Basic Conversions

Common Mistakes:
1. Did not show ALL MATH and ALL UNITS in determining an answer
2. Did not show the correct number of significant digits
3. As a comment – numbers in the thousands and millions, put in the comma: 1,234   1,234,567.0
4. As a comment – for readability with a decimal with a lot of zero's, put in a space every 3 zero's:
     0.000 000 012345
   But, that number above should be expressed as Scientific Notation: 1.2345×10^{-8}
5. Numbers greater than 999 or less than 0.01 should be expressed in Scientific Notation

13 How far can you travel in one second when moving at 65 mph?

Problems: Express the following Scientific Notation as a decimal value:

9   a. 6.442×10^3 g. 9.721×10^{-4}
    b. 5.991×10^{-5} h. 2.015×10^6
    c. 2.001×10^4 i. 5.583×10^{-2}
    d. 1.997×10^{-3} j. 4.227×10^{-6}
    e. 7.871×10^{-1} k. 9.734×10^3 .
    f. 1.001×10^1 l 1.000×10^1

20 0.5 kg is how many pounds?

23 Convert 50. Miles to km?

    Convert 100. km to miles?

43 Express the following:\

    102.4005   to five digits   15.9995   to three digits
    1.6385   to four digits   7.355   to three digits

47 0.005215 * 0.08212 * 273.2 / 4.1 = ?

64 a. 2.23 m   to yards

    b. 46.2 yd to meters

    c. 292 cm to inches

    d. 881.2 in to centimeters

e. 1043 km to miles

f. 445.5 mi to kilometers

g. 36.2 m to kilometers

h. 0.501 km to centimeters

79 Convert the following temperatures ($^{\circ}$F to $^{\circ}$C)

45 $^{\circ}$F

115° F

-10 $^{\circ}$F

10,000. $^{\circ}$F

80 Convert the following temperatures ($^{\circ}$C to $^{\circ}$F)

78.1 $^{\circ}$C

40. $^{\circ}$C

-273 $^{\circ}$C

32 $^{\circ}$C

93   CH_3CH_2OH [Ethanol] has a density of 0.785 g/ml, what is the volume 82.5 g of Ethanol?

109   Convert 45 mi/gal to km/liter? (Car miles per gallon to metric)

        Convert 38 mi/gal to metric

133   Is 100 km/h > 65 mph

156   If an object has a density of 155 lb per 4.2 ft^3, what is its density in the metric system?

12 Does copper react with Nitric Acid?

18 Are these Chemical or Physical Changes?
   A   Shirt scorches
   B   Tires flat in cold
   C   Silver gets black
   D   Wine to vinegar
   E   Cleaner grease to soap
   F   Battery leaks
   G   Acids produce bacteria

H   sugar will char
I   Hydrogen Peroxide fizzes
J   Dry ice evaporates
K   Bleach changes color

28   3 examples of heterogeneous mixtures,
     What is the difference between a Solutions vs Mixtures

44   526 J to warm 7.40 g water by 17 deg C   How much heat is required to warm 7.40 g of water by 55 deg C

50   Convert 76.52 cal -> Kjoules

     Convert 7.824 Kj ->   Kcal

     Convert 489.4 j   ->   cal

     Convert 1.598 x 10^4 j -> kcal

ANSWERS

13 How far can you travel in one second when moving at 65 mph?\

$\dfrac{65 \text{ miles}}{\text{Hour}}$ x $\dfrac{5280 \text{ ft}}{\text{mile}}$ x $\dfrac{1 \text{ hr}}{60 \text{ min}}$ x $\dfrac{1 \text{ min}}{60 \text{ sec}}$ = 95.33 ft = 95 ft (2 SD)

Problems: Express the following Scientific Notation as a decimal value:

9 a. 6.442 x 10^3   6,442.   g. 9.721 x 10^-4   0.0009721
   b. 5.991 x 10^-5   0.00005991   h. 2.015 x 10^6   2,015,000
   c. 2.001 x 10^4   20,010   i. 5.583 x 10^-2   0.05583
   d. 1.997 x 10^-3   0.001997   j. 4.227 x 10^-6   0.000 004227
   e. 7.871 x 10^-1   0.7871   k. 9.734 x 10^3   9734.
   f. 1.001 x 10^1   10.01   l   1.000 x 10^1   10.00

20 0.5 kg is how many pounds?

