<u>Solutions to Tutorial Set 7 – Some Basic English Gramma - 1</u>

1. What is the plural of the word people?

    Answer: People (The plural is the same as the singular form.)

2. What is the plural of the word fish?

    Answer: fish (The plural is the same as the singular form.)

3. What is the plural of the word sheep?

    Answer: Sheep (The plural is the same as the singular form.)

4. Concerning words with the letters ie and ei, there is a saying "i before e except after e or when pronounce as a as in neighbor or weigh". Write 3 words where the i comes before the e and write 3 words where the e comes before the i.

    Answer:

    Words where the i comes before the e: thief, tie, tier

    Words where the e comes before the i: vein, weird, weight

5. Tell which of these two sentences is correct and tell why.

    A. I go to school with he.

    B. I go to school with him.

    Answer: Sentence B is correct. The word with him is the object of a preposition.

    After a preposition the objective (accusative) form of a pronoun, where it differs from the subjective (nominative) form, must always be used.

6. What is the past tense of the word read?

    Answer: Read

    In English, many verbs behave in a funny way. This pushes us to consider their groups or categories. For instance, the verb "**to read**" is an example of an irregular verb. Meaning that not much changes could be observed when used in different contexts except in the **third person singular** and the **present participle or gerund. Consider the illustrative example below;**

    Simple present: **Read; Simple** Past: Read**; Past participle: Read; Third** Pers. Sing: **Reads** Present continuous: **Reading**

Note from above that the different forms are almost the same but for the last two. However, the past tense of the verb "to read" is only heard in pronunciation. For instance, the verb is (based form) **read** pronounced as **(REED)** the past tense is pronounced as **(RED).**

Finally, read as an irregular verb in the infinitive form, forms its past tense as in RED only when pronouncing the word. The mistake some learners commit is to consider the RED like the color red.

7.   What is wrong with this sentence?

All twelve of the football players is big.

Answer: Use are. The plural form is needed.

8.   What is wrong with this sentence?

He give his time helping others.

Answer: Use gives since it is the singular form.

9.   Which one of the following two sentences is correct?

A. There were 12 mens with Jesus at the last supper.

B. There were 12 men with Jesus at the last supper.

Answer: Answer B is correct. The plural and singular forms are the same. (For possessive case, use men's.)

10.   He go to school on the bus.

Answer: Use goes since it is singular.

11.   You is invited to the program.

Answer: Use are since it is plural.

Solutions to Tutorial Set 8 – Some basic Physics and Related Questions -1

1. Name the 8 planets of our solar system in order of their distance from the sun. (Do not include Pluto in that it is considered to be a "dwarf" planet.)

   Answer:

   The inner, rocky planets are Mercury, Venus, Earth and Mars. The outer planets are gas giants Jupiter and Saturn and ice giants Uranus and Neptune.

   Beyond Neptune, a newer class of smaller worlds called dwarf planets reign, including perennial favorite Pluto.

2. Which of the following is the approximate distance of the sun from earth?
   a. 100,000 miles
   b. 20 billion miles
   c. 93 million miles
   d. 5 million miles

   Answer c.

   Answer: When the Earth is closest to the sun, we call that perihelion, and it's approximately 91.5 million miles. When the Earth is farthest from the sun, it's called aphelion, and it's approximately 94.5 million miles.

3. Which of the following is the approximate distance of the moon from earth?
   a. 5,000 miles
   b. 240,000 miles
   c. 93 million miles
   d. 3 billion miles

   Answer b.

   The mean semi-major axis has a value of 384,402 km (238,856 mi).[1] The time-averaged distance between Earth and Moon centers is 385,000.6 km (239,228.3 mi). The actual distance varies over the course of the orbit of the Moon, from 356,500 km (221,500 mi) at the perigee to 406,700 km (252,700 mi) at apogee, resulting in a differential range of 50,200 km (31,200 mi).[2]

4. What is the approximate speed of light?
   a. 8 million miles per second
   b. 250,000 miles per second
   c. 186,000 million per second
   d. 8 billion miles per second

Answer: None of the above. Number c should have been 186,000 miles per second. (Omit the word million).

5. What is the approximate speed of sound?
    a. 767 miles per hour
    b. 200,000 miles per hour
    c. 50 million miles per hour
    d. 200 miles per hour

    Answer a.

    At 20 °C (68 °F), the speed of sound in air is about 343 metres per second (1,235 km/h; 1,125 ft/s; 767 mph; 667 kn), or a kilometre in 2.9 s or a mile in 4.7 s. It depends strongly on temperature as well as the medium through which a sound wave is propagating.

6. Sound travels through the air or another medium causing a vibration. For humans, sound is defined as the range of vibrations per second that can be heard. Which of the following two ranges of vibrations are used to define sound?
    a. 5 to 50,000 second
    b. 20 to 20,000 per second
    c. 8,000 to 80,000 per second
    d. 16 to 16,000 per second

    Answer: Answer b. As an alternative, 16 to 16,000 vibrations per second is sometimes used.

