11}{21} \text{ m}^2$ .

Alex says,



$\frac{1}{4} \times \frac{1}{2}$  is the same as  $\frac{1}{2}$  of a quarter.

Do you agree?

Explain why.

Alex is correct.

Multiplication is commutative so

$\frac{1}{4} \times \frac{1}{2}$  is the same

as  $\frac{1}{2}$  of a quarter or

$\frac{1}{4}$  of a half.

# Divide Fractions by Integers (1)

## Reasoning and Problem Solving

Tommy says,



Dividing by 2 is the same as finding half of a number so  $\frac{4}{11} \div 2$  is the same as  $\frac{1}{2} \times \frac{4}{11}$

Do you agree?  
Explain why.

Tommy is correct. It may help children to understand this by reinforcing that  $\frac{1}{2} \times \frac{4}{11}$  is the same as  $\frac{1}{2}$  of  $\frac{4}{11}$

Match the equivalent calculations.

$$\frac{1}{4} \times \frac{12}{13}$$

$$\frac{12}{13} \div 2$$

$$\frac{1}{6} \times \frac{12}{13}$$

$$\frac{12}{13} \div 6$$

$$\frac{1}{2} \times \frac{12}{13}$$

$$\frac{12}{13} \div 4$$

$$\frac{1}{3} \times \frac{12}{13}$$

$$\frac{12}{13} \div 3$$

$$\frac{1}{4} \times \frac{12}{13} = \frac{12}{13} \div 4$$

$$\frac{1}{6} \times \frac{12}{13} = \frac{12}{13} \div 6$$

$$\frac{1}{2} \times \frac{12}{13} = \frac{12}{13} \div 2$$

$$\frac{1}{3} \times \frac{12}{13} = \frac{12}{13} \div 3$$

Complete the missing integers.

$$\frac{15}{16} \div \square = \frac{5}{16}$$

$$\frac{15}{16} \div \square = \frac{3}{16}$$

$$\frac{20}{23} \div \square = \frac{4}{23}$$

$$\frac{20}{23} \div \square = \frac{5}{23}$$

3  
5  
5  
4

Rosie walks for  $\frac{3}{4}$  of an hour over 3 days. She walks for the same amount of time each day. How many minutes does Rosie walk each day?

Rosie walks for  $\frac{1}{4}$  of an hour each day. She walks for 15 minutes each day.

## Divide Fractions by Integers (2)

### Reasoning and Problem Solving

Alex says,



I can only divide a fraction by an integer if the numerator is a multiple of the divisor.

Do you agree?  
Explain why.

Alex is wrong, we can divide any fraction by an integer.

Calculate the missing fractions and integers.

$$\square \div 4 = \frac{7}{36}$$

$$\frac{3}{20} \div \square = \frac{3}{80}$$

$$\square \div \square = \frac{2}{5}$$

Is there more than one possibility?

$\frac{7}{9}$

4

There are many possibilities in this last question. Children could look for patterns between the fractions and integers.

# Four Rules with Fractions

## Reasoning and Problem Solving

Add two sets of brackets to make the following calculation correct:

$$\frac{1}{2} + \frac{1}{4} \times 8 + \frac{1}{6} \div 3 = 6\frac{1}{18}$$

Explain where the brackets go and why.  
Did you find any difficulties?

$$\left(\frac{1}{2} + \frac{1}{4}\right) \times 8 + \left(\frac{1}{6} \div 3\right)$$

Match each calculation to the correct answer.

$$\left(\frac{2}{3} + \frac{2}{9}\right) \div 4$$

$$\frac{5}{9}$$

$$\frac{2}{3} - \frac{1}{3} \div 3$$

$$\frac{2}{9}$$

$$\frac{1}{3} \times 2 - \left(1\frac{1}{9} \div 2\right)$$

$$\frac{1}{9}$$

$$\left(\frac{2}{3} + \frac{2}{9}\right) \div 4 = \frac{2}{9}$$

$$\frac{2}{3} - \frac{1}{3} \div 3 = \frac{5}{9}$$

$$\frac{1}{3} \times 2 - \left(1\frac{1}{9} \div 2\right) = \frac{1}{9}$$