

Reasoning and Problem Solving

Step 16: Multiply Unit Fractions by an Integer

National Curriculum Objectives:

Mathematics Year 5: (5F5) [Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams](#)

Mathematics Year 5: (5F2a) [Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements \$> 1\$ as a mixed number \[for example, \$2/5 + 4/5 = 6/5 = 1 \frac{1}{5}\$ \]](#)

Mathematics Year 5: (5F2b) [Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Identify and explain errors when multiplying unit fractions by a single-digit integer. Images provided for support.

Expected Identify and explain errors when multiplying unit fractions by integers. Answers either need to be converted to mixed numbers or simplified using knowledge of equivalent fractions. Images provided for support.

Greater Depth Identify and explain errors when multiplying unit fractions by integers. Answers need to be converted to mixed numbers and simplified using knowledge of equivalent fractions.

Questions 2, 5 and 8 (Problem Solving)

Developing Use digit cards to complete a multiplication of unit fractions by integers.

Expected Use digit cards to complete a multiplication of unit fractions by integers. Answers need to be simplified using knowledge of equivalent fractions.

Greater Depth Use digit cards to complete a multiplication of unit fractions by integers. Answers need to be converted to mixed numbers and simplified using knowledge of equivalent fractions.

Questions 3, 6 and 9 (Reasoning)

Developing Solve the word problem. Denominators are double or half of each other. Images provided for support.

Expected Solve the word problem. Denominators are direct multiples of each other and answers can be simplified using knowledge of equivalent fractions.

Greater Depth Solve the word problem. Denominators share common factors and answers can be converted to mixed numbers and simplified using knowledge of equivalent fractions.

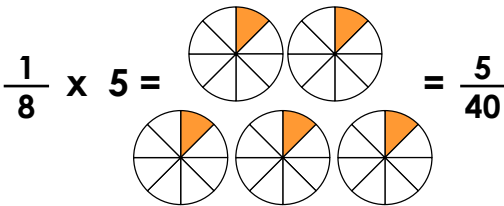
More [Year 5 Fractions](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

Multiply Unit Fractions by an Integer

Multiply Unit Fractions by an Integer

1a. Remy has completed the calculation below.

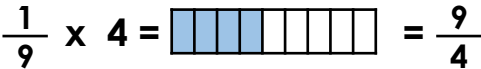


Is she correct? Explain your answer.



R

1b. Kai has completed the calculation below.

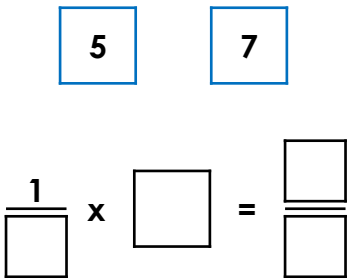


Is he correct? Explain your answer.



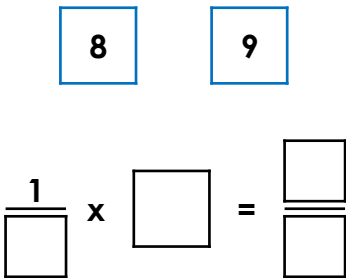
R

2a. Use the digit cards to create a proper fraction. Cards can be used more than once.



PS

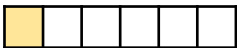
2b. Use the digit cards to create a proper fraction. Cards can be used more than once.



PS

3a. Solve the problem.

Sunil walks $\frac{1}{6}$ of a mile to work five times a week.



Sasha walks $\frac{1}{12}$ of a mile to work seven times a week.



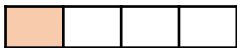
Sunil thinks that he walks further to work than Sasha. Is he correct? Prove it.



R

3b. Solve the problem.

Carter jogs $\frac{1}{4}$ of a mile three times a week.



Layla jogs $\frac{1}{8}$ of a mile five times a week.



Layla thinks that she jogs further than Carter. Is she correct? Prove it.



R

Multiply Unit Fractions by an Integer

Multiply Unit Fractions by an Integer

4a. Sanjeet has completed the calculation below.

$$\frac{1}{8} \times 9 = \text{[Diagram: A circle divided into 8 equal sectors, with 9 sectors shaded blue.]} = \frac{9}{72}$$

Is he correct? Explain your answer.



R

4b. Mia has completed the calculation below.

$$\frac{1}{10} \times 4 = \text{[Diagram: A rectangle divided into 10 equal vertical strips, with 4 strips shaded green.]} = \frac{4}{10} = \frac{4}{5}$$

Is she correct? Explain your answer.



R

5a. Use each digit card once to complete the calculation. The answer has been reduced to its simplest form.



$$\frac{1}{\boxed{}} \times \boxed{} = \frac{1}{\boxed{}}$$



PS

5b. Use each digit card once to complete the calculation. The answer has been reduced to its simplest form.



$$\frac{1}{\boxed{}} \times \boxed{} = \frac{1}{\boxed{}}$$



PS

6a. Solve the problem.

