

Student Success Center

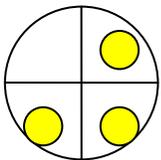
Arithmetic Study Guide for the ACCUPLACER (CPT)

Fractions

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) $\rightarrow \frac{3}{4}$

Example:



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

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

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

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

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

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

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

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

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

The common denominator for these fractions will be 12. It also happens to be least common denominator.

Reducing Fractions to Lowest Terms

Example:

$\frac{48}{64} \div \frac{8}{8} = \frac{6}{8}$ **Step 1:** Find a number that goes evenly into the numerator and the denominator of the fraction. With the fraction to the left, a number that will go in evenly is 8. Divide both the numerator and denominator by 8

$\frac{6}{8} \div \frac{2}{2} = \frac{3}{4}$ **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.
 In the example, the fraction can be reduced further by dividing numerator and denominator by 2.

Changing Mixed Numbers to Improper Fractions

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

$2 \times 4 = 8$ **Step 1:** Multiply the denominator by the whole number. In this example, multiply the denominator of 4 by the whole number of 2.

$8 + 3 = 11$ **Step 2:** Add the result to the numerator. So, add the 8 from Step 1 to the numerator of 3

$\frac{11}{4}$ **Step 3:** Place the total of Step 2 over the denominator. So, the total of 11 is placed over the original denominator or 4.

Adding and Subtracting Fractions With Different Denominators

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

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

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

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

*Remember to change improper fractions to a mixed number.

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

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

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

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

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

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

Multiplying Fractions

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

Multiply the numerators straight across. Then multiply the denominators across. Make sure the product is reduced to lowest terms.

Multiplying with Mixed Numbers

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

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

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

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

$$\frac{8}{3} \times \frac{7}{5} = \frac{56}{15} = 3\frac{11}{15}$$

Step 2: Then multiply across.

Step 3: And then, change any improper fraction to a mixed number in lowest terms.

Dividing Fractions

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

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.

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

Practice:

1. Change $4\frac{1}{6}$ to an improper fraction.

2. Change $\frac{42}{16}$ to a mixed number.

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

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

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

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

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. $3\frac{4}{5} \div 5\frac{5}{6} =$

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) $\frac{114}{175}$

DECIMALS

Adding and Subtraction Decimals

Add: $28.5 + 44.47 + 3075.6$

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

Step 1: Line up the decimal points.

Step 2: Then add or subtract.

Subtract: $380.53 - 75$

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

Multiplying Decimals

Multiply $1.89 \times 5.03 = \underline{\hspace{2cm}}$

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

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

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

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

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

Dividing a Decimal by a Whole Number

Example:

$$\begin{array}{r} .037 \\ 73 \overline{)2.701} \\ \underline{-219} \\ 511 \\ \underline{-511} \\ 0000 \end{array}$$

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

Dividing a Decimal by a Decimal Number

Example: $4.374 \div .03 = \underline{\hspace{2cm}}$

$$\begin{array}{r} .03 \overline{)4.374} \quad \rightarrow \quad 3 \overline{)437.4} \\ \rightarrow 2 \text{ spaces} \end{array}$$

Move the decimal point of the divisor (outside the bracket) as far right as you can go.
Then move the decimal point in the dividend (inside the bracket) the same number of places as the divisor.

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

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

Practice:

1.
$$\begin{array}{r} 18.1 \\ \times .04 \\ \hline \end{array}$$

2.
$$\begin{array}{r} .97 \\ \times 5.6 \\ \hline \end{array}$$

3. $123 + 2.6 + 9.04 = \square$

4. $83.0097 + 124.9 + 9.043 = \square$

5. $.07 - .002 =$

6. $96 - .3992 =$

7. $4 \overline{)27.36}$

8. $0.2601 \div 9$

9. $7.055 \div 0.83$

10. $2.03 \overline{)4.466}$

Answers: 1) 0.724 2) 5.432 3) 134.64 4) 216.9527 5) 0.068
6) 95.6008 7) 6.84 8) 0.0289 9) 8.5 10) 2.2

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.

