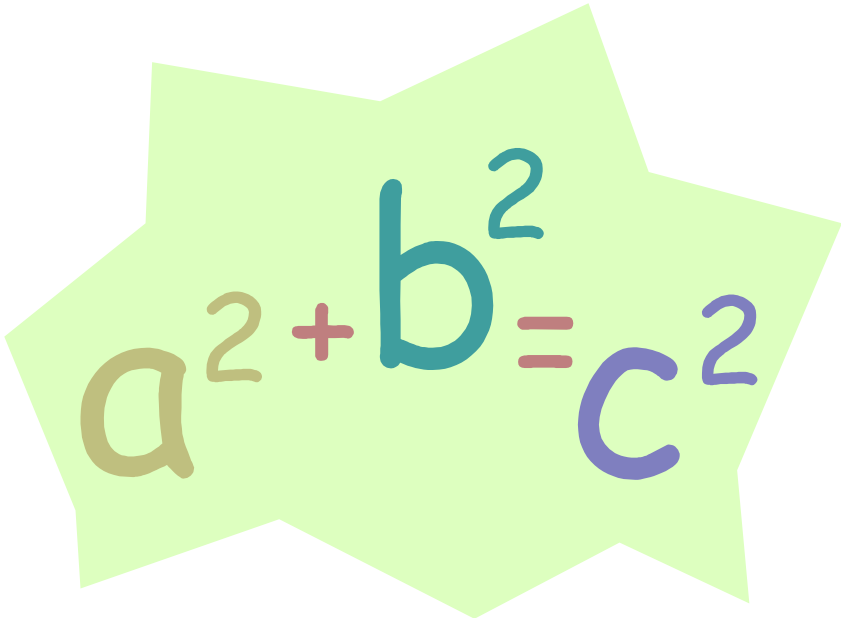
ELEMENTARY ALGEBRA



Overview

The Elementary Algebra section of ACCUPLACER contains 12 multiple choice Algebra questions that are similar to material seen in a Pre-Algebra or Algebra I pre-college course. A calculator is provided by the computer on questions where its use would be beneficial. On other questions, solving the problem using scratch paper may be necessary. Expect to see the following concepts covered on this portion of the test:

- Operations with integers and rational numbers, computation with integers and negative rationals, absolute values, and ordering.
- Operations with algebraic expressions that must be solved using simple formulas and expressions, adding and subtracting monomials and polynomials, multiplying and dividing monomials and polynomials, positive rational roots and exponents, simplifying algebraic fractions, and factoring.
- Operations that require solving equations, inequalities, and word problems, solving linear equations and inequalities, using factoring to solve quadratic equations, solving word problems and written phrases using algebraic concepts, and geometric reasoning and graphing.

Testing Tips

- ✓ Use resources provided such as scratch paper or the calculator to solve the problem. DO NOT attempt to only solve problems in your head.
- ✓ Start the solving process by writing down the formula or mathematic rule associated with solving the particular problem.
- ✓ Put your answer back into the original problem to confirm that your answer is correct.
- ✓ Make an educated guess if you are unsure of the answer.

Algebra Tips

Test takers should be familiar with the following concepts. For specific practice exercises using these concepts, please utilize the resources listed at the end of this guide.

- Understanding a number line
- Adding and subtracting negative numbers
- Using exponents
- Finding a square root
- Writing algebraic expressions
- Using parentheses in algebraic expressions
- Evaluating formulas
- Multiplying binomials
- Using proportions to solve problems
- Combining like terms
- Evaluating expressions
- Solving linear equations
- Solving equations $(+,-,\times,\div)$

Practice Questions

Order of Operations

1. $3 \cdot 7^2$
2. $3+2(5)-|-7|$
3. $\dfrac{4^2-5^2}{(4-5)^2}$

Please note: Multiplication signs may take the form of an x , * , or •

Scientific Notation

Write the following in Scientific Notation.

1. $0.00000000\mathbf{0}00523$

Write in expanded form.

2. 6.02×10^{11}

Simplify. Write answers in scientific notation.

1. $(3\times10^3)(5\times10^6)$
2. $\dfrac{6\times10^9}{3\times10^4}$

Substitution

Find each value if $x=3$, $y=-4$, *and* $z=2$.

1. $xyz-4z$
2. $\dfrac{5x-z}{xy}$

Linear equations in one variable

Solve the following for x.

1. $6x-48=6$

2. $50-x-(3x+2)=0$

Formulas

1. *Solve* $PV=nRT$ *for T.*

2. *Solve* $y=hx+4x$ *for x.*

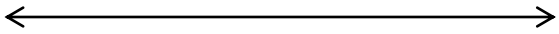
Word Problems

1. *One number is 5 more than twice another number. The sum of the numbers is 35. Find the numbers.*
2. *Sheila bought burgers and fries for her children and some friends. The burgers cost $2.05 each and the fries are $.85 each. She bought a total of 14 items, for a total cost of $19.10. How many of each did she buy?*

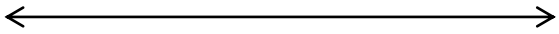
Inequalities

Solve and graph on the number line.

1. $2x-7\geq 3$



2. $3(x-4)-(x+1)<-12$



Exponents & Polynomials

Simplify and write answers with positive exponents.

1. $(3x^2-5x-6)+(5x^2+4x+4)$

2. $\dfrac{24x^4-32x^3+16x^2}{8x^2}$

3. $(5a+6)^2$

Factoring

1. x^2+5x-6

2. $2x^2+4x-16$

3. $4x^2-36$

4. $49y^2+84y+36$

Quadratic Equations

1. $4a^2+9a+2=0$

2. $(3x+2)^2=16$

Rational Expressions

Perform the following operations and simplify where possible. If given an equation, solve for the variable.

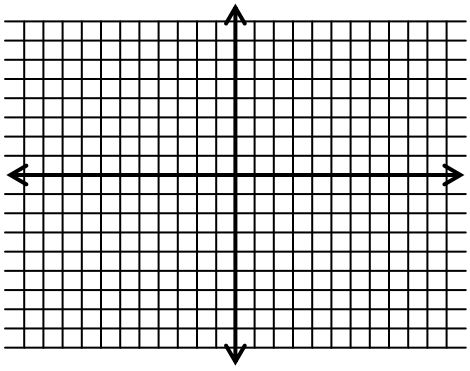
1. $\dfrac{4}{2a-2}+\dfrac{3a}{a^2-a}$

2. $\dfrac{16-x^2}{x^2+2x-8}\div\dfrac{x^2-2x-8}{4-x^2}$

Graphing

Graph each equation on the coordinate axis.

1. $3x-2y=6$
2. $x=-3$
3. $y=2$
4. $y=\dfrac{-2}{3}x+5$



Systems of Equations

Solve the following systems of equations.