7. In art primary colors are often defined as a set of colors that can be mixed to produce all other colors. Which of the following are usually considered to be the three primary colors?
    a. Black, white and red
    b. red, green and blue
    c. yellow, violet and black
    d. red, white and blue

    Answer b.

    In modern color theory, also known as the RGB color model, red, green and blue are additive primary colors. Red, green and blue light combined together makes white light, and these three colors, combined in different mixtures, can produce nearly any other color. This is the principle that is used to make all of the colors on your computer screen and your television.

8. There is a key on the piano that is referred to as A440. Where is that key located and to what does 440 refer?

Answer:

A440 (also known as **Stuttgart pitch**), or **A₄** in [scientific pitch notation](#), is the [musical pitch](#) corresponding to an audio frequency of 440 [Hz](#), which serves as a tuning standard for the [musical note](#) of [A](#) above [middle C](#). It is standardized by the [International Organization for Standardization](#) as **ISO 16**. While other frequencies have been, and occasionally still are, used to tune the first A above middle C, A440 is now commonly used as a reference frequency to calibrate acoustic equipment and to tune [pianos](#), [violins](#), and other [musical instruments](#).

9. A submarine communicates by which of the following methods?
    a. radar
    b. b sonar
    c. radio waves
    d. light

Answer b.

Because [radio waves](#) do not travel well through good [electrical conductors](#) like [salt water](#), submerged [submarines](#) are cut off from [radio communication](#) with their command authorities at ordinary radio frequencies. Submarines can surface and raise an [antenna](#) above the sea level, then use ordinary radio transmissions, however this makes them vulnerable to detection by [anti-submarine warfare](#) forces.

[Sound](#) travels far in water, and underwater [loudspeakers](#) and [hydrophones](#) can cover quite a gap. Apparently, both the [American](#) ([SOSUS](#)) and the [Russian](#) navies have placed sonic communication equipment in the seabed of areas frequently traveled by their submarines and connected it by [underwater communications cables](#) to their land stations. If a submarine hides near such a device, it can stay in contact with its headquarters.

10. What is the approximate circumference of the earth (around the equator)?
    a. 4,000 miles
    b. 24,900 miles
    c. 100,000 miles
    d. 500,000 miles

Answer b.

The circumference of the earth at the equator is 40,075.16 kilometers (24,901.55 miles).

Solutions to Tutorial Set 9 – Some Very Simple Chemistry

1.   Which of the following is not found in the nucleus of an atom?

     a.   A proton
     b.   An electron
     c.   A neutron

     Answer b.

     The **atomic nucleus** is the small, dense region consisting of protons and neutrons at the center of an atom

2.   Which of the following have a negative charge?

     a.   A proton
     b.   An electron
     c.   A neutron

     Answer b.

3.   How many electrons does a hydrogen atom have?

     Answer is 1.

     The electrically neutral atom contains a single positively charged proton and a single negatively charged electron bound to the nucleus by the Coulomb force.

4.   What is the second lightest element?

     The answer is helium.

     Whereas hydrogen is the lightest element with 1 electron and one protons, hhelium is composed of two electrons bound by the electromagnetic force to a nucleus containing two protons along with either one or two neutrons, depending on the isotope, held together by the strong force.

5.   What is H two 0?

     Answer is water.

     Water's chemical formula is H_2O, meaning that each of its molecules contains one oxygen and two hydrogen atoms, connected by covalent bonds

6.   Which of the following elements could be used to make atom bombs?

    a.   Chlorine
    b.   Iron
    c.   Uranium

    Answer is c.

    On August 6, one of the modified B-29s dropped a uranium gun-type bomb ("Little Boy") on Hiroshima. Another B-29 dropped a plutonium implosion bomb ("Fat Man") on Nagasaki three days later.

7.   Which of the following two elements compose table salt?

    a.   Hydrogen and oxygen
    b.   Sodium and chlorine
    c.   Nitrogen and carbon

    Answer is b.

8.   Air consists of a number of elements. Which of the following elements is the greatest in air?

    a.   Helium
    b.   Oxygen
    c.   Nitrogen

    Answer is c. Nitrogen and oxygen are the greatest two elements; Nitrogen, N2 being 78.084% and Oxygen, O_2 being 20.9476%.

9.   If an element loses some of its electrons, will it become negatively or positively charged?

    Answer: It will become positively charged.

10.   What determines the atomic number and what determines the atomic weight of an atom?

    Answer: The atomic number is the number of protons (same of the number of electrons if neutral); the atomic weight is the total number of particles in the nucleus which is the number of protons plus the number of neutrons.

