

- Area of Rectangle with Fractions
- Multiplication of Fractions
- Division of Fractions
- Multiplication of Decimal Numbers
- Division of Decimal Numbers

Area of Rectangle with Fractions

The area A of a rectangle is calculated by multiplying its length l and breadth b :

$$A = l \times b$$

When length and breadth are mixed numbers, convert them to improper fractions before multiplication.

Example: Find the area of a rectangle with length $7\frac{1}{2}$ cm and breadth $3\frac{1}{2}$ cm.

Convert mixed numbers to improper fractions:

$$7\frac{1}{2} = \frac{15}{2}, \quad 3\frac{1}{2} = \frac{7}{2}$$

Multiply the fractions:

$$A = \frac{15}{2} \times \frac{7}{2} = \frac{15 \times 7}{2 \times 2} = \frac{105}{4} \text{ cm}^2$$

Convert to mixed number:

$$\frac{105}{4} = 26\frac{1}{4} \text{ cm}^2$$

Practice Set

- Find the area of a rectangle with length $6\frac{1}{3}$ cm and breadth $2\frac{2}{5}$ cm.
- Calculate the area of a rectangle with length $5\frac{1}{4}$ cm and breadth $4\frac{3}{7}$ cm.
- Find the area of a rectangle with length $8\frac{2}{3}$ cm and breadth $3\frac{1}{2}$ cm.

Answer Key

- $6\frac{1}{3} = \frac{19}{3}$, $2\frac{2}{5} = \frac{12}{5}$, area = $\frac{19}{3} \times \frac{12}{5} = \frac{228}{15} = 15\frac{3}{15} = 15\frac{1}{5} \text{ cm}^2$
- $5\frac{1}{4} = \frac{21}{4}$, $4\frac{3}{7} = \frac{31}{7}$, area = $\frac{21}{4} \times \frac{31}{7} = \frac{651}{28} = 23\frac{7}{28} \text{ cm}^2$
- $8\frac{2}{3} = \frac{26}{3}$, $3\frac{1}{2} = \frac{7}{2}$, area = $\frac{26}{3} \times \frac{7}{2} = \frac{182}{6} = 30\frac{1}{3} \text{ cm}^2$

Quick Reference

To find area of rectangle with mixed numbers:

1. Convert mixed numbers to improper fractions.

2. Multiply numerators and denominators.

3. Simplify and convert to mixed number if needed.

Glossary

- **Mixed Number:** A number consisting of a whole number and a fraction.
- **Improper Fraction:** A fraction where numerator is greater than or equal to denominator.
- **Area:** The measure of the surface enclosed within a shape.

Multiplication of Fractions

Multiplying fractions involves multiplying the numerators and denominators separately:

$$\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d}$$

For multiplying a whole number by a fraction, multiply the whole number by the numerator and keep the denominator same:

$$n \times \frac{a}{b} = \frac{n \times a}{b}$$

Concept Explanation

Visual models such as shaded parts of circles or squares help understand multiplication of fractions as finding a part of a part.

Example: To find $\frac{1}{2} \times \frac{1}{3}$, divide a whole into 3 parts, take one part, then divide that part into 2 equal parts, taking one part of those. The result is $\frac{1}{6}$.

Worked Illustration

Multiply $3 \times \frac{1}{4}$:

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

Practice Set

- Multiply $2 \times \frac{3}{7}$
- Multiply $4 \times \frac{5}{9}$
- Multiply $3 \times \frac{8}{5}$

Answer Key

- $\frac{6}{7}$
- $\frac{20}{9} = 2\frac{2}{9}$
- $\frac{24}{5} = 4\frac{4}{5}$

Quick Reference

Multiply fractions by multiplying numerators and denominators.

Multiply whole number by fraction by multiplying numerator and keeping denominator.

Glossary

- **Proper Fraction:** Numerator less than denominator.
- **Improper Fraction:** Numerator greater than or equal to denominator.
- **Reciprocal:** Inverse of a fraction obtained by swapping numerator and denominator.

Division of Fractions

Division of fractions is performed by multiplying by the reciprocal of the divisor.

For any numbers a and fraction $\frac{c}{d}$:

$$a \div \frac{c}{d} = a \times \frac{d}{c}$$

Similarly, for fractions:

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{a \times d}{b \times c}$$

Concept Explanation

Dividing by a fraction means finding how many times the fraction fits into the number.

Example: $1 \div \frac{1}{2} = 2$ because two halves make one whole.

Worked Illustration

Calculate $4 \div 2\frac{2}{5}$:

Convert mixed number to improper fraction:

$$2\frac{2}{5} = \frac{12}{5}$$

Divide by multiplying by reciprocal:

$$4 \div \frac{12}{5} = 4 \times \frac{5}{12} = \frac{20}{12} = \frac{5}{3}$$

Practice Set

- Find $7 \div \frac{2}{5}$
- Find $\frac{3}{4} \div 3$
- Find $\frac{1}{2} \div \frac{3}{4}$

Answer Key

- $\frac{35}{2} = 17\frac{1}{2}$
- $\frac{1}{4}$
- $\frac{2}{3}$

Quick Reference

Divide by fraction by multiplying by its reciprocal.

Convert mixed numbers to improper fractions before division.

Glossary

- **Reciprocal:** The inverse of a fraction.
- **Division:** Operation to find how many times one number is contained in another.

Multiplication of Decimal Numbers

To multiply decimals:

- Ignore the decimal points and multiply as whole numbers.
- Count total digits to the right of decimal points in both numbers.
- Place the decimal point in the product so that it has the same total digits to the right.

Example: 0.1×0.1

Ignore decimals: $1 \times 1 = 1$

Total decimal digits: $1 + 1 = 2$

Place decimal: 0.01

Worked Illustration

Multiply 1.5×2.5 :

Ignore decimals: $15 \times 25 = 375$

Total decimal digits: $1 + 1 = 2$

Place decimal: 3.75

Practice Set

- Calculate 2.7×4
- Calculate 1.8×1.2
- Calculate 2.3×4.35

Answer Key

- 10.8
- 2.16
- 10.005

Quick Reference

Multiply decimals as whole numbers, then place decimal point according to total decimal digits.

Glossary

- **Decimal Number:** Number with digits to the right of decimal point.
- **Place Value:** Value of digit depending on its position.

Division of Decimal Numbers

To divide decimals:

- Multiply numerator and denominator by power of 10 to make divisor a whole number.
- Perform division as with whole numbers.
- Place decimal point in quotient according to digits in dividend.

Example: $25.5 \div 0.5$

Multiply numerator and denominator by 10:

$$\frac{25.5}{0.5} = \frac{255}{5}$$

Divide: $255 \div 5 = 51$

Worked Illustration

Divide $12.96 \div 4$:

$$\text{Convert to fraction: } \frac{1296}{100} \div 4 = \frac{1296}{100} \times \frac{1}{4} = \frac{1296}{400} = \frac{324}{100} = 3.24$$

Practice Set

- Calculate $35.7 \div 3$
- Calculate $25.5 \div 3$
- Calculate $43.15 \div 5$

Answer Key

- 11.9
- 8.5
- 8.63

Quick Reference

Multiply numerator and denominator by power of 10 to clear decimals in divisor.

Divide as whole numbers and place decimal point accordingly.

Glossary

- **Quotient:** Result of division.
- **Dividend:** Number being divided.
- **Divisor:** Number dividing the dividend.