

Grade 5 - Area of Rectangles with Fractional Sides - Answer Key

Common Core 5.NF.B.4b · maths-pdf.fr/en/

This answer key gives a full worked solution for each of the 20 area problems. Tiling problems show the count of tiles and the area of one tile. Multiplication problems show the numerators, denominators, simplified product, and square units in bold.

Grade 5 · Common Core State Standards: **5.NF.B.4b**

Exercise 1 - Size of one tile

The unit square has $3 \times 2 = 6$ equal tiles.

Each tile is $\frac{1}{6}$ of the unit square.

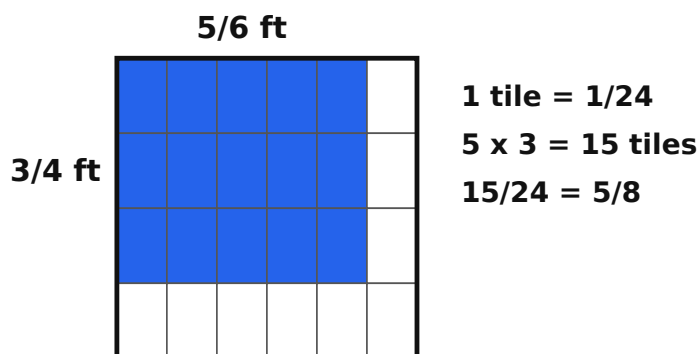
Exercise 2 - Fourths by fourths

Number of tiles: $4 \times 4 = 16$.

Area of one tile: $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$ square unit.

There are 16 tiles, and each has area $\frac{1}{16}$ square unit.

Exercise 3 - Count the tiles



The shaded rectangle covers 15 of the 24 tiles.

The unit square has $6 \times 4 = 24$ tiles, so each tile is $\frac{1}{24}$ square unit.

The shaded rectangle is 5 tiles wide and 3 tiles tall: $5 \times 3 = 15$ tiles.

$$\frac{15}{24} = \frac{5}{8}$$

The area is $\frac{5}{8}$ square unit.

Exercise 4 - Half by fifth

Multiply the numerators and multiply the denominators: $\frac{1}{2} \times \frac{1}{5} = \frac{1 \times 1}{2 \times 5} = \frac{1}{10}$.

The area is $\frac{1}{10}$ square foot.

Exercise 5 - Thirds and sevenths

Multiply the numerators and multiply the denominators: $\frac{2}{3} \times \frac{3}{7} = \frac{2 \times 3}{3 \times 7} = \frac{6}{21}$.

Simplify: $\frac{6}{21} = \frac{2}{7}$.

The area is $\frac{2}{7}$ square foot.

Exercise 6 - Rectangle in inches

Multiply the numerators and multiply the denominators: $\frac{3}{4} \times \frac{5}{6} = \frac{3 \times 5}{4 \times 6} = \frac{15}{24}$.

Simplify: $\frac{15}{24} = \frac{5}{8}$.

The area is $\frac{5}{8}$ square inch.

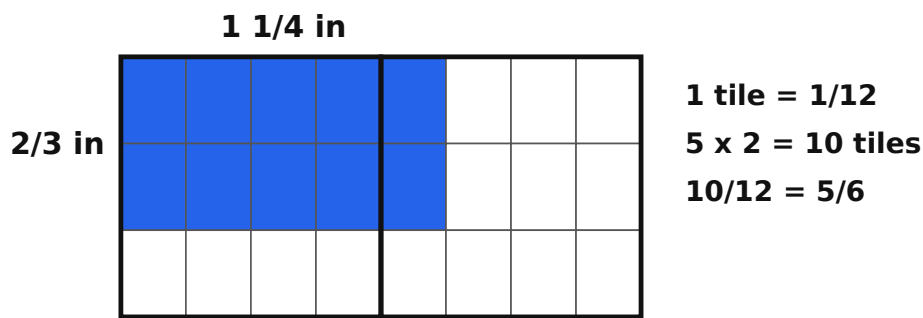
Exercise 7 - Yards that simplify

Multiply the numerators and multiply the denominators: $\frac{4}{5} \times \frac{5}{8} = \frac{4 \times 5}{5 \times 8} = \frac{20}{40}$.