0.5 kilogram x $\dfrac{1000 \text{ g}}{1 \text{ kilogram}}$ x $\dfrac{1 \text{ pound}}{454 \text{ g}}$ = 1.101 = 1 pound   (1 SD)

23 Convert 50. Miles to km?

50. miles   x $\dfrac{5280. \text{ ft}}{1 \text{ mile}}$ x $\dfrac{12 \text{ inches}}{1 \text{ ft}}$ x $\dfrac{2.54 \text{ cm}}{1 \text{ inch}}$ x $\dfrac{1 \text{ Meter}}{100 \text{ cm}}$ x $\dfrac{1 \text{ Kilometer}}{1000 \text{ Meters}}$ = 80.46 km = 81. Km (2 SD)

Convert 100. km to miles?

100. kilometers x $\dfrac{1,000 \text{ Meters}}{1 \text{ Km}}$ x $\dfrac{100 \text{ cm}}{1 \text{ Meter}}$ x $\dfrac{1 \text{ inch}}{2.54 \text{ cm}}$ x $\dfrac{1 \text{ ft}}{12 \text{ inches}}$ x $\dfrac{1 \text{ mile}}{5280 \text{ ft}}$ = 62.1 miles (3 SD)

43 Express the following:\

102.4005   to five digits   102.40   15.9995   to three digits   16.0
1.6385   to four digits   1.639   7.355   to three digits   7.36

47 0.005215 * 0.08212 * 273.2 / 4.1 = ?

report to 2 digits, 4.1 has only 2 significant digits

64   a.   2.23 m   to yards

2.23 m   X $\dfrac{100 \text{ cm}}{1 \text{ m}}$ X $\dfrac{1 \text{ in}}{2.54 \text{ cm}}$ X $\dfrac{1 \text{ yard}}{36 \text{ in}}$ =   2.4381 yards = 2.44 yards   (3 SD)

b.   46.2 yd to meters

46.2 yd   X $\dfrac{36 \text{ in}}{1 \text{ yd}}$ X $\dfrac{2.54 \text{ cm}}{1 \text{ in}}$ X $\dfrac{1 \text{ m}}{100 \text{ cm}}$ =   42.245 m = 42.2 m   (3 SD)

c.   292 cm to inches

292 cm   X $\dfrac{1 \text{ in}}{2.54 \text{ cm}}$ =   114.96 in = 115 in   (3 SD)

d.   881.2 in to centimeters

881.2 in X $\dfrac{2.540 \text{ cm}}{1 \text{ in}}$ =   2238.248 cm = 2238 cm   [Note I put in an extra zero on the 2.54 cm/in to keep 4 significant figures]

e.   1043 km to miles

1043 km X $\dfrac{1000 \text{ m}}{1 \text{ km}}$ X $\dfrac{100 \text{ cm}}{1 \text{ m}}$ X $\dfrac{1 \text{ in}}{2.54 \text{ cm}}$ X $\dfrac{1 \text{ ft}}{12 \text{ in}}$ X $\dfrac{1 \text{ mi}}{5280 \text{ ft}}$ =   648.090 mi = 648.1 mi   (4 Sd)

f.   445.5 mi to kilometers

445.5 mi   X $\dfrac{5280 \text{ ft}}{1 \text{ mi}}$ X $\dfrac{12 \text{ in}}{1 \text{ ft}}$ X $\dfrac{2.54 \text{ cm}}{1 \text{ in}}$ X $\dfrac{1 \text{ m}}{100 \text{ cm}}$ X $\dfrac{1 \text{ km}}{1000 \text{ m}}$ =   716.962 = 717.0   (4 SD)

g.   36.2 m to kilometers

36.2 m   X $\dfrac{1 \text{ km}}{1000 \text{ m}}$ = 0.0362 km = 3.62×10^{-2} km   (3 SD)

h.   0.501 km to centimeters

0.501 km   X $\dfrac{1000 \text{ m}}{1 \text{ km}}$ x $\dfrac{100 \text{ cm}}{1 \text{ m}}$ =   50,100 = 5.01×10^{4} cm   (3 SD, must be in Scientific Notation)

79 Convert the following temperatures ($^\circ$F to $^\circ$C)   Tc = [F – 32] / 1.80   -or-   Tc = [F – 32] * 5/9

   (**45 $^\circ$F** – 32) x 5/9 = 7.222 C = 7.2 $^\circ$C   (2 SD)

   (**115°** F – 32) x 5/9 = 46.111 C = 46.1 $^\circ$C   (3 SD)

   (**-10 $^\circ$F** – 32) x 5/9 = =23.3333 C = -23 $^\circ$C   (2 SD, assumed -10 is -10.)

