

# Reasoning and Problem Solving

## Step 17: Multiply Fractions by Fractions

### National Curriculum Objectives:

Mathematics Year 6: (6F2) [Use common factors to simplify fractions; use common multiples to express fractions in the same denomination](#)

Mathematics Year 6: (6F3) [Compare and order fractions, including fractions > 1](#)

Mathematics Year 6: (6F4) [Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions](#)

Mathematics Year 6: (6F5a) [Multiply simple pairs of proper fractions, writing the answer in its simplest form \[for example,  \$1/4 \times 1/2 = 1/8\$ \]](#)

### Differentiation:

Questions 1, 4 and 7 (Reasoning)

**Developing** Explain whether or not a given fraction could be multiplied by any other to give a certain answer. Numerators are all 1.

**Expected** Explain whether or not a given fraction could be multiplied by any other to give a certain answer.

**Greater Depth** Explain whether or not a given fraction could be multiplied by any other to give a certain simplified answer. Mixed numbers and improper fractions are used.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Find 1 pair of fractions which multiply together to give a specified answer. Numerators are all 1.

**Expected** Find 3 pairs of fractions which multiply together to give a specified answer.

**Greater Depth** Find 8 pairs of fractions which multiply together to give a specified answer. Mixed numbers and improper fractions are used.

Questions 3, 6 and 9 (Reasoning)

**Developing** Explain the mistake made in a fraction multiplication, and give the correct answer. Numerators are all 1.

**Expected** Explain the mistake made in a fraction multiplication, and give the correct answer.

**Greater Depth** Explain the mistake made in a fraction multiplication, and give the correct answer. Mixed numbers and improper fractions are used.

More [Year 5 and Year 6 Fractions](#) resources.

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## Multiply Fractions by Fractions

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1a.



Rosie

If the answer to a fraction multiplication is  $\frac{1}{6}$ , one of the fractions which was multiplied could have been  $\frac{1}{2}$ . The answer has not been simplified.

Is Rosie correct? Explain how you know.



6 R

1b.



Gruff

If the answer to a fraction multiplication is  $\frac{1}{4}$ , one of the fractions which was multiplied could have been  $\frac{1}{3}$ . The answer has not been simplified.

Is Gruff correct? Explain how you know.



6 R

2a. Marcus has been trying to find pairs of proper fractions which multiply together to make the answer below.

$$\frac{?}{?} \times \frac{?}{?} = \frac{1}{8}$$

He has found 1 pair. What could his pair be?



6 PS

2b. Elle has been trying to find pairs of proper fractions which multiply together to make the answer below.

$$\frac{?}{?} \times \frac{?}{?} = \frac{1}{6}$$

She has found 1 pair. What could her pair be?



6 PS

3a. Maya has been multiplying fractions, but she has found the wrong answer.

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

What mistake has she made?

What should the answer be?



6 R

3b. Troy has been multiplying fractions, but he has found the wrong answer.

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

What mistake has he made?

What should the answer be?



6 R

## Multiply Fractions by Fractions

## Multiply Fractions by Fractions

4a.



Sian

If the answer to a fraction multiplication is  $\frac{4}{16}$ , one of the fractions which was multiplied could have been  $\frac{2}{7}$ . The answer has not been simplified.

Is Sian correct? Explain how you know.



6 R

4b.



Cory

If the answer to a fraction multiplication is  $\frac{6}{15}$ , one of the fractions which was multiplied could have been  $\frac{2}{3}$ . The answer has not been simplified.

Is Cory correct? Explain how you know.



6 R

5a. Stacy has been trying to find pairs of proper fractions which multiply together to make the answer below.

$$\frac{?}{?} \times \frac{?}{?} = \frac{12}{30}$$

She has found 3 pairs. What could her pairs be?



6 PS

5b. Joel has been trying to find pairs of proper fractions which multiply together to make the answer below.

$$\frac{?}{?} \times \frac{?}{?} = \frac{4}{20}$$

He has found 3 pairs. What could his pairs be?



6 PS

6a. Rupert has been multiplying fractions, but he has found the wrong answer.

$$\frac{7}{8} \times \frac{3}{5} = \frac{24}{40}$$

What mistake has he made?