Simplify: $\frac{20}{40} = \frac{1}{2}$.

The area is $\frac{1}{2}$ square yard.

Exercise 8 - Tiles across two squares



The rectangle covers 10 tiles of 1/12 square inch.

Each unit square is cut into 12 tiles, so each tile is $\frac{1}{12}$ square inch. The rectangle is 5 tiles wide and 2 tiles tall: 10 tiles.

$$\frac{10}{12} = \frac{5}{6}$$

Write the mixed number as improper fraction: $1\frac{1}{4} = \frac{5}{4}$.

Multiply the numerators and multiply the denominators: $\frac{5}{4} \times \frac{2}{3} = \frac{5 \times 2}{4 \times 3} = \frac{10}{12}$.

Simplify: $\frac{10}{12} = \frac{5}{6}$.

The area is $\frac{5}{6}$ square inch.

Exercise 9 - Mixed number by fraction

Write the mixed number as improper fraction: $2\frac{1}{2} = \frac{5}{2}$.

Multiply the numerators and multiply the denominators: $\frac{5}{2} \times \frac{3}{5} = \frac{5 \times 3}{2 \times 5} = \frac{15}{10}$.

Simplify: $\frac{15}{10} = \frac{3}{2}$.

Write as a mixed number: $\frac{3}{2} = 1\frac{1}{2}$.

The area is $1\frac{1}{2}$ square yards.

Exercise 10 - Two mixed numbers

Write the mixed numbers as improper fractions: $1\frac{3}{4} = \frac{7}{4}$ and $1\frac{1}{3} = \frac{4}{3}$.

Multiply the numerators and multiply the denominators: $\frac{7}{4} \times \frac{4}{3} = \frac{7 \times 4}{4 \times 3} = \frac{28}{12}$.

Simplify: $\frac{28}{12} = \frac{7}{3}$.

Write as a mixed number: $\frac{7}{3} = 2\frac{1}{3}$.

The area is $2\frac{1}{3}$ square feet.

Exercise 11 - Compare two areas

Area of A: $\frac{3}{4} \times \frac{4}{5} = \frac{12}{20} = \frac{3}{5}$ square foot.

Area of B: $\frac{2}{3} \times \frac{7}{8} = \frac{14}{24} = \frac{7}{12}$ square foot.

Common denominator 60: $\frac{3}{5} = \frac{36}{60}$ and $\frac{7}{12} = \frac{35}{60}$.

Rectangle A has the greater area.

Exercise 12 - Area of a square

Multiply the numerators and multiply the denominators: $\frac{2}{5} \times \frac{2}{5} = \frac{2 \times 2}{5 \times 5} = \frac{4}{25}$.

The area is $\frac{4}{25}$ square foot.

Exercise 13 - Square with a mixed side

Write the mixed numbers as improper fractions: $1\frac{1}{2} = \frac{3}{2}$ and $1\frac{1}{2} = \frac{3}{2}$.

Multiply the numerators and multiply the denominators: $\frac{3}{2} \times \frac{3}{2} = \frac{3 \times 3}{2 \times 2} = \frac{9}{4}$.

Write as a mixed number: $\frac{9}{4} = 2\frac{1}{4}$.

The area is $2\frac{1}{4}$ square inches.

Exercise 14 - Area and perimeter

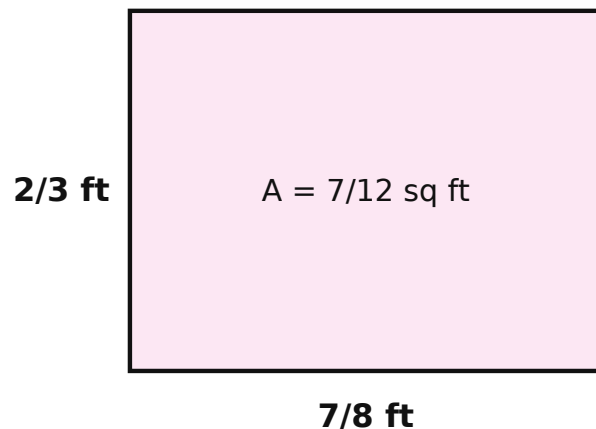
Multiply the numerators and multiply the denominators: $\frac{3}{4} \times \frac{1}{2} = \frac{3 \times 1}{4 \times 2} = \frac{3}{8}$.