Tom cycles $\frac{1}{6}$ of a mile to school five times a week.

Jasmine cycles $\frac{1}{12}$ of a mile to school four times a week.

Jasmine thinks that she cycles further to school than Tom. Is she correct? Prove it.



R

6b. Solve the problem.

Jim walks $\frac{1}{15}$ of a mile to the shops five times a week.

Odell walks $\frac{1}{6}$ of a mile to the shops two times a week.

Odell thinks that she walks further than Jim. Is she correct? Prove it.



R

Multiply Unit Fractions by an Integer

Multiply Unit Fractions by an Integer

7a. Oscar has completed the calculation below.

$$\frac{1}{8} \times 10 = \frac{10}{8} = 1 \frac{2}{8} = 1 \frac{1}{2}$$

Is he correct? Explain your answer.



R

7b. Tiana has completed the calculation below.

$$\frac{1}{6} \times 9 = \frac{9}{6} = 1 \frac{3}{6} = 1 \frac{1}{2}$$

Is she correct? Explain your answer.



R

8a. Use each digit card once to complete the calculation. The answer has been converted to a mixed number and reduced to its simplest form.

1 3 6 10

$$\frac{1}{\square} \times \square = \square \frac{2}{\square}$$



PS

8b. Use each digit card once to complete the calculation. The answer has been converted to a mixed number and reduced to its simplest form.

1 3 9 12

$$\frac{1}{\square} \times \square = \square \frac{1}{\square}$$



PS

9a. Solve the problem.

Sara swims $\frac{1}{6}$ of a mile eight times a week.

Liam swims $\frac{1}{4}$ of a mile six times a week.

Sara thinks that she swims further than Liam. Is she correct? Prove it.



R

9b. Solve the problem.

Matt power walks $\frac{1}{9}$ of a mile twelve times a week.

Lana power walks $\frac{1}{6}$ of a mile eight times a week.

Matt thinks that he power walks further than Lana. Is he correct? Prove it.



R

Reasoning and Problem Solving Multiply Unit Fractions by an Integer

Developing

- 1a. Remy is incorrect. She has multiplied the denominator by 5 as well as the numerator but the denominator should remain the same. The answer is $\frac{5}{8}$.
- 2a. $\frac{1}{7} \times 5 = \frac{5}{7}$
- 3a. Sunil is correct as $\frac{5}{6}$ of a mile is further than $\frac{7}{12}$ of a mile.

Expected

- 4a. Sanjeet is incorrect. He has multiplied the denominator by 8. The denominator should remain the same. The answer is $\frac{9}{8}$ converted to $1\frac{1}{8}$.
- 5a. $\frac{1}{6} \times 2 = \frac{1}{3}$ or $\frac{1}{6} \times 3 = \frac{1}{2}$
- 6a. Jasmine is incorrect as $\frac{5}{6}$ of a mile is further than $\frac{4}{12}$ of a mile.

Greater Depth

- 7a. Oscar is incorrect. He has simplified incorrectly as he has divided the denominator by 4 instead of by 2. The simplest form of $1\frac{2}{8}$ is $1\frac{1}{4}$.
- 8a. $\frac{1}{6} \times 10 = 1\frac{2}{3}$
- 9a. Sara is incorrect as $\frac{8}{6} = 1\frac{2}{6} = 1\frac{1}{3}$ and $\frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$. $1\frac{1}{2}$ of a mile is greater than $1\frac{1}{3}$.

Reasoning and Problem Solving Multiply Unit Fractions by an Integer

Developing

- 1b. Kai is incorrect. He has swapped the numerator and denominator around. The answer is $\frac{4}{9}$.
- 2b. $\frac{1}{9} \times 8 = \frac{8}{9}$
- 3b. Layla is incorrect as $\frac{3}{4}$ of a mile is greater than $\frac{5}{8}$ of a mile.

Expected

- 4b. Mia is incorrect. She has not divided the numerator by 2 when simplifying. The answer is $\frac{4}{10}$ which is $\frac{2}{5}$ when simplified.
- 5b. $\frac{1}{12} \times 3 = \frac{1}{4}$ or $\frac{1}{12} \times 4 = \frac{1}{3}$
- 6b. Odell is incorrect as $\frac{5}{15}$ of a mile is the same as $\frac{2}{6}$ of a mile. Both fractions are equal to $\frac{1}{3}$.

Greater Depth

- 7b. Tiana is incorrect. She has not divided the denominator when simplifying.
- $1\frac{3}{6} = 1\frac{1}{2}$
- 8b. $\frac{1}{9} \times 12 = 1\frac{1}{3}$
- 9b. Matt is incorrect as $\frac{12}{9} = 1\frac{3}{9} = 1\frac{1}{3}$ and $\frac{8}{6} = 1\frac{2}{6} = 1\frac{1}{3}$. Both children power walk the same number of miles.