What should the answer be?



6 R

6b. Carrie has been multiplying fractions, but she has found the wrong answer.

$$\frac{5}{7} \times \frac{4}{9} = \frac{9}{63}$$

What mistake has she made?

What should the answer be?



6 R

## Multiply Fractions by Fractions

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7a.



Zoe

If the simplified answer to a fraction multiplication is  $1\frac{6}{10}$ , one of the fractions which was multiplied could have been  $\frac{4}{5}$ .

Is Zoe correct? Explain how you know.



6 R

7b.



Ugo

If the simplified answer to a fraction multiplication is  $2\frac{1}{2}$ , one of the fractions which was multiplied could have been  $\frac{9}{2}$ .

Is Ugo correct? Explain how you know.



6 R

8a. Titus has been trying to find pairs of fractions which multiply together to make the answer below.

$$\frac{?}{?} \times \frac{?}{?} = 2\frac{4}{16}$$

He has found 8 pairs so far. What could his pairs be?



6 PS

8b. Tamar has been trying to find pairs of fractions which multiply together to make the answer below.

$$\frac{?}{?} \times \frac{?}{?} = 3\frac{6}{24}$$

She has found 8 pairs so far. What could her pairs be?



6 PS

9a. Ada has been multiplying fractions, but she has found the wrong answer.

$$\frac{11}{16} \times \frac{8}{5} = 2\frac{18}{55}$$

What mistake has she made?

What should the answer be?



6 R

9b. Mikey has been multiplying fractions, but he has found the wrong answer.

$$\frac{6}{7} \times \frac{17}{13} = 1\frac{24}{78}$$

What mistake has he made?

What should the answer be?



6 R

## Reasoning and Problem Solving Multiply Fractions by Fractions

### Developing

1a. Yes. 1 is a multiple of 1 and 6 is a multiple of 2.

2a.  $\frac{1}{2} \times \frac{1}{4}$

3a. She has multiplied the numerators by the denominators. The answer should be:

$$\frac{1}{6}$$

### Expected

4a. No. 4 is a multiple of 2, but 16 is not a multiple of 7.

5a. Various answers, for example:

$$\frac{1}{2} \times \frac{12}{15}; \frac{2}{3} \times \frac{6}{10}; \frac{3}{5} \times \frac{4}{6}$$

6a. He has multiplied the 3 by the 8, not the 7. The answer should be:

$$\frac{21}{40}$$

### Greater Depth

7a. Yes. 4 is a factor of 16, and 5 is a factor of 10;  $\frac{16}{10} = 1\frac{6}{10}$

8a. Accept any 8 pairs of proper and improper fractions which multiply together to give the correct answer, for example:

$$\frac{1}{2} \times \frac{36}{8} = \frac{36}{16}$$

9a. She has multiplied the numerators by the opposite denominators. The answer should be:

$$\frac{88}{80} \text{ or } 1\frac{8}{80} \text{ or } 1\frac{1}{10}$$

## Reasoning and Problem Solving Multiply Fractions by Fractions

### Developing

1b. No. 1 is a multiple of 1, but 4 is not a multiple of 3.

2b.  $\frac{1}{2} \times \frac{1}{3}$

3b. He has added the fractions instead of multiplying them:

$$\frac{1}{8}$$

### Expected

4b. Yes. 6 is a multiple of 2 and 15 is a multiple of 3.

5b. Various answers, for example:

$$\frac{1}{2} \times \frac{4}{10}; \frac{1}{4} \times \frac{4}{5}; \frac{2}{4} \times \frac{2}{5}$$

6b. She has added the numerators. The answer should be:

$$\frac{20}{63}$$

### Greater Depth

7b. Yes. 9 is a factor of 45, and 2 is a factor of 18;  $\frac{45}{18} = 2\frac{1}{2}$

8b. Accept any 8 pairs of proper and improper fractions which multiply together to give the correct answer, for example:

$$\frac{6}{3} \times \frac{13}{8} = \frac{78}{24}$$

9b. He has multiplied both 17 and 13 by 6, instead of multiplying 17 by 6 and 13 by 7. The answer should be:

$$\frac{102}{91} \text{ or } 1\frac{11}{91}$$