Changing Decimals to Percents or Percents to Decimals

The important key is where to move the decimal point. If changing from decimal to a percent, you would need to move the decimal point two places to the right and add the percent sign.

$$\begin{aligned} \text{Example: } 0.35 &= 35\% \\ 0.8 &= 80\% \end{aligned}$$

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

$$\begin{aligned} \text{Example: } 30\% &= 0.3 \\ 0.9\% &= 0.009 \end{aligned}$$

Converting Fraction to Percent Form

First convert the fraction to a decimal then to a percent. Divide the denominator of the fraction into the numerator and move the resulting decimal point two places to the right adding the percent sign.

$$\begin{array}{r} \text{Example: } \frac{3}{4} \qquad \qquad \qquad \begin{array}{r} .75 \\ 4 \overline{)3.00} = .75 = 75\% \\ \underline{28} \\ 20 \\ \underline{20} \\ 0 \end{array} \end{array}$$

Or, you can convert the fraction directly to a percent

Multiply the fraction by 100% and reduce the numerator and denominator appropriately to the lowest terms.

$$\begin{array}{l} \text{Example: } \frac{3}{4} \\ \frac{3}{4} \times \frac{100\%}{1} = \frac{75\%}{1} = 75\% \end{array}$$

Percent to Fraction

Example: 85%

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

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

Percent of a Number

What is 25% of \$6,500?.

Change the percent to a fraction in lowest terms and multiply.

$$\begin{array}{l} n = 25\% \times \$6,500 \qquad \text{-or-} \qquad n = \frac{25}{100} (6500) = \frac{1}{4} (6500) \\ n = .25 \times 6500 \qquad \text{Change the percent to a} \qquad n = \frac{6,500}{4} \\ n = \$1,625 \qquad \text{decimal and multiply.} \qquad n = \$1,625 \end{array}$$

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 it is equal to.

Example: 9 is what percent of 45

$$\begin{array}{ccc} \downarrow & & \downarrow \\ 9 = & a & \times 45 \end{array}$$

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

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

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

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

$$0.20 = a$$

$$20\% = a$$

Therefore, 9 is 20% of 45.

The variable 'a' representing the percentage is being multiplied by 45.
So, to begin solving this equation divide each side by 45.

Finding a Number When a Percent of It is Given

Example: 20% of what number is 16?

↓

$$20\% \times a = 16$$

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

Change the percent to fraction in its lowest terms.

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

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

Need to multiply both sides of the equation by 5.

$$a = 16 \times 5$$

$$a = 80$$

Practice:

Write the following in percent form.

1. 0.12 2. $\frac{6}{8}$ 3. $\frac{2}{5}$ 4. 0.233 5. 1.15

6. What is 11% of \$3,000?

7. 60 is what percent of 12,000?

8. 28 is 40 % of what number?

Answers: 1) 12% 2) 75% 3) 40% 4) 23.3% 5) 115% 6) \$330 7) 0.5% 8) 70
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Practice questions and information below are from Maine Community College website. *Revised 03/31/09*

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ARITHMETIC TEST

This test measures your ability to perform basic arithmetic operations and to solve problems that involve fundamental arithmetic concepts (addition, subtraction, multiplication, division, and fractions). Before you begin there will be a sample question with the correct answer indicated. The math tests are normed without the use of calculators, so they are not allowed for all Accuplacer math tests.

1. Solve the following problem. You may use the paper you have been given for scratch work.
What percent of 2098 is 15?

A. 17.1%
B. 13,986.7%
C. 7.1%
D. .7%

2. **Substitute to find the value of the expression.** A basketball player's free throw percentage is m/a where m is the number of free throws made and a is the number attempted. If a player attempts 169 free throws and makes 130, what is his free throw percentage?

