Multiplication and Division Applications of Fractions

In application problems that require multiplication of fractions, the keyword *of* is most commonly used to denote the multiplication.

A review of the *keywords* and *key phrases* that denote multiplication follows:

Keyword/Key Phrase	Phrase	Multiplication
product	the product of 4 and 6	$4 \cdot 6$
multiply	multiply 5 and 9	$5 \cdot 9$
of	half of 32	$\frac{1}{2} \cdot 32$
by	an area of 14 feet by 16 feet	$14 \cdot 16$

Example: The dimensions of Kara's den are $18\frac{2}{3}$ feet by $14\frac{5}{6}$ feet. What is the area of her den?

Answer: Both the keyword *by* and the fact that the problem asks for *area* flag this problem as a multiplication application. Since area is found by multiplying length *by* width, multiply: $A = 18\frac{2}{3} \cdot 14\frac{5}{6} = \frac{56}{3} \cdot \frac{89}{6} = \frac{4984}{18} = \frac{2492}{9} = 276\frac{8}{9}$ square feet.

In application problems that require division of fractions, look for situations that require *repeated subtraction* as well as *keywords* and *key phrases*.

A review of the *keywords* and *key phrases* that denote division follows:

Keyword/Key Phrase	Phrase	Division
divided by	54 divided by 2	$54 \div 2$
divided into equal parts	27 marbles divided equally among 3 people	$27 \div 3$
average	The average of 5, 8, 9 and 12	$\frac{5+8+9+12}{4}$

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Multiplication and Division Applications of Fractions (continued)

Example: How many $1\frac{1}{8}$-pound horseshoes can be made from 237 pounds of iron?

Answer: Notice that this problem could be solved by repeatedly subtracting $1\frac{1}{8}$ from 237. Since division is repeated subtraction, we divide: $237 \div 1\frac{1}{8} = \frac{237}{1} \div \frac{9}{8} = \frac{237}{1} \cdot \frac{8}{9} = \frac{1896}{9} = \frac{632}{3} = 210\frac{2}{3}$. Since $\frac{2}{3}$ of a horseshoe is not of much use, the correct answer is that 210 horseshoes can be made from 237 pounds of iron.

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