   (**10,000. $^\circ$F** – 32) x 5/9 = 5537.777 = 5,537.7 $^\circ$C (5 SD)

   Answer Note: Temperature is reported to the number of SD equal to the lowest number of SD in the starting temp

80 Convert the following temperatures ($^\circ$C to $^\circ$F) T_f = (9/5 * Tc) + 32

   (**78.1 $^\circ$C** * 9/5) + 32 = 172.58 $^\circ$F = 173 $^\circ$F   (3 SD)

   (**40. $^\circ$C** * 9/5) + 32 = 104 $^\circ$C = 100 $^\circ$C   (2 SD, Note should be expressed as 1.0 x 10^2 $^\circ$C)

   (**-273 $^\circ$C** * 9/5) + 32 = -459.4 $^\circ$F = -459 $^\circ$F   (3 SD)

   (**32 $^\circ$C** * 9/5) + 32 = 89.6 $^\circ$F = 90 $^\circ$F = 90. $^\circ$F   (2 SD)

93   CH_3CH_2OH [Ethanol] has a density of 0.785 g/ml, what is the volume 82.5 g of Ethanol?

          82.5 g   X   1 ml   =   105.095 ml = 105 ml (3 SD)
                       0.785 g

109   Convert 45 mi/gal to km/liter? (Car miles per gallon to metric)

   45 mi   X   5280 ft X   12 in   X   2.54 cm X   1 m   X   1 km   X   1 gal   1.057 qts   =   19.137 = 19 km/Liter
   gal   Mi   ft   in   100 cm   1000 m   4 qts   1 l

   Convert 38 mi/gal to metric

   38 mi   X   5280 ft X   12 in   X   2.54 cm X   1 m   X   1 km   X   1 gal   1.057 qts   =   16.160 = 16 km/Liter
   gal   Mi   ft   in   100 cm   1000 m   4 qts   1 Liter

133   Is 100 km/h > 65 mph

   100 km X   1000 m X   100 cm X   1 in   X   1 ft   X   1 mi   =   62.137 = 62.1 mph = NO
      Hr   1 km   1 m   2.54 cm   12 in   5280 ft

156   If an object has a density of 155 lb per 4.2 ft^3, what is its density in the metric system?

   Den = mass / vol
   155 lb   X   453.6 g X   1 ft^3   X   1 in^3   =   0.591167 = 0.591 g/cm^3 (3 SD)
   4.2 ft^3   1 lb   12 in x 12 in x 12 in   2.54 cm X 2.54 cm X 2.54 cm

12 Does copper react with Nitric Acid?

Chemical Change   Cu(s) + 4HNO3(aq) ——> Cu(NO3)2(aq) + 2NO2(g) + 2H2O(l)
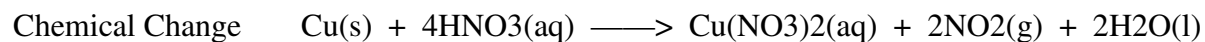
http://www.angelo.edu/faculty/kboudrea/demos/copper_HNO3/Cu_HNO3.htm

18 A   Shirt scorches   Chemical
    B   Tires flat in cold   Physical
    C   Silver gets black   Chemical
    D   Wine to vinegar   Chemical
    E   Cleaner grease to soap   Chemical
    F   Battery leaks   Chemical (White / Blue Green gunk around an electrode)
    G   Acids produce bacteria   Chemical
    H   sugar will char   Chemical
    I   Hydrogen Peroxide fizzes   Chemical $H_2O_2 -> H_2O + O_2 \uparrow$
    J   Dry ice evaporates   Physical
    K   Bleach changes color   Chemical

28 3 examples of heterogeneous mixtures,
    What is the difference between a Solutions vs Mixtures

44 526 J to warm 7.40 g water by 17 deg C   How much heat is required to warm 7.40 g of water by 55 deg C

$$\frac{17 \text{ deg C}}{526 \text{ J}} = \frac{55 \text{ deg C}}{X}$$ X = 1701 J

50 Convert 76.52 cal -> Kjoules

76.52 cal   x $\frac{1 \text{ kcal}}{1000 \text{ cal}}$ x $\frac{4.184 \text{ kJ}}{1 \text{ kcal}}$ =   0.3202 kJ

Convert 7.824 Kj ->   Kcal

7.824 Kj   x $\frac{1 \text{ kcal}}{4.184 \text{ kJ}}$ =   1.870 kcal

Convert 489.4 j   ->   cal

489.4 j   x $\frac{1 \text{ cal}}{4.184 \text{ J}}$ =   117.0 cal

Convert 1.598 x 10^4 j -> kcal

$$1.598 \times 10^4 \quad \text{x} \quad \frac{1 \text{ kJ}}{1000 \text{ J}} \quad \text{X} \quad \frac{1 \text{ kcal}}{4.184 \text{ kJ}} \quad = \quad 3.819 \text{ kcal}$$