1. $\begin{cases} 2x-3y=-12 \\ x-2y=-9 \end{cases}$

2. $\begin{cases} 2x-3y=-4 \\ y=-2x+4 \end{cases}$

Radicals

Simplify the following using the rules of radicals (rationalize denominators). All variables represent positive numbers.

1. $\left(\sqrt{8}\right)\left(\sqrt{10}\right)$

2. $2\sqrt{18}-5\sqrt{32}+7\sqrt{162}$

3. $\sqrt{\dfrac{12}{18}}\cdot\sqrt{\dfrac{15}{40}}$

4. $\left(2\sqrt{3}+5\sqrt{2}\right)\left(3\sqrt{3}-4\sqrt{2}\right)$

Answers

Order of Operations

1. *147*
2. $3+2(5)-|-7|=3+10-7=13-7=6$
3. *-9*

Rule 1: *Simplify all operations inside parentheses.*
Rule 2: *Simplify all exponents, working from left to right.*
Rule 3: *Perform all multiplications and divisions, left to right.*
Rule 4: *Perform all additions and subtractions, left to right.*

To help remember the order of operations, use the mnemonic ***PEMDAS****, which stands for Please Excuse My Dear Aunt Sally (Parentheses, Exponents, Multiplication & Division, Addition & Subtraction).*

Scientific Notation

All numbers in scientific notation have the following form:

$nonzerodigit.restofnumber \times 10^{power}$.

1. $0.00000000\mathbf{0}00523 = 5.23\times10^{-12}$

2. $602{,}000{,}00{,}000$

1. $(3\times10^{3})(5\times10^{6}) = 3\cdot5\times10^{3}\cdot10^{6} = 15\times10^{9} = 1.5\times10^{10}$
2. $\dfrac{6\times10^{9}}{3\times10^{4}} = \dfrac{6}{3}\times\dfrac{10^{9}}{10^{4}} = 2\times10^{5}$

Substitution

1. $xyz-4z=(3)(-4)(2)-4(2)=-24-8=-32$

2. $\dfrac{5x-z}{xy}=\dfrac{5(3)-2}{(3)(-4)}=\dfrac{13}{-12}=-\dfrac{13}{12}$

Linear equations in one variable

1. $6x-48=6\Rightarrow 6x-48+48=6+48\Rightarrow 6x=54\Rightarrow \dfrac{6x}{6}=\dfrac{54}{6}\Rightarrow x=9$

2. $x=12$

Formulas

1. $PV=nRT\Rightarrow \dfrac{PV}{nR}=\dfrac{nRT}{nR}\Rightarrow \dfrac{PV}{nR}=T$

2. $y=hx+4x\Rightarrow y=x(h+4)\Rightarrow \dfrac{y}{h+4}=\dfrac{x(h+4)}{h+4}\Rightarrow \dfrac{y}{h+4}=x$

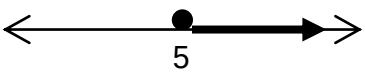
Word Problems

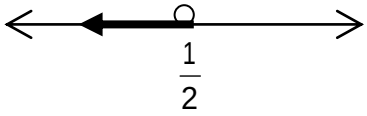
1. *x = "another number" and 2x + 5 = "one number." Remember, sum means to add. x + 2x + 5 = 35 therefore x = 10 which is "another number." 2x + 5 = 25 which is "one number."*

2. *Let x = the number of burgers and 14 – x = the number of fries. To get the total amount of money spent, multiply the number of items by the cost of the item. 2.05 x = the total dollars spent on burgers and .85 (14 – x) = the total dollars spent on fries. The equation is: 2.05x + .85 (14 – x) = 19.10. Solving the equation, x = 6. Hence, she bought 6 burgers and 8 fries.*

Inequalities

Solve inequalities the same as equations with one exception. When both sides are multiplied or divided by a negative number, remember to switch the direction of the inequality.

1. $2x-7\geq 3 \Rightarrow 2x-7+7\geq 3+7 \Rightarrow 2x\geq 10 \Rightarrow \frac{2x}{2}\geq\frac{10}{2} \Rightarrow x\geq 5$ 

2. $x<\frac{1}{2}$ 

Exponents & Polynomials

1. *Add like terms:* $(3x^2-5x-6)+(5x^2+4x+4)=8x^2-x-2$

2. $\frac{24x^4-32x^3+16x^2}{8x^2}=\frac{24x^4}{8x^2}-\frac{32x^3}{8x^2}+\frac{16x^2}{8x^2}=3x^2-4x+2$

3. $(5a+6)^2=(5a+6)(5a+6)=25a^2+30a+30a+36=25a^2+60a+36$

Factoring

Steps to factoring, the FOIL method:

1. *Always factor out the Greatest Common Factor (if possible).*
2. *Factor the first and last term.*
3. *Figure out the middle term.*

1. $x^2+5x-6 \longrightarrow (x+6)(x-1)$*, to check, multiply back using FOIL method*

2. $2x^2+4x-16 \longrightarrow 2(x^2+2x-8) \longrightarrow 2(x-2)(x+4)$

3. $4x^2-36 \longrightarrow 4(x^2-9) \longrightarrow 4(x+3)(x-3)$

4. $(7y+6)^2$

Quadratic Equations

Steps:
1. *Get zero on one side of the equals*
2. *Factor*
3. *Set each factor to zero*
4. *Solve for your variable*

If you cannot factor the equation and the quadratic is in the form $ax^2+bx+c=0$, *then use the quadratic formula.*

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

1. $4a^2+9a+2=0 \Rightarrow (4a+1)(a+2)=0 \Rightarrow 4a+1=0$ *or* $a+2=0 \Rightarrow a=-\frac{1}{4}$ or $a=-2$

2. *The solution is given below:*

$(3x+2)^2=16 \Rightarrow 9x^2+12x+4=16 \Rightarrow 9x^2+12x+4-16=16-16 \Rightarrow 9x^2+12x-12=0$

$\Rightarrow 3(3x+4x-4)=0 \Rightarrow 3(3x-2)(x+2)=0 \Rightarrow x=\frac{2}{3}$ *or* $x=-2$

Rational Expressions

1. *First, find a common denominator (factor denominators to see what you need), add, and then reduce (if possible) at the very end.*

$$\frac{4}{2a-2}+\frac{3a}{a^2-a}=\frac{4}{2(a-1)}+\frac{3a}{a(a-1)}=\frac{4}{2(a-1)}\cdot\frac{a}{a}+\frac{3a}{a(a-1)}\cdot\frac{2}{2}=\frac{4a}{2a(a-1)}+\frac{6a}{2a(a-1)}=\frac{10a}{2a(a-1)}$$
$$=\frac{5}{a-1}$$

