

## To know how to use fractions as operators

1 Use bar models to solve:

a  $12 \text{ lots of } \frac{1}{4}$   
 $\frac{1}{4} \text{ of } 12$

b  $18 \text{ lots of } \frac{4}{9}$   
 $\frac{4}{9} \text{ of } 18$

c Which calculations will give the answer 12?

$16 \text{ lots of } \frac{3}{4}$

$\frac{6}{7} \text{ of } 14$

$4 \text{ lots of } \frac{3}{5}$

$\frac{1}{2} \text{ of } 48$

$20 \text{ lots of } \frac{3}{5}$

Complete the missing fractions:

d  $12 \text{ lots of } \dots\dots\dots = 3$   
 $\dots\dots\dots \text{ of } 12 = 3$

e  $30 \text{ lots of } \dots\dots\dots = 6$   
 $\dots\dots\dots \text{ of } 30 = 6$

2 Complete the calculation and find the answer.

a  $20 \times \frac{4}{5} = \dots\dots\dots \text{ of } 20 = \dots\dots\dots$

b  $\dots\dots\dots \times \frac{2}{3} = \dots\dots\dots \text{ of } 18 = 12$

Use the same fraction to complete all of the calculations in each group.

c  $60 \times \dots\dots\dots = \dots\dots\dots \text{ of } 60 = 20$   
 $\dots\dots\dots \text{ of } 45 = 45 \times \dots\dots\dots = 15$

d  $\dots\dots\dots \times 144 = \dots\dots\dots \text{ of } 144 = 132$   
 $60 \times \dots\dots\dots = \dots\dots\dots \text{ of } 60 = 55$

Draw bar models to prove that your fractions are correct.

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- 3 Which method would you choose to complete these calculations: multiply the fraction or find the fraction of the amount?

Explain your choice for each one and find the answer.

a  $\frac{5}{6}$  of 36

$$36 \times \frac{5}{6}$$

b  $\frac{4}{5}$  of 9

$$9 \times \frac{4}{5}$$

c  $\frac{3}{4}$  of 12

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

- d Taylor and Joshua are thinking of a number greater than 20 but less than 30. Taylor finds  $\frac{5}{8}$  of the number. Joshua multiplies the number by  $\frac{5}{8}$ . Their answer is a two digit number and it has the same digit total as their original number.

What number did they start with? Show each step of Taylor's calculation. Show each step of Joshua's calculation.

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Question Number	Question	Answer
1	<p>Use bar models to solve:</p> <p>a) 12 lots of <math>\frac{1}{4}</math> <math>\frac{1}{4}</math> of 12</p> <p>b) 18 lots of <math>\frac{4}{9}</math> <math>\frac{4}{9}</math> of 18</p> <p>c) Which calculations will give the answer 12?</p> <p>d to e) Complete the missing fractions</p>	<p>a) 3</p> <p>b) 8</p> <p>c) 16 lots of <math>\frac{3}{4}</math>, <math>\frac{6}{7}</math> of 14 and 20 lots of <math>\frac{3}{5}</math></p> <p>d) <math>\frac{1}{4}</math></p> <p>e) <math>\frac{1}{5}</math></p>
2	<p>a) <math>20 \times \frac{4}{5} = \dots\dots\dots</math> of 20 = <math>\dots\dots\dots</math></p> <p>b) <math>\dots\dots\dots \times \frac{2}{3} = \dots\dots\dots</math> of 18 = 12</p> <p>Use the same fraction to complete all of the calculations in each group.</p> <p>c) <math>60 \times \dots\dots\dots = \dots\dots\dots</math> of 60 = 20</p> <p><math>\dots\dots\dots</math> of 45 = <math>45 \times \dots\dots\dots = 15</math></p> <p>d) <math>\dots\dots\dots \times 144 = \dots\dots\dots</math> of 144 = 132</p> <p><math>60 \times \dots\dots\dots = \dots\dots\dots</math> of 60 = 55</p> <p>Draw bar models to prove that your fractions are correct.</p>	<p>a) <math>20 \times \frac{4}{5} = \frac{4}{5}</math> of 20 = 16</p> <p>b) <math>18 \times \frac{2}{3} = \frac{2}{3}</math> of 18 = 12</p> <p>c) <math>60 \times \frac{1}{3} = \frac{1}{3}</math> of 60 = 20</p> <p><math>45 = 45 \times \frac{1}{3} = 15</math></p> <p>d) <math>11\frac{1}{12} \times 144 = \frac{11}{12}</math> of 144 = 132</p> <p><math>60 \times \frac{11}{12} = \frac{11}{12}</math> of 60 = 55</p>
3	<p>Which method would you choose to complete these calculations: multiply the fraction or find the fraction of the amount?</p> <p>a) <math>\frac{5}{6}</math> of 36 <math>36 \times \frac{5}{6}</math></p> <p>b) <math>\frac{4}{5}</math> of 9 <math>9 \times \frac{4}{5}</math></p> <p>c) <math>\frac{3}{4}</math> of 12 <math>12 \times \frac{3}{4}</math></p> <p>d) What number did they start with? Show each step of Taylor's calculation. Show each step of Joshua's calculation.</p>	<p>a) You may find it easier to find <math>\frac{5}{6}</math> of 36 than to calculate <math>5 \times 36</math>; <math>\frac{5}{6}</math> of 36 = 30</p> <p>b) <math>9 \times \frac{4}{5}</math> is easier than trying to divide 9 by 5. <math>9 \times \frac{4}{5} = \frac{36}{5} = 7\frac{1}{5}</math></p> <p>b) Both methods are of similar efficiency as they use times table facts. <math>\frac{3}{4}</math> of 12 = 9; <math>12 \times \frac{3}{4} = \frac{36}{4} = 9</math></p> <p>c) They started with 24; <math>\frac{5}{8}</math> of 24 = 15 Taylor: <math>24 \div 8 = 3</math>; <math>5 \times 3 = 15</math> Joshua: <math>5 \times 24 = 120</math>; <math>120 \div 8 = 15</math></p>