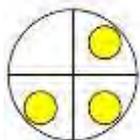


Accuplacer Arithmetic Study Guide

I. Terms

Numerator: which tells how many parts you have (the number on top) $\rightarrow \frac{3}{4}$
Denominator: which tells how many parts in the whole (the number on the bottom) $\rightarrow 4$

Example:



$$= \frac{3}{4} \quad 3 \text{ parts have a dot out of } 4$$

Proper fraction: the top number is less than the bottom number.

Example: $\frac{1}{3}, \frac{7}{10}, \frac{9}{19}$

Improper fraction: the top number is equal to or is larger than the bottom number.

Example: $\frac{3}{2}, \frac{9}{4}, \frac{8}{8}$

Mixed Number: a whole number is written next to a proper fraction.

Example: $1\frac{3}{4}, 2\frac{2}{5}, 10\frac{1}{2}$

Common Denominator: is a number that can be divided evenly by all of the denominators in the problem

Example: The common denominator for these fractions will be 12.
 $\rightarrow 12$ is also the least common denominator.

$$\frac{3}{4} \rightarrow 12 \rightarrow \frac{9}{12} \quad \frac{2}{3} \rightarrow 12 \rightarrow \frac{8}{12} \quad \frac{1}{2} \rightarrow 12 \rightarrow \frac{6}{12}$$

Whole Number: is a number with no fraction, decimal or negative parts

Example: 1, 2, 3, 4, 945, 8224

Divisor (factor): is the number that you are dividing by

Dividend: is the number being divided

Example: 5 is the divisor, 15 is the dividend

(3 ways to write division)

$$15 \div 5 \quad \frac{15}{5} \quad 5 \overline{)15}$$

Variable: a letter used for an unknown number, e.g. x or y

Equation: a mathematical way showing that two things are the same

Term: a number, variable or combination in an equation

Product: an answer from multiplication

Sum: an answer from addition

Difference: an answer from subtraction

Quotient: an answer from division

Example:

$$\text{Equation: } 5x + 2 = 17$$

Variable: x
Sum: 17
Terms: $5x$ and 2

II. Fractions

A. Reducing Fractions to Lowest Terms

Step 1: Find a number that goes evenly into the numerator and the denominator of the fraction.

Example: The number that will go in evenly is 8

$$\frac{48}{64} \div \frac{8}{8} = \frac{6}{8}$$

Step 2: Check to see whether another number goes evenly into both the numerator and denominator. Stop when there are no more numbers that can go into the fraction.

Example: The fraction can be reduced further by dividing it by 2

$$\frac{6}{8} \div \frac{2}{2} = \frac{3}{4}$$

B. Changing Mixed Numbers to Improper Fractions

Step 1: Multiply the denominator by the whole number.

Example: Change $2\frac{3}{4}$ to an improper fraction

$$2 \times 4 = 8$$

Step 2: Add the result to the numerator

$$8 + 3 = 11$$

Step 3: Place the total over the denominator.

$$\frac{11}{4}$$

C. Adding and Subtracting Fractions with Different Denominators (Bottom Numbers)

Example 1: $\frac{3}{4} + \frac{2}{3} =$

Step 1: Need to find the common denominator for all fractions

Example 2: $\frac{3}{4} - \frac{3}{16} =$

$$\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$$

$$\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$$

$$\frac{9}{12} + \frac{8}{12} = \frac{17}{12} = 1\frac{5}{12}^*$$

Step 2: Then go ahead and add or subtract the fractions.

$$\frac{3}{4} \times \frac{4}{4} = \frac{12}{16}$$

$$\frac{3}{16} \times \frac{1}{1} = \frac{3}{16}$$

$$\frac{12}{16} - \frac{3}{16} = \frac{9}{16}$$

*Remember to change improper fractions to a mixed number.

D. Multiplying Fractions

Step 1: Multiply the numerators across.

Step 2: Then multiply the denominators across.