2. *Division is the same process with one extra step (invert & multiply):* $\frac{a}{b}\div\frac{c}{d}=\frac{a}{b}\cdot\frac{d}{c}$

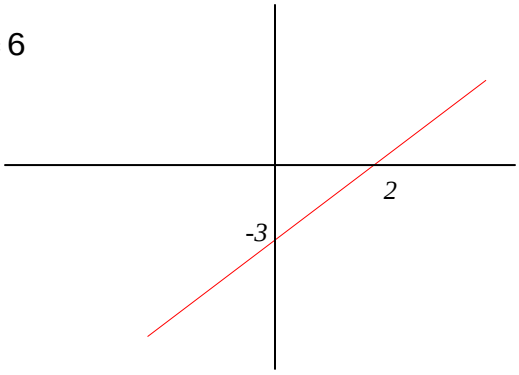
One other hint: $(1-x)=-(x-1)$

$$\frac{16-x^2}{x^2+2x-8}\div\frac{x^2-2x-8}{4-x^2}=\frac{(4-x)(4+x)}{(x-2)(x+4)}\div\frac{(x-4)(x+2)}{(2-x)(2+x)}=\frac{(4-x)(4+x)}{(x-2)(x+4)}\cdot\frac{(2-x)(2+x)}{(x-4)(x+2)}$$

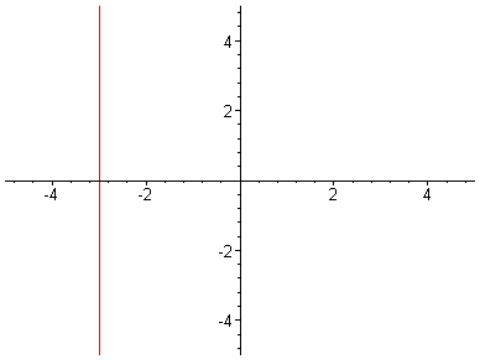
$$=\frac{-(x-4)(4+x)}{(x-2)(x+4)}\cdot\frac{-(x-2)(2+x)}{(x-4)(x+2)}=\frac{-\cancel{(x-4)}\cancel{(4+x)}}{\cancel{(x-2)}\cancel{(x+4)}}\cdot\frac{-\cancel{(x-2)}\cancel{(2+x)}}{\cancel{(x-4)}\cancel{(x+2)}}=1$$

Graphing

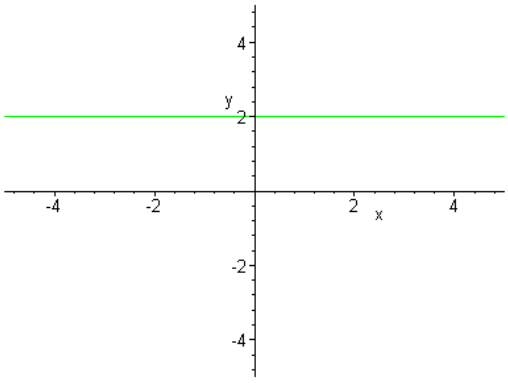
1. $3x-2y=6$



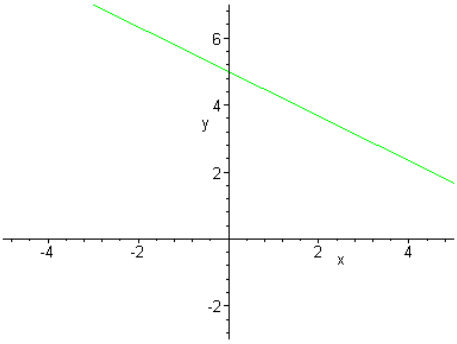
2. $x=-3$



3. $y=2$



4. $y=\frac{-2}{3}x+5$



Systems of Equations

The following are 2 dimensional linear equations. Each equation represents a line that can be graphed on the coordinate plane. The ultimate solution to a system of equations is for the lines to intersect in one point such as question #1 and #2.

1. *The answer is x = 3 and y = 6. The work is below.*

$$\begin{array}{l} 2x-3y=-12 \\ x-2y=-9 \quad \text{Multiply by } -2 \rightarrow \end{array} \qquad \begin{array}{l} 2x-3y=-12 \\ \underline{-2x+4y=\ 18} \\ y=\ 6 \quad \text{Now, substitute into the first equation} \\ 2x-3(6)=-12 \quad \Rightarrow \quad x=3 \end{array}$$

2. *x = 1, y = 2*

Radicals

Think of the index ($\sqrt[\text{index}]{\ }$) as a door person. If it is two, then two identical factors inside become one outside. Also, remember these properties:

$$\sqrt[n]{a}\cdot\sqrt[n]{b}=\sqrt[n]{ab} \qquad \sqrt[n]{\frac{a}{b}}=\frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

1. $\left(\sqrt{8}\right)\left(\sqrt{10}\right)=\sqrt{8\cdot10}=\sqrt{2\cdot2\cdot2\cdot2\cdot5}=2\cdot2\sqrt{5}=4\sqrt{5}$

2. $\sqrt{\frac{12}{18}}\cdot\sqrt{\frac{15}{40}}=\sqrt{\frac{2}{3}}\cdot\sqrt{\frac{3}{8}}=\sqrt{\frac{2\cdot3}{3\cdot8}}=\sqrt{\frac{6}{24}}=\frac{\sqrt{1}}{\sqrt{4}}=\frac{\sqrt{1}}{\sqrt{4}}=\frac{1}{2}$ *Continue to reduce to yield the answer*

3. *Worked out below.*

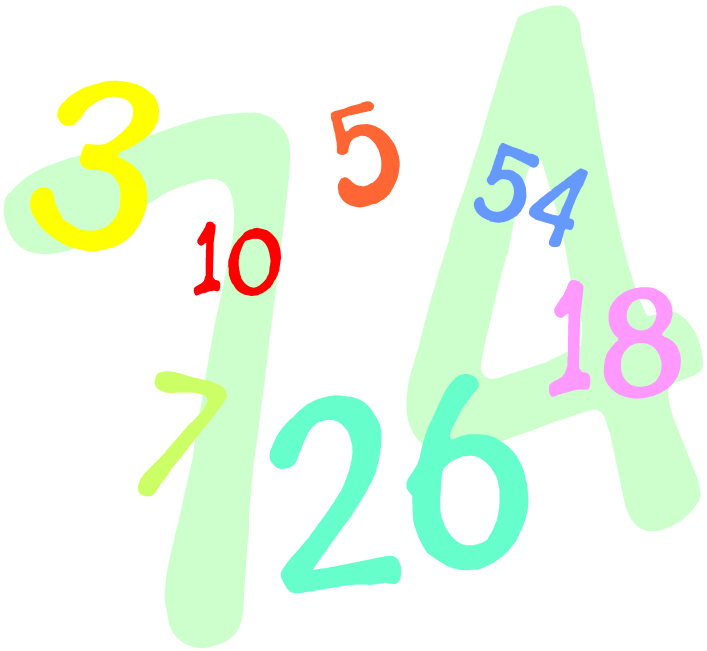
$$2\sqrt{18}-5\sqrt{32}+7\sqrt{162}=$$
$$2\sqrt{9\cdot2}-5\sqrt{16\cdot2}+7\sqrt{81\cdot2}$$
$$2\cdot3\sqrt{2}-5\cdot4\sqrt{2}+7\cdot9\sqrt{2}$$
$$6\sqrt{2}-20\sqrt{2}+63\sqrt{2} \qquad \textit{They all have } \sqrt{2} \textit{ as a factor}$$
$$49\sqrt{2}$$