The area is $\frac{3}{8}$ square foot.

Perimeter: $2 \times \left(\frac{3}{4} + \frac{1}{2}\right) = 2 \times \left(\frac{3}{4} + \frac{2}{4}\right) = 2 \times \frac{5}{4} = \frac{10}{4} = 2\frac{1}{2}$ feet.

The area is $\frac{3}{8}$ square foot and the perimeter is $2\frac{1}{2}$ feet.

Exercise 15 - Picture frame



Area = $\frac{7}{12}$ sq ft.

Multiply the numerators and multiply the denominators: $\frac{7}{8} \times \frac{2}{3} = \frac{7 \times 2}{8 \times 3} = \frac{14}{24}$.

Simplify: $\frac{14}{24} = \frac{7}{12}$.

The area is $\frac{7}{12}$ square foot.

Exercise 16 - Poster paint

Area:

Write the mixed numbers as improper fractions: $2\frac{1}{2} = \frac{5}{2}$ and $1\frac{1}{2} = \frac{3}{2}$.

Multiply the numerators and multiply the denominators: $\frac{5}{2} \times \frac{3}{2} = \frac{5 \times 3}{2 \times 2} = \frac{15}{4}$.

Write as a mixed number: $\frac{15}{4} = 3\frac{3}{4}$.

$3\frac{3}{4}$

Cost: $3\frac{3}{4} \times 4 = \frac{15}{4} \times 4 = 15$ dollars.

The poster has an area of $3\frac{3}{4}$ square feet, and the paint costs \$15.

Exercise 17 - Rug for the den

Write the mixed numbers as improper fractions: $2\frac{1}{3} = \frac{7}{3}$ and $1\frac{1}{2} = \frac{3}{2}$.

Multiply the numerators and multiply the denominators: $\frac{7}{3} \times \frac{3}{2} = \frac{7 \times 3}{3 \times 2} = \frac{21}{6}$.

Simplify: $\frac{21}{6} = \frac{7}{2}$.

Write as a mixed number: $\frac{7}{2} = 3\frac{1}{2}$.

The area is $3\frac{1}{2}$ square yards.

Exercise 18 - Bulletin board

Area of the board:

Write the mixed numbers as improper fractions: $4\frac{1}{2} = \frac{9}{2}$ and $2\frac{2}{3} = \frac{8}{3}$.

Multiply the numerators and multiply the denominators: $\frac{9}{2} \times \frac{8}{3} = \frac{9 \times 8}{2 \times 3} = \frac{72}{6}$.

Simplify: $\frac{72}{6} = 12$.

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Blue paper: $\frac{3}{4} \times 12 = 9$.

Ethan covers 9 square feet with blue paper.

Exercise 19 - Two garden beds

Bed A: $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$ square yard.

Bed B: $\frac{5}{6} \times \frac{3}{4} = \frac{15}{24} = \frac{5}{8}$ square yard.

Total: $\frac{3}{8} + \frac{5}{8} = \frac{8}{8} = 1$.

The total area is 1 square yard.

Exercise 20 - Window decals

One decal:

Write the mixed number as improper fraction: $1\frac{2}{3} = \frac{5}{3}$.

Multiply the numerators and multiply the denominators: $\frac{5}{3} \times \frac{3}{4} = \frac{5 \times 3}{3 \times 4} = \frac{15}{12}$.

Simplify: $\frac{15}{12} = \frac{5}{4}$.

Write as a mixed number: $\frac{5}{4} = 1\frac{1}{4}$.

The area is $1\frac{1}{4}$ square feet.

Six decals: $6 \times 1\frac{1}{4} = 6 \times \frac{5}{4} = \frac{30}{4} = 7\frac{1}{2}$.

One decal has area $1\frac{1}{4}$ square feet, and 6 decals have a total area of $7\frac{1}{2}$ square feet.