Solutions to Tutorial Set 10 Multiplication and Division

1. Multiply the following numbers by hand. (You may use a calculator to check your answer.)

    a. 456 x 45

        Solution:

        ```
            456
            x45
           2280
           1824
          20520
        ```

    b. 5898 x 10

        Solution:

        ```
           5898
            x10
           0000
           5898
          58980
        ```

    c. 8064 * 68

        Solution

        ```
           8064
            x68
          64512
          48384
         548352
        ```

    d. 6744* 1000

        Solution: 6744000; Just add 3 zeros to the end of the number.

2. Divide the following numbers by hand and round to the nearest hundredth. (You may use a calculator to check your answer.)

    a.   458/23

        Solution: Answer is 19.91

```
            19.913
      23 458.000
         23_
         228
         207
           210
           207
             30
             23
             70
             69
              1
```

    b.   8300/952

        Solution: Answer is 8.72

```
            8.718
    952 8300.000
        7316
          6840
          6664
          1760
           952
          8080
          7616
           464
```

    c.   65739/1000

        Solution: Answer is 65.739 rounded to 65.74; move the decimal point (assumed at the end of the number) 3 place to the left.

    d.   45/1000

        Solution: Answer is .045 rounded to .05; move the decimal point (assumed at the end of the number) 3 place to the left.

Solutions to Tutorial Set 11 Adding Fractions – An Introduction

Considering a fraction represented as num/den; num is called the numerator and den is called the denominator, so given 4/7, 4 is the numerator and 7 is the denominator.

Two fractions can be added only if their denominators are the same. If the denominators are the same, add the two numerators and use the denominator. As an example, $3/2 + 5/2 = 8/2$.

If the denominators are not the same, we must change the fractions so as to make the denominations the same. In doing so, remember that multiplying a fraction by a value such as X/X is just multiplying by the value 1, so it is legal. So if we wish to add $2/3 + 4/5$ we can multiply 2/3 by 5/5 to get 10/15 and multiply 4/5 by 3/3 to get 12/15. Then, $2/3 + 4/5$ is the same as $10/15 + 12/15 = 22/15$.

If you can follow this, we are saying that to add N1/D1 + N3/D4 (having different denominators, multiply the first number by D4/D4 and the second number by D1/D1 to give (N1/D1)xD4/D4) +

(N3/D4)x(D1/D1). This give (N1xD4)/(D1xD4) + (N3xD1)/(D1xD4); Now both numbers have the denominator of D1xD4.

Note that we multiply numerator by numerator and denominator be denominator.

This is called a common denominator. However, we would like to have the smallest possible common denominator which is called the least common denominator. We will discuss that later. However, the method we just presented often results in the least common denominator.

An additional example:

$3/5 + 4/3 = (3/3)*(3/5) + (5/5)x(4/3) = 9/15 + 20/15 = 29/15$.

Later, we will also discuss reducing fractions to their lowest term.

Now, you tried it.

I.   Adding Fractions with common denominators

   Solutions:

   a. $2/4 + 5/4 = 7/4$ b. $6/9 + 5/9 = 11/9$ c. $5/8 + 2/8 = 7/8$

   d. $4/3 + 2/3 = 6/3$ e. $4/9 + 3/9 = 7/9$

II. Adding Fractions with different denominators

    a. $2/3 + 6/4 =$

       Solution

         $2/3 + 6/4$;Multiply the denominators.

       Multiply 3x4 = 12 for a common denominator. $2/3 = (4/4)(2/3) = 8/12$

                                             $6/4 = (3/3)(6/4) = 18/12$

       $8/12 + 18/12 = 26/12$

    b. $4/5 + 3/7=$

       Solution

       $4/5 + 3/7$;Multiply the denominators.

       Multiply 5x7 = 35 for a common denominator. $4/5 = (7/7)(4/5) = 28/35$

                                             $3/7 = (5/5)(3/7) = 15/35$

       $28/35 + 15/35 = 43/35$

    c. $3/4 + 2/6 =$

       Solution

       $3/4 + 2/6$;Multiply the denominators.

       Multiply 4x6 = 24 for a common denominator. $3/4 = (6/6)(3/4) = 18/24$

                                             $2/6 = (4/4)(2/6) = 8/24$

       $18/24 + 8/24 = 26/24$

d. $2/8 + 4/3 =$

Solution

$2/8 + 4/3$; Multiply the denominators.

Multiply 8x3 = 24 for a common denominator. $2/8 = (3/3)(2/8) = 6/24$

$$4/3 = (8/8)(4/3) = 32/24$$

$6/24 + 32/24 = 38/24$

e. $4/9 + 4/5 =$

Solution

$4/9 + 4/5$;Multiply the denominators.

Multiply 9x5 = 45 for a common denominator. $4/9 = (5/5)(4/9) = 20/45$

$$4/5 = (9/9)(4/5) = 36/45$$

$20/45 + 36/45 = 56/45$