4. *Worked out below.*

$$\left(2\sqrt{3}+5\sqrt{2}\right)\left(3\sqrt{3}-4\sqrt{2}\right)=6\sqrt{9}-8\sqrt{6}+15\sqrt{6}-20\sqrt{4}=18-8\sqrt{6}+15\sqrt{6}-40=-22+7\sqrt{6}$$

**Use the FOIL method and multiply

ARITHMETIC



Overview

The Arithmetic section of ACCUPLACER contains 17 multiple choice questions that measure your ability to complete basic arithmetic operations and to solve problems that test fundamental arithmetic concepts. A calculator is provided by the computer on questions where its use would be beneficial. Expect to see the following concepts covered on this portion of the test:

- Operations with whole numbers and fractions such as addition, subtraction, multiplication, division, recognizing equivalent fractions and mixed numbers, and estimating.
- Operations with decimals and percents, including addition, subtraction, multiplication, and division with decimals. Percent problems, recognition of decimals, fraction and percent equivalencies, and problems involving estimation are also given.
- Problems that involve applications and problem solving are also covered, including rate, percent, and measurement problems, simple geometry problems, and distribution of a quantity into its fractional parts.

Testing Tips

- ✓ Start the solving process by utilizing basic Arithmetic skills and formulas. Then if advanced mathematical skills are required such as Algebra, use those skills next.
- ✓ Use resources provided such as scratch paper or the calculator to solve the problem. DO NOT attempt to only solve problems in your head.
- ✓ Try putting your answer back into the original problem to confirm that your answer is correct.
- ✓ Make an educated guess if you are unsure of the answer.

Arithmetic Tips

Test takers should be familiar with the following detailed list of concepts. For additional practice exercises using these concepts, please utilize the resources listed at the end of this guide.

Whole Numbers and Money

- Rounding whole numbers and dollars and cents
- Adding (larger numbers, by regrouping, dollars and cents)
- Subtracting (larger numbers, by regrouping, dollars and cents)
- Regrouping/borrowing
- Multiplying (larger numbers, by regrouping, by zeros)
- Dividing (using long division, remainders, zero as a placeholder, larger numbers)

Fractions

- Like fractions and unlike fractions
- Adding and subtracting like fractions and unlike fractions
- Lowest common denominator (LCD)
- Estimating with mixed numbers
- Adding and subtracting mixed numbers
- Subtracting fractions from whole numbers
- Subtracting mixed numbers by regrouping
- Multiplying and dividing fractions by fractions
- Canceling to simplify multiplication
- Multiplying and dividing fractions by whole numbers or mixed numbers
- Multiplying mixed numbers by mixed numbers

Percents

- Changing a fraction to a percent
- Changing a decimal to a percent
- Changing a percent to a fraction
- Changing a percent to a decimal
- Finding the part, percent, and whole
- Finding percent increase or decrease
- Finding the original price
- Understanding simple interest
- Computing interest for part of a year

Decimals

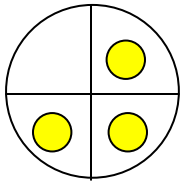
- Comparing/ordering decimal fractions
- Reading and writing mixed decimals
- Estimating with mixed decimals
- Rounding to a chosen place value
- Adding and subtracting decimals
- Using zeros as placeholders
- Multiplying decimals by whole numbers
- Multiplying decimals by decimals
- Multiplying by 10, 100, or 1,000
- Dividing decimals by whole numbers
- Dividing decimals by decimals
- Dividing by 10, 100, or 1,000

Practice Questions & Answers

Fractions – Practice Questions & Answers

Numerator: *tells how many parts you have (the number on top)* $\rightarrow 3$

Denominator: *tells how many parts in the whole (the number on the bottom)* $\rightarrow 4$

Example:  $= \frac{3}{4}$ *3 parts have a dot out of 4*

Proper fraction: *top number is less than the bottom number:* $\frac{1}{3}, \frac{7}{10}, \frac{9}{19}$

Improper fraction: *top number is equal to or larger than the bottom number:* $\frac{3}{2}, \frac{8}{8}$

Mixed Number: *a whole number is written next to a proper fraction:* $1\frac{3}{4},\ 2\frac{2}{5},\ 10\frac{1}{2}$

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

Ex: $\frac{3}{4} \rightarrow \frac{3}{3} \rightarrow \frac{9}{12}$

$\frac{2}{3} \rightarrow \frac{4}{4} \rightarrow \frac{8}{12}$

$\frac{1}{2} \rightarrow \frac{6}{6} \rightarrow \frac{6}{12}$

The common denominator for these fractions will be 12. It also happens to be the 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 divides evenly into the numerator and the denominator of the fraction. With the fraction to the left, the number that will divide evenly is 8.*

$\frac{6}{8} \div \frac{2}{2} = \frac{3}{4}$ ***Step 2:*** *Check to see whether another number divides evenly into both the numerator and denominator. Stop when there are no more numbers that can divide into the fraction.*

Changing Mixed Numbers to Improper Fractions

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

2 x 4 = 8 ***Step 1****: Multiply the denominator by the whole number.*

8 + 3 = 11 ***Step 2****: Add the result to the numerator.*

$\frac{11}{4}$ ***Step 3****: Place the total over the denominator.*

Adding and Subtracting Fractions with Different Bottom Numbers

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

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

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

Step 1*: Find the common denominator for all fractions.*

Step 2*: Then add or subtract the fractions.*

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

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

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

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

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

**Remember to change improper fractions to a mixed number.*

Multiplying Fractions

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

Multiply the numerators across. Then multiply the denominators across. Make sure the product is in lowest terms.

