

Determining SIG Figs

101

3

0.1

1

0.05

1

0.050

2

1,457.0

5

1,457,000

4

1,000,000

1

1,000,000.0

8

14

2

14.0

3

14.00

4

14,000

2

14,101

5

14,101,000

5

Determining sig figs

1,010³

1,011⁴

1,011.0⁵

1,011,000⁴

1,011,000.00⁹

1,011,000.000¹⁰

$\left(\frac{12 \text{ ft}}{84 \text{ inches}} \right)$

unlimited

5 apples

unlimited

6 entries

unlimited

$\left(\frac{6.02 \times 10^{23} \text{ atoms Ag}}{1 \text{ mol Ag}} \right)$

unlimited

124.0⁴

1240³

1240.00⁶

Operations with SIGFIGS

$$(41.29)(5.05) = 209$$

$$12 \times 12.0 = 140$$

$$0.001 \times 15.9 \times 41.6987 = 0.7$$

$$12.0 + 12 = 24$$

$$12.0 + 12.0 = 24.0$$

$$\frac{6.98 \times 14.91}{1.003} = 104$$

$$\frac{(9.05 - 1.008) + (6.534 - 1.009)}{(4.975 + 6.988)(1.4978 - 0.5149)} = 1.154$$

Determine the MEAN of these ~~scores~~ ^{measurements}

95.5, 80.5, 91.0, 93, 97.5

$$95.5 + 80.5 + 91.0 + 93 + 97.5 = 458$$

$$\frac{458}{5}$$

=

91.6

unlimited
(centres)

Metric Prefixes

M	-	MEGA	-	10^6	-	1,000,000
	-	kilo	-	10^3	-	1,000
K	-		-		-	
	-	deci	-	10^{-1}	-	0.1
d	-		-		-	
	-	centi	-	10^{-2}	-	0.01
c	-		-		-	
	-	milli	-	10^{-3}	-	0.001
m	-		-		-	
	-	micro	-	10^{-6}	-	0.000001
μ	-		-		-	
	-	nano	-	10^{-9}	-	0.000000001
n	-		-		-	
	-	pico	-	10^{-12}	-	0.000000000001
p	-		-		-	

How many grams in a kg? 1000

How many nanometers in a meter? 10^9

How many grams in a Mg? 10^6

How many grams in a mg? 10^{-3}

MetRIC Conversion

- Use D.A.

$$14.9 \text{ mL} = ? \text{ cL}$$

$$14.9 \text{ mL} \left(\frac{1 \text{ cL}}{10 \text{ mL}} \right) = \boxed{1.49 \text{ cL}}$$

$$15,900 \text{ g} = ? \text{ kg}$$

$$15,900 \text{ g} \left(\frac{1 \text{ kg}}{1000 \text{ g}} \right) = \boxed{15.9 \text{ kg}}$$

$$0.05 \text{ mm} = ? \text{ m}$$

$$0.05 \text{ mm} \left(\frac{1 \text{ m}}{1000 \text{ mm}} \right) = \boxed{0.00005 \text{ m}}$$

$$15.5 \text{ mm} = ? \text{ cm}$$

$$15.5 \text{ mm} \left(\frac{1 \text{ cm}}{10 \text{ mm}} \right) = \boxed{1.55 \text{ cm}}$$

$$1400 \text{ cm} = ? \text{ km}$$

$$1400 \text{ cm} \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) \left(\frac{1 \text{ km}}{1000 \text{ m}} \right) = \boxed{0.01400 \text{ km}}$$

$$1400 \text{ km} = ? \text{ cm}$$

$$1400 \text{ km} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right) \left(\frac{100 \text{ cm}}{1 \text{ m}} \right) = \boxed{140000000 \text{ cm}} \\ \boxed{1.4 \times 10^8 \text{ cm}}$$

$$9,050 \text{ mL} = ? \text{ L}$$

$$9050 \text{ mL} \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right) = \boxed{9.050 \text{ L}}$$

$$9,050 \text{ mL} = ? \text{ dL}$$

$$9050 \text{ mL} \left(\frac{1 \text{ dL}}{100 \text{ mL}} \right) = \boxed{90.5 \text{ dL}}$$

$$9,050 \text{ dL} = ? \text{ cL}$$

$$9050 \text{ dL} \left(\frac{10 \text{ cL}}{1 \text{ dL}} \right) = \boxed{90,500 \text{ cL}}$$

$$375 \text{ mg} = ? \text{ g}$$

$$375 \text{ mg} \left(\frac{1 \text{ g}}{1000 \text{ mg}} \right) = \boxed{0.375 \text{ g}}$$

$$375 \text{ mg} = ? \text{ cg}$$

$$375 \text{ mg} \left(\frac{1 \text{ cg}}{10 \text{ mg}} \right) = \boxed{37.5 \text{ cg}}$$

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$D = \frac{m}{V}$$

① 15.0 g takes up a volume of 45 cm³. Density = ?

$$D = \frac{m}{V} = \frac{15.0 \text{ g}}{45 \text{ cm}^3} = \boxed{0.33 \text{ g/cm}^3}$$



What is the volume if Density is 0.33 g/cm³ and mass is 15.0 g?

$$D = \frac{m}{V} \quad \text{so} \quad DV = m \quad \text{so} \quad V = \frac{m}{D}$$

$$V = \frac{15.0 \text{ g}}{0.33 \text{ g/cm}^3} = \boxed{45 \text{ cm}^3}$$

Accuracy & Precision

Which group is most precise

- a) 6, 7, 8
- b) 6.0, 7.0, 8.0
- c) 6.0, 6.5, 7.0
- d) 6.0, 7.0, 8.0

Use Dimensional Analysis to solve the following:

$$500 \text{ cm} = ? \text{ miles}$$

$$[1 \text{ inch} = 2.54 \text{ cm}]$$

$$500 \text{ cm} \left(\frac{2.54 \text{ in}}{1 \text{ cm}} \right) \left(\frac{1 \text{ ft}}{12 \text{ in}} \right) \left(\frac{1 \text{ mile}}{5280 \text{ ft}} \right) = \boxed{0.020 \text{ miles}}$$

$$93.5 \text{ ft} = ? \text{ km}$$

$$[5280 \text{ ft} = 1 \text{ mile}; 39 \text{ inches} = 1 \text{ meter}; \\ 144 = 3 \text{ ft}; 12 \text{ inches} = 1 \text{ ft}; 1000 \text{ m} = 1 \text{ km}]$$

$$93.5 \text{ ft} \left(\frac{12 \text{ in}}{1 \text{ ft}} \right) \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right) \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) \left(\frac{1 \text{ km}}{1000 \text{ m}} \right) =$$
$$\boxed{0.0285 \text{ km}}$$

Temp Conversions

$$K = C + 273$$

so

$$C = K - 273$$

Freeze

Boiling

K

$$273 \rightarrow 373$$

C

$$0 \rightarrow 100$$

$$109^{\circ}C = ? K$$

$$27^{\circ}C = ? K$$

$$273 K = ?^{\circ}C$$

$$115 K = ?^{\circ}C$$

$$45 K = ?^{\circ}C$$

382 K

300 K

0^{\circ}C

-158^{\circ}C

-228^{\circ}C