Make sure the product is in lowest terms

$$\frac{3}{4} \times \frac{5}{6} = \frac{15}{24}$$

$$\frac{15}{24} \div \frac{3}{3} = \frac{5}{8}$$

E. Multiplying Fractions with Mixed Numbers

Step 1: Change every mixed fraction to an improper fraction.

$$2\frac{2}{3} \times 1\frac{2}{5} =$$

$$2\frac{2}{3} = \frac{8}{3}$$

$$1\frac{2}{5} = \frac{7}{5}$$

Step 2: Then multiply across

$$\frac{8}{3} \times \frac{7}{5} = \frac{56}{15}$$

Step 3: Then change the improper fraction to a mixed number in lowest terms. $\frac{56}{15} = 3\frac{11}{15}$

F. Dividing Fractions

The fraction that is right of the division sign will need to be turned upside down by writing the numerator in the denominator and the denominator in the numerator. Then follow the rules for multiplying fractions.

Example: $\frac{1}{4} \div \frac{1}{2} =$

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

Simplify $\frac{2}{4} \div \frac{2}{2} = \frac{1}{2}$

Practice:

1) Change $4\frac{1}{6}$ to an improper fraction. 2) Change $\frac{42}{16}$ to a mixed number.

$$3) \begin{array}{r} 5\frac{3}{5} \\ +2\frac{2}{3} \\ \hline \end{array}$$

$$4) \begin{array}{r} 5\frac{1}{2} \\ +3\frac{2}{3} \\ \hline \end{array}$$

$$5) \begin{array}{r} 9\frac{11}{13} \\ -2\frac{1}{2} \\ \hline \end{array}$$

$$6) \begin{array}{r} 10\frac{7}{8} \\ -2\frac{3}{7} \\ \hline \end{array}$$

$$7) 3\frac{1}{7} \times \frac{5}{9} =$$

$$8) 3\frac{3}{7} \times 2\frac{7}{9} =$$

$$9) \frac{6}{11} \div 14 =$$

$$10) 3\frac{4}{5} \div 5\frac{5}{6} =$$

III. Decimals

A. Adding and Subtracting Decimals

Example - Add: $28.5 + 44.47 + 307.6$

Example - Subtract: $380.53 - 75$

$$\begin{array}{r} 28.50 \\ 44.47 \\ +3075.60 \\ \hline 3148.57 \end{array}$$

Step 1: Line up the decimal points.

Step 2: Then add or subtract

$$\begin{array}{r} 380.53 \\ -75.00 \\ \hline 305.53 \end{array}$$

B. Multiplying Decimals

Example: Multiply $1.89 \times 5.03 =$

$$\begin{array}{r} 1.89 \\ \times 5.03 \\ \hline 567 \\ 94500 \\ \hline 9.5067 \end{array}$$

Step 1: Multiply the decimals as you would do with whole numbers.

Step 2: Then count the number of spaces of each factor being multiplied.

Decimal places are the number of spaces to the right of the decimal point. There are 2 in the top factor and 2 in the bottom factor, so the decimal is placed 4 spaces from the right.

Step 3: Show the total number of places in your answer

C. Dividing a Decimal by a Whole Number

Place the decimal point directly above its position in the problem. Then divide the same way as you divide whole numbers.

Example: $73 \overline{)2.701}$

$$\begin{array}{r} .037 \\ 73 \overline{)2.701} \\ \underline{-219} \\ 511 \\ \underline{-511} \\ 0 \end{array}$$

D. Dividing Decimal by a Decimal Number

Example: $4.374 \div 0.03 =$ Dividend \div Divisor =

$$\begin{array}{r} 0.03 \overline{)4.374} \\ 3 \overline{)437.4} \end{array}$$

Step 1: Move the decimal point of the divisor as far right as you can go.
– 2 spaces in this example.

Step 2: Then move the decimal point in the dividend the same number of places as the divisor

$$\begin{array}{r} 145.8 \\ 3 \overline{)437.4} \\ \underline{3} \\ 13 \\ \underline{12} \\ 17 \\ \underline{15} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Step 3: Place the decimal point above its position in the problem. Then divide the same way as divide whole numbers.

Practice:

11) $\begin{array}{r} 18.1 \\ \times 0.04 \\ \hline \end{array}$

12) $\begin{array}{r} 0.97 \\ \times 5.6 \\ \hline \end{array}$

13) $123 + 2.6 + 9.04 =$

14) $83.0097 + 124.9 + 9.043 =$

15) $0.07 - 0.002 =$

16) $96 - 0.3992 =$

17) $4 \overline{)27.36}$

18) $0.2601 \div 9 =$

19) $7.055 \div 0.83 =$

20) $2.03 \overline{)4.466}$

IV. Percents

Percents are used to describe a part of something. Percents are used to figure out sales or the amount of interest someone will pay on a loan. When converting a percent to its fraction form, it will always have a denominator of 100.