Multiplying with Mixed Numbers

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

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

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

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

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

Step 2: *Multiply across.*

Step 3: *Then, change the 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 be multiplied by the reciprocal where $\frac{1}{2}$ becomes $\frac{2}{1}$

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

Practice:

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

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

3. $5\frac{3}{5} + 2\frac{2}{3}$

4. $5\frac{1}{2} + 3\frac{2}{3}$

5. $9\frac{11}{13} - 2\frac{1}{2}$

6. $10\frac{7}{8} - 2\frac{3}{7}$

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 *Subtract:* 380.53 - 75

```
  28.50        Step 1:  Line up the decimal points.      380.53
  44.47                                                - 75.00
+ 3075.60                                               305.53
 3148.57       Step 2:  Then add or subtract.
```

Multiplying Decimals

Multiply 1.89 x 5.03 = ____

```
  1.89
× 5.03
  567
94500
9.5067
```

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 two in the top factor and two in the bottom factor, so the decimal is placed four spaces from the right.*

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

Dividing a Decimal by a Whole Number

Example:

```
   .037
73)2.701
  219
   511
   511
     0
```

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 ÷ .03 = __

$.03\overline{)4.374}$ → $3\overline{)437.4}$

→ 2 spaces

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.

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

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

Practice:

1. 18.1 x .04

2. .97 x 5.6

3. 123 + 2.6 + 9.04 = ☐

4. 83.0097 + 124.9 + 9.043 = ☐

5. .07 - .002 =

6. 96 - .3992 =

7. $4\overline{)27.36}$

8. 0.2601 ÷ 9

9. 7.055 ÷ 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 key to changing decimals and percents is knowing where to move the decimal point. If changing from a decimal to a percent, move the decimal point two places to the right and add the percent sign.

Example: 0.35 = 35%
0.8 = 80%

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

Example: 30% = .3
0.9% = .009

Converting Fraction to Percent Form

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

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

$$4\overline{)3.00} \quad \begin{array}{r} .75 \\ 28 \\ \hline 20 \\ 20 \\ \hline 0 \end{array}$$

$= .75 = 75\%$

-or-

Multiply the fraction by 100%

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

$$\frac{3}{\cancel{4}_{1}} \times \frac{\cancel{100}^{25}\%}{1} = \frac{75\%}{1} = 75\%$$

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

1) What is 25% of $6,500?

n = 25% x $6,500

n = .25 x 6500

n = $1,625

-or-

2) Change the percent to a fraction

$n = \frac{1}{4}(6500)$

$n = \frac{6,500}{4}$

n = $1,625

Finding What Percent One Number Is of Another

There are key words to remember that will help you solve a problem involving percents.
The word 'of' in the sentence means to multiply.
The word 'is' means it is equal to.

Example: 9 is what percent of 45?

↓ ↓

9 = x times (x) 45

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

The variable 'x' is being multiplied by 45.

Divide by 45.

.20 = x

.20 = 20% therefore 20% of 45 is 9

Finding a Number When a Percent of It is Given

Example: 20% of (what number) is 16?

$$\downarrow$$
$$.2 \times x = 16$$

$$\frac{.20x}{.20} = \frac{16}{.20}$$

$$x = 80$$

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 1200?

8. 28 is 40 % of what number?

Answers: 1) 12% *2)* 75% *3)* 40% *4)* 23.3% *5)* 115% *6)* $330 *7)* 5% *8)* 70%

READING

Overview

The Reading Comprehension section of ACCUPLACER contains 20 multiple choice questions that fall into two categories:

1. A reading passage followed by a question based on the text. Both short and long passages are provided.
2. Sentence relationships presenting two sentences followed by a question about the relationship between these two sentences.

Testing Tips

- ✓ Do not rush. Take your time and make sure you understand what you are reading.
- ✓ Read carefully. Sometimes, one word in the passage can change the entire meaning.
- ✓ Double check your answer before moving to the next question.
- ✓ Understand what the test question is asking about the passage before attempting to answer. In many cases, reviewing the passage and answer choices will help.

Concepts & Practice Questions

Six skills prepare students to become better readers and for reading in college-level courses:

- ❖ recognizing main ideas
- ❖ identifying supporting details
- ❖ recognizing implied main ideas and the central point
- ❖ understanding relationships that involve addition and time
- ❖ understanding relationships that involve illustration, comparison or contrast, and cause and effect
- ❖ understanding purpose and tone

Main idea

In order to become a better and faster reader, recognizing the main idea is the most important skill you can develop.

Think of the **main idea** as an umbrella--it is the author's primary point about a topic. All other material in the paragraph fits under the main idea. In a paragraph, authors often present the main idea to readers in a single sentence called the **topic sentence**.

Consider this example:

TV violence does affect people in negative ways. Frequent TV watchers are more fearful and suspicious of others. Heavy TV watchers are less upset about real-life violence than non-TV watchers. TV violence increases aggressive behavior in children.

You will see the word **topic** used in two different ways. First, topic can be used generally to mean the subject of the reading. Second, it can be used as a part of the phrase '**topic sentence**.' In this example, the first sentence tells the reader the general subject, or topic, of the passage. The second sentence is the **topic sentence,** and in this case also gives the author's main idea. This sentence tells the reader what the passage is about and gives the main point the author is making.

Supporting Details

Supporting details are reasons, examples, steps, or other kinds of factual evidence that explain a main idea.

Consider this example:

Main idea: Our government should phase out the penny in the economy.
Supporting detail 1: Pennies take up more space than they are worth.
Supporting detail 2: Pennies are a nuisance to the business community.
Supporting detail 3: Pennies cost the nation as a whole.

In this case the supporting details give reasons to support the main idea.

Recognizing Implied and Stated Ideas

Sometimes a selection lacks a topic sentence, but that does not mean it lacks a main idea. The author has simply decided to let the details of the selection suggest the main idea. You must figure out what the implied main idea is by deciding upon the point made by all of the details when they are all added together.

Passages that imply an idea give supporting details first. The reader must make an educated guess in order to understand the main idea. In these sorts of passages, the main idea is the general statement that all of the details make when they are considered as a whole. The main idea must be general enough that **all** of the details fit into it.

Consider this example:

1. The smaller a group is, the more opportunities we have to get to know other people well and to establish close ties with them.
2. Two-person groups are the setting for many of our most intense and influential relationships.
3. In three-person groups, coalitions become possible, with two members joining forces against a third member.
4. Five-person groups are large enough so that people feel they can express their emotions freely and even risk antagonizing one another, yet they are small enough so that members show regard for one another's feelings and needs.

Which statement best expresses the unstated main idea of the above sentences?

a. Two-person groups are an important part of our lives.
b. A five-person group is better than a two-person group
c. The number of people in a group affects relationships within the group.
d. Groups play a central part in every human activity, within family, the workplace, and the government.

Explanation:

a. Answer *a* is too narrow to be the implied idea. It is based on only one of the four supporting details, statement 1.
b. Answer *b* covers only statements 2 and 4; therefore, it is too narrow to be the implied main idea. In addition, it is a conclusion that is not based on the given facts, which say nothing about one group always being better than another.

c. Answer *c* is a general statement about the number of people in a group and how that number affects a group. It is illustrated by all four of the supporting details. **The answer c is the implied main idea**.
d. Answer *d* is true, but it is not what the supporting details are discussing. The supporting details do not address the part that groups play in society.