A. 0808
B. 1.3
C. .692
D. 76.9

3. The average weight for a group of 20 women is 130 pounds. If the average weight for $3/4$ of these women was 140 pounds, what was the average weight, in pounds, for the rest of the women?

A. 100
B. 110
C. 120
D. 135

4. $(9 \div 3) \times (8 \div 4) =$

A. 1
B. 6
C. 72
D. 576
E. 752

5. $4x(3-2) + 4 \times 4$
 $4x(5-1)$

A. $1 \frac{1}{8}$
B. $1 \frac{5}{8}$
C. 2
D. $1 \frac{1}{4}$

6. A wheel on a bicycle makes $71 \frac{1}{4}$ revolutions per minute. If it rotates for 40 minutes, how many revolutions does it make?

- A) $2840 \frac{1}{4}$
- B) $1 \frac{25}{32}$
- C) None of these
- D) 2850

7. Find decimal notation: 0.71%

- A) 0.071
- B) 71
- C) 0.71
- D) 0.0071

8. When 10 is subtracted from two times a certain number, the result is twenty-eight (28). What is the number?

- A) 17
- B) 19
- Revised 03/31/09*
- C) None of these
- D) 22

9. Approximate $\sqrt{15}$ (Square Root of 15) to three decimal places.

- A) 225
- B) 7.500
- C) 3.873
- D) 3.742

10. Divide 2455 by 6 . Write a mixed numeral for the answer.

- A) $411 \frac{5}{6}$
- B) $49 \frac{1}{6}$
- C) $51 \frac{5}{6}$
- D) $409 \frac{1}{6}$

Answers: 1.d, 2.d, 3.a, 4.b, 5.d, 6.d, 7.d, 8.b, 9.c, 10.d

For further arithmetic sample questions: go to www.google.com and type in Accuplacer Practice Arithmetic.

ELEMENTARY ALGEBRA TEST

This test measures your ability to perform basic algebraic operations and to solve problems that involve elementary algebraic concepts. Before you begin there will be a sample question with the correct answer indicated. The math tests are normed without the use of calculators, so they are not allowed for all Accuplacer math tests.

1. $2x + 3x + y =$

- A. $6xy$
- B. $5x + y$
- C. $5(x + y)$
- D. $6x + y$

2. If A represents the number of apples purchased at \$15 each and B represents the number of bananas purchased at \$10 each, which of the following represents the total value of the purchases?

- A. $A+B$
- B. $25(A+B)$
- C. $10A + 15B$
- D. $15A + 10B$

3. If $-x - 6 = 0$, then x is
- 2 or 3
 - 1 or 6
 - 1 or -6
 - 2 or -3
4. $(3x^3y)^3 = ?$
- $9x_9y^3$
 - $9x_6y^3$
 - $27x_9y^3$
 - $27x_9y^3$
5. $(x - 2)$ is a factor of which polynomial? I. $x^2 - 4x + 4$ II. $x^2 + x - 6$
- I only
 - II only
 - I and II
 - neither
6. $3x \times 8y^2 = ? \times 2y \times 27x$
- $4y/3$
 - $4y/9$
 - $4y/3x$
 - $4y/9x$
7. Solve for x and y : $2x + y = 3$ $x - 3y = 12$
- (3, 9)
 - (3, -9)
 - (3, -3)
 - (3, 3)
8. If $4(3x + 2) - (x + 5) = -3$ then $x = ?$
- $11/6$
 - $-11/6$
 - $6/11$
 - $-6/11$
9. $3x^2 - 15x = ? \times 3x$
- $x - 5x$
 - $x - 5$
 - $x^2 - 5x$
 - $x^2 - 5$
10. Which of the following is equal to $x^2 - 10x + 24$?
- $(x - 4)(x + 6)$
 - $(x + 4)(x - 6)$
 - $(x - 4)(x - 6)$
 - $(x + 4)(x + 6)$

Answers: 1.b., 2.d., 3.a., 4.d., 5.c., 6.b., 7.c., 8.d., 9.b., 10.c