A. Changing Decimal to Percents or Percents to Decimals

The important key is where to move the decimal point.

If changing from a decimal to percent, move the decimal point 2 places to the right and add a percent sign.

Example: $0.35 = 35\%$

$0.8 = 80\%$

To change from percent to decimal, need to move the decimal point 2 places to the left and drop the percent sign

Example: $30\% = 0.3$

$0.9\% = 0.009$

B. Converting Fractions to Percent Form

Divide the bottom number of the fraction into the top number and move the point 2 places to the right.

Example: $\frac{3}{4}$

$4 \overline{)3.00} = 0.75 = 75\%$

$$\begin{array}{r} 28 \\ \underline{20} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

-Or-

Multiply the fraction by 100%

Example: $\frac{3}{4}$

$\frac{3}{4} \times \frac{100\%}{1} = \frac{75\%}{1} = 75\%$

C. Converting Percents to Fraction Form

Write the percent as a fraction with 100 as the denominator. Then reduce the fraction to the lowest terms.

Example: 85%

$$\frac{85}{100} \div \frac{5}{5} = \frac{17}{20}$$

D. Finding the Percent of a Number

Example: What is 25% of \$6,500? There are 2 ways to solve this problem

1) Change the percent to a decimal and multiply.
multiply.

$$n = 25\% \times \$6,500$$

$$n = .25 \times 6500$$

$$n = \$1,625$$

2) Change the percent to a fraction and

$$n = \frac{1}{4}(6,500)$$

$$n = \frac{6500}{4}$$

$$n = \$1,625$$

E. Finding What Percent One Number is of Another

There are key words to remember that will help you solve the problem it is asking you.

The word "of" in the sentence means to multiply

The word "is" means equal to.

The word "what" is the number you are trying to find which is represented by a letter.

Example: 9 is what percent of 45

$$9 = a \times 45$$

$$\frac{9}{45} = a$$

$$\frac{9}{45} = a$$

$$\frac{9}{45} \div \frac{9}{9} = a$$

$$\frac{1}{5} = a$$

$$0.20 = a$$

$$20\% = a$$

The variable "a" is being multiplied by 45

Step 1: Divide both sides of the equation by same number to get the variable alone

Step 2: Reduce the fraction

Step 3: Change the fraction into a decimal

Step 4: Change the decimal into a percent

Therefore, 20% of 45 is 9.

F. Finding a Number When a Percent of It is Given

Example: 20% of what number is 16?

$$\begin{array}{ccccccc} & \downarrow & \downarrow & \downarrow & & \downarrow & \\ & 20\% & \times & a & & = & 16 \end{array}$$

$$20\%a = 16$$

$$\frac{20}{100}a = 16$$

$$\frac{1}{5}a = \frac{16}{1}$$

$$\cancel{5} \times \frac{1}{\cancel{5}}a = \frac{16}{1} \times 5$$

$$a = 16 \times 5$$

$$a = 80$$

Therefore, 20% of 80 is 16.

Step 1: Change the percent to a fraction form

Step 2: Simplify the fraction

Step 3: Multiply both sides of the equation to remove the fraction and get the variable alone

Practice:

Write the following in percent form.

21) 0.12

22) $\frac{6}{8}$

23) $\frac{2}{5}$

24) 0.233

25) 1.15

26) What is 11% of \$3,000?

27) 60 is what percent of 12,000?

28) 28 is 40% of what number?

Answers

1) $\frac{25}{6}$

2) $2\frac{5}{8}$

3) $8\frac{4}{15}$

4) $9\frac{1}{6}$

5) $7\frac{9}{26}$

6) $8\frac{25}{56}$

7) $1\frac{47}{63}$

8) $9\frac{11}{21}$

9) $\frac{3}{77}$

10) $\frac{114}{175}$

11) 0.724

12) 5.432

13) 134.64

14) 216.9527

15) 0.068

16) 95.6008

17) 6.84

18) 0.0289

19) 8.5

20) 2.2

21) 12%

22) 75%

23) 40%

24) 23.3%

25) 115%

26) \$330

27) 0.5%

28) 70