The topic of the supporting ideas above is the number of people in a group. Ask yourself the question, "What are the supporting details saying about the number of people in a group?" As you think about the four statements, try to find a point about the number of people in a group that is general enough to cover all of the specific details.

Understanding Relationships That Involve Addition and Time

To help readers understand the main points, authors use two common methods to show relationships among ideas and to make ideas clear: transitions and patterns of organization.

Transitions are words or phrases (ex: first of all) that show relationships between ideas. Two types of transitions are words that show:

- addition, contrast, exception
- time or sequence

Addition words tell you that writers are adding to their thoughts. The writers are presenting one or more ideas that continue along the same line of thought as a previous idea. Addition words include: furthermore, additionally, next, in addition, etc.

Contrast words show differences between two or more items being compared. Contrast words include: on the other hand, in contrast, despite.

Exception words point out an unusual or unique feature of one item that is otherwise part of the same main category. Exception words include: however, nevertheless, with the exception of, in the case of.

Time words provide chronological organization to writing. Time words include: later, a decade, a year, a month, a week, a century such as the 90's, the nineteenth century.

Sequential words provide step-by-step organization to writing. Sequential words include: next, first, second, after, before.

Understanding Relationships That Involve Illustration, Comparison or Contrast, and Cause and Effect

Illustration is one method of clarifying our ideas. Writers often use examples and illustrations introduced by a phrase such as *for example* or *for instance* to demonstrate the point they are trying to make.

Which of these two statements is easier to understand?

1. Even very young children can do household chores. They can run a duster along baseboards or fold napkins for dinner.
2. Even very young children can do household chores. For instance, they can run a duster along baseboards or fold a napkin for dinner.

The second item is easier to understand because the phrase "For instance" tells the reader that there is a relationship between the first and second sentence. The second sentence offers an example of the point the author makes in the first sentence.

Comparison and Contrast

Comparison shows similarities. Contrast shows differences. Writers often use comparison and contrast together as a way of explaining and/or analyzing the relationship between or among items, ideas, or people.

Consider the relationship among these sentences as an example of how comparison and contrast can be used together and notice the role that the underlined transitions play in making this relationship clear to the reader:

1. Advertising is part of the strategy manufacturers use to sell their products.
2. Manufacturers use advertising as a way to market established products as well as new products.
3. New products are generally advertised differently from established products.
4. New products are often introduced with "informational" advertising telling what the products are, why they are needed, and where they are available.
5. Established products on the other hand can rely on "reminder" advertisements, which provide little hard information about the product.

The first sentence gives the general, or main, idea. The second sentence uses "as well as" to signal that the writer is showing a similarity between the way new and established products are advertised. The word "differently" in the third sentence and "on the other hand" in the fifth sentence shows that the writer is also demonstrating differences in the way these two types of products are advertised.

Cause/Effect

Information that falls into a cause-effect pattern addresses the question "Why does an event happen?" and "What are the results of an event?" Often, authors try to tell about events in a way that explains both what happened and why.

Consider how this passage reflects the relationship between cause and effect:

In 1970, about sixty small and medium-sized factories in the United States adopted a four-day workweek. According to the plan, workers work forty hours but instead of the usual five-day week, they now work only four days. Workers are enthusiastic about the three-day weekly vacation. According to management, productivity has increased about 18% since the inception of the new plan. Absenteeism has dropped by 69% and lateness is almost non-existent.

What are the effects being discussed in this passage?

A. shorter work weeks
B. sixty small and medium-sized factories decided to try the four-day work week
C. the seventies were a time of change
D. increased productivity and decreases in absenteeism and tardiness

Explanation:

a. Answer *a* gives the topic of the passage but does not discuss cause or effect.
b. Answer *b* explains who was involved in this experiment, but does not show a cause/effect relationship.
c. Answer *c* is true, but is not discussed in this passage.
d. Answer *d* explains the results of the four-day workweek.

Tone

A writer's tone reveals the attitude he or she has toward a subject. Tone is expressed through the words and details the author selects. Just as a speaker's voice can project a range of feelings, a writer's voice can project one or more tones or feelings: anger,

sympathy, hopefulness, sadness, respect, dislike and so on. Understanding tone is an important part of understanding what an author has written.

To illustrate the difference a writer can express in tone, consider the following comments made by workers in a fast food restaurant.

> "I hate this job. The customers are rude, the managers are idiots, and the food smells like dog chow." (Tone: bitter, angry)
>
> "I have no doubt that flipping burgers and toasting buns will prepare me for a top position on Wall Street." (Tone: mocking, sarcastic)
>
> "I love working at Castle Burger. I meet interesting people, earn extra money, and get to eat all the chicken nuggets I want when I go on break." (Tone: enthusiastic, positive)

Words that express tone reflect a feeling or judgment. Some words that describe tone include: amused, angry, ashamed, praising, and excited.

Sample Test Questions

Answer each of the following 10 questions. To review the questions you missed, return to the reading strategies area in parentheses following the correct answers on the answer key.

1. Read the statements below and then choose the best answer to the question from the list of lettered choices that follow.

   Sometimes when we don't get enough sleep we become very short-tempered.

   It is important to set a time to go to bed that is realistic.

   How are these two sentences related?

   A. The first sentence explains the meaning of the second.
   B. The second sentence explains why a lack of sleep affects us.
   C. The second sentence contradicts the first.
   D. The second sentence proposes a solution.

2. Read the statements below and then choose the best answer to the question from the list of lettered choices that follows.

    Most people collect *Star Wars* toys for sentimental reasons.

    Some people collect them strictly to make money.

    What is the relationship between the two sentences?

    A. cause & effect
    B. contrast
    C. repetition
    D. statement & example

3. Answer the question based on what is stated or implied.

There are two kinds of jewelry that I do. There is commercial jewelry - class rings, necklaces, the kinds of things most people wear. I sell these items to meet my expenses for raw materials, supplies, and to make my living. The other more creative work I do, makes me feel that I am developing as a craftsperson.

    The author of this passage implies that:

    A. artists are poor.
    B. there is no market for creative work.
    C. rings and necklaces can not be creative.
    D. commercial and creative work fulfill different needs for the artist.

4. Read the statements below and then choose the best answer to the question from the list of lettered choices that follows.

    Jenny does not like cake.

    She does not like to bake it, to ice it, or to eat it.

    What does the second sentence do?

    A. It states the cause of the first.

B. It emphasizes what is stated in the first.
C. It compares the three things Jenny does not like about cake.
D. It draws a conclusion about Jenny.

5. Read the sentences below and then choose the best answer to the question from the list of lettered choices that follows.

   When we write a check that we know is going to "bounce," we are in fact performing a criminal act.

   It is a crime to knowingly write a "hot" check, one in which we know we don't have sufficient funds to cover.

   What does the second statement do?

   A. It provides supporting evidence for the first statement.
   B. It draws a conclusion from the first sentence.
   C. It restates the central idea of the first sentence.
   D. It provides a contradictory point of view.

6. Read the passage below and then choose the best answer to the question from the list of lettered choices that follows.

   Scuba diving is the most exhilarating experience I have ever had. The first time I went, the dark mirror of the water beckoned me to drop from the side of the boat. I jumped feet first and entered a brightly colored world populated with fish, plants, and objects I had never dreamed of.

   Which of the following best describes the mood of the author after having this experience?
   A. Bored
   B. Anxious
   C. Excited
   D. Serene

7. Read the passage below and then choose the best answer to the question.

   Huge beasts such as the dinosaur have never really become extinct. Mothra, a giant caterpillar who later becomes a moth, destroys Tokyo, and stars in the 1962

Japanese film named for him. Mothra is born, dies, and reborn regularly on classic movie channels. In Japan, Mothra is one of the most popular films ever made. Mothra has survived the creation of more current scary creatures such as giant apes, extraterrestrial beings and swamp creatures. More than 30 years after his creation, Mothra still lives.

The main subject of the passage is:
A. the reasons that fads do not endure.
B. the lasting appeal of Mothra.
C. the difficulty of marketing good horror movies.
D. old models for creatures are still used because making new monsters is expensive.

8. Two underlined sentences are followed by a question or statement. Read the sentences, and then choose the best answer to the question or the best completion of the statement.

   Anxious to ensure that America would depart from European traditions regarding religion and royalty, the early U.S. could be described as a place that focused more on work than on the entertainment offered by spectacle and ceremony in the Old World.

   However, national celebrations such as the lighting of the White House Christmas Tree and the ceremonies used to swear in new federal officials give the American people some experiences that are based upon national tradition.

   What does the second sentence do?
   A. It cancels the meaning of the first sentence
   B. It provides an example of the first sentence.
   C. It adds more detail to the first sentence.
   D. It offers an exception to the information given in the first sentence.

9. Two underlined sentences are followed by a question or a statement. Read the sentences, and then choose the best answer to the question or the best completion of the statement.

   Public speaking is very different from everyday conversation.

First of all, speeches are much more structured than a typical informal discussion.

How are these sentences related?

A. Sentence two offers support for the statement made in the first sentence.
B. Sentence two contradicts the statement made in the first sentence.
C. Sentence two shows an exception to the first sentence
D. Sentence two compares two kinds of speeches.

10. Read the passages below, and then choose the best answer to the question. Answer the question on the basis of what is stated or implied in these passages.

Many people who have come close to death from drowning, cardiac arrest, or other causes have described near-death experiences - profound, subjective events that sometimes result in dramatic changes in values, beliefs, behavior, and attitudes toward life and death. These experiences often include a new clarity of thinking, a feeling of well being, a sense of being out of the body, and visions of bright light or mystical encounters. Such experiences have been reported by an estimated 30 to 40 percent of hospital patients who were revived after coming close to death and about 5 percent of adult Americans in a nationwide poll. Near-death experiences have been explained as a response to a perceived threat of death (a psychological theory); as a result of biological states that accompany the process of dying (a physiological theory); and as a foretaste of an actual state of bliss after death (a transcendental theory).

The primary purpose of this passage is to:

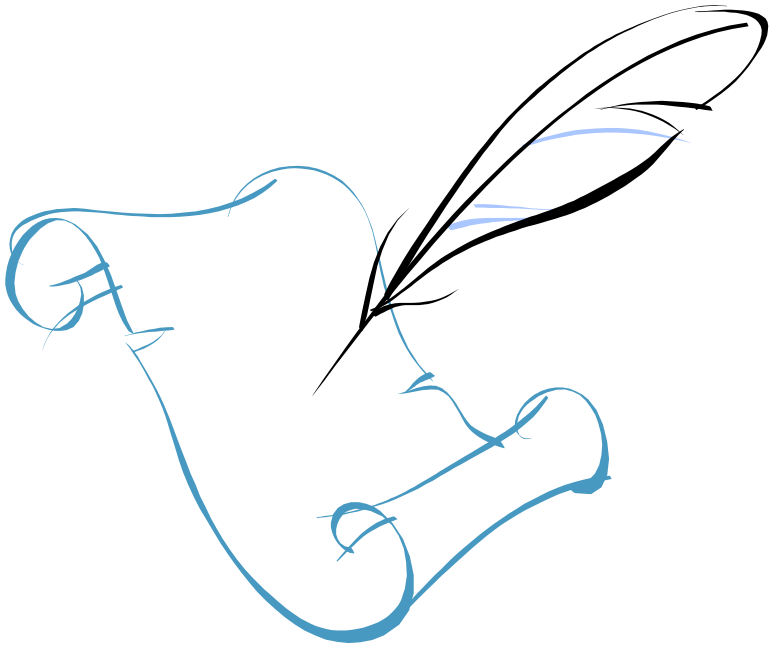
A. entertain
B. persuade
C. inform
D. express disbelief in the afterlife

ANSWER KEY

Review the questions you missed in the Reading Strategies sections indicated in parentheses following the correct answer.

1. D (Cause/Effect)
2. B (Comparison/Contrast)
3. D (Implied and Stated Ideas)
4. B (Supporting Details)
5. C (Main Idea)
6. C (Tone)
7. B (Main Idea)
8. D (Exception)
9. A (Supporting Details)
10. C (Main Idea)

SENTENCE SKILLS



Overview

The Sentence Skills section of ACCUPLACER contains 20 multiple choice questions that fall into two categories.

❖ The first category involves sentence correction questions that require an understanding of sentence structure. These questions ask you to choose the most appropriate word or phrase to substitute for the underlined portion of the sentence. If no changes need to be made to the sentence, the answer choice would be A.

Example: Ms. Rose planning to teach a course in biology next summer.

Select the best version of the underlined part of the sentence above.

a. planning

b. are planning

c. with a plan

d. plans *

If necessary, rewrite the sentence on your scratch paper, substituting each choice for the underlined part of the sentence. The correct answer is *d. plans*. The sentence should be "Ms. Rose plans to teach a course in biology next summer."

❖ The second type involves construction shift questions. These questions ask that a sentence be rewritten according to the criteria shown while maintaining essentially the same meaning as the original sentence.

Example: Being a female jockey, she was often interviewed.

Rewrite the sentence, beginning with:

She was often interviewed...

The next words will be:

on account of she was

by her being

because she was

being as she was

As in the previous section, rewrite the sentences on your scratch paper, substituting each choice to create a sentence that is well written and has the same meaning as the original sentence. The correct answer is *because she was*. The sentence should be "She was often interviewed because she was a female jockey."

Testing Tips

- ✓ Familiarize yourself with basic grammar rules.
- ✓ Reread the sentence with the answer you chose to make sure it sounds correct.
- ✓ Utilize scratch paper to write out the sentence.
- ✓ Remember: You should answer the question using proper grammar and English language skills, not how YOU would necessarily write or speak informally.

Sample Questions

The following questions ask you to rewrite sentences. You will be given information regarding what changes should be made to form your new sentence. The new sentence should be grammatically correct and have essentially the same meaning as the original.

1. *Writing a best seller had earned the author a sum of money and had freed him from the necessity of selling his pen for the political purposes of others.*

   Rewrite, beginning with

   The author was not obliged . . .

   The new sentence will include

   A) consequently he earned

   B) because he had earned

   C) by earning

   D) as a means of earning

Analysis of #1: In the above sample, you must rewrite the sentence to begin The author was not obliged... To decide what to do, look at the meaning of the original

sentence: What was the author "obliged" to do? The sentence says he was *faced with "the necessity of selling his pen," etc. Therefore, this necessity was his obligation.*

To retain this main idea, your new sentence must begin with "The author was not obliged to sell his pen for the political purposes of others..." But you must now complete the sentence to explain **why** he was not so obliged. To do so, test all four options (A--D) to see which fits your main clause best in both grammar and meaning. Write your options out! Don't jump at the first version you think sounds good!

A. The author was not obliged to sell his pen for the political purposes of others [consequently he earned] a sum of money by writing a best seller.

Note that this sentence makes little sense because his earning the money is not a consequence of his lack of obligation but rather the cause of it. Besides, the structure creates a run-on sentence, which is grammatically incorrect.

B. The author was not obliged to sell his pen for the political purposes of others [because he had earned] a sum of money by writing a best seller.

This version makes more sense because earning the money is in fact the cause of his not needing to sell his pen, and the sentence is grammatically correct.

C. The author was not obliged to sell his pen for the political purposes of others [by earning] a sum of money by writing a best seller.

At first glance, this sentence may seem to make sense, but "was not obliged...by earning" makes little sense and only clumsily conveys the idea.

D. The author was not obliged to sell his pen for the political purposes of others [as a means of earning] a sum of money by writing a best seller.

This sentence also makes no sense because not selling his pen is not a means of earning money but rather a result of such earning.

Therefore, of the four choices, **B** is clearly the best.

2. *Jose wanted to study he tried to keep his roommates quiet; but he did not succeed.*

   A) Jose wanted to study he tried to keep

   B) Jose wanted to study, he tried to keep

   C) Because he wanted to study, Jose tried to keep

   D) Jose wanting to study, and trying to keep

Analysis of #2: In this sample, you must examine four versions of the same sentence to determine which one is grammatically correct.

A: Jose wanted to study he tried to keep his roommates quiet; but he did not succeed.

This version places two independent clauses together with no separating punctuation. Therefore, version A is a run-on sentence, which is not correct.

B: Jose wanted to study, he tried to keep his roommates quiet; but he did not succeed.

This version places two independent clauses together with only a comma to separate them, creating a comma splice, which is grammatically incorrect.

C: Because he wanted to study, Jose tried to keep his roommates quiet; but he did not succeed.

In this version, the opening clause has been changed from an independent (main) clause to a dependent (subordinate) clause introduced by the subordinating conjunction "Because". Therefore, we no longer see two main clauses strung together incorrectly. The subordinate clause is correctly separated from the following main cause by a comma, so this version of the sentence is correct.

D: Jose wanting to study, and trying to keep his roommates quiet; but he did not succeed.

You notice that in this version, the past tense verbs "wanted" and "tried" have been changed to -ing verbs. But "wanting" and "trying" by themselves do not create a definite time frame for the actions. The word "trying" could be taken to mean "is trying," "was trying", "has been trying," "will be trying," etc. Each of these verb structures indicates a different time frame. So, an -ing verb form by itself is not a COMPLETE verb; it requires a helping verb to fix the time of the action. Therefore, the verb structures in version D are incomplete, and the sentence is thus an incorrect fragment.

Therefore, answer **C** is the only correct choice here.

Practice Questions

3. In the modern world, groups of people living thousands of miles apart may still be dependent on each other politically, culturally, and economically.

   Change people living to people may live.

   Your new sentence will include

   A) apart and still be dependent

   B) apart so as to be dependent still

   C) apart, they are still dependent

   D) apart, but would still be dependent

4. Predictions twenty years ago that the phonograph record was about to become obsolete have proven to be true.

   A) Predictions twenty years ago that

   B) Predictions twenty years ago,

   C) Twenty years ago, predictions that

   D) Predictions, twenty years ago

5. When you move out of an apartment before the contract expires, this is an example of breaking a lease.

   A) When you move out of an apartment before the contract expires, this

   B) You move out of an apartment before the contract expires, this

   C) Moving out of an apartment before the contract expires

   D) The fact that you move out of an apartment before the contract expires

6. Knocked to his knees, the quarterback looked as if he were in pain.

   A) Knocked to his knees, the quarterback looked

   B) The quarterback was knocked to his knees, looked

C) The quarterback looked knocked to his knees

D) The quarterback, looking knocked to his knees,

7. Yesterday the President announced that he would retire from political life, to amazed reporters.

   A) Yesterday the President announced that he would retire from political life, to amazed reporters.

   B) Yesterday the President announced that he would retire from political life, amazing reporters.

   C) The President, to the amazement of reporters, announced that he would retire from political life yesterday.

   D) Yesterday the President announced to amazed reporters that he would retire from political life.

THE ANSWERS

1. B
2. C
3. A
4. A
5. C
6. A
7. D

Resource Guide

General Websites

www.studyguidezone.com/accuplacertest.htm

www.testprepreview.com/accuplacer_practice.htm

www.collegeboard.com/student/testing/ACCUPLACER/

www.google.com – in the search box, type "ACCUPLACER practice"

www.amazon.com – in the search box, type "ACCUPLACER"

www.sparknotes.com

www.cliffsnotes.com

Reading/Grammar Websites

www.chompchomp.com

www.dailygrammar.com

www.grammar-monster.com

Basic Math/Algebra Websites

ncc.mymathtest.com

www.purplemath.com

www.math.com

www.mathmix.com

www.algebrahelp.com

www.mathgoodies.com

Books/Study Guides
(available at libraries and major bookstores)

SAT/ACT/GED study guides (publishers such as Kaplan, Princeton Review, CollegeBoard, Barron, McGraw-Hill)

Cliffs Quick Review book

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