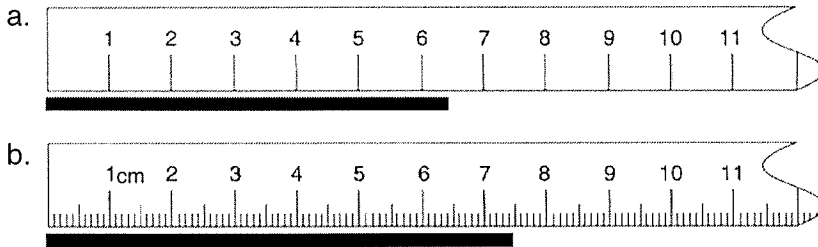


Name: KEY

Math Essentials

1. To the correct number of significant figures, record the measurement of the black line:



6.4 cm last digit
is estimated!

2. Give the number of significant figures in each of the following measurements:

c. 30,406 cm 5

j. 2.00×10^{-3} mL

d. 0.003040 g 4

k. 30 m

e. 3,005 kg 4

l. 4.12×10^5 cm³

f. 270 pairs ∞

m. 0.00078 mg

g. 0.20 mm 2

n. 22.70 cm

h. 105,000 s 3

o. 0.176 m/s

i. 13,030 L 4

p. 52 pencils

3. Express the following numbers in scientific notation with the correct number of significant figures and units:

a. 9,457 km 9.457×10^3 km

f. 0.000670 g

b. 0.00007 cm 7×10^{-5} cm

g. 332,080,000 L

c. 21,000 s 2.1×10^4 s

h. 0.0002383 cg

d. 0.01234 mg 1.234×10^{-2} mg

i. 0.3048 ms

e. 652.38 mL 6.5238×10^2 mL

j. 300 m

4. Round the following measurements to three significant figures:

a. 33.85 g 33.8 g (odd/even) g. 32.55 L

b. 137,928 mm 138000 mm h. 45.651 m

c. 4,575 s 4580 s (odd/even) i. 45.650 m

d. 0.30333 mL 0.303 mL j. 289.7 s

e. 3.996 cm 4.00 cm k. 99,950 km

f. 33.73 kg 33.7 kg l. 344,500 mm

5. Perform the following calculations and report answers with the correct number of significant figures:

a. $23.098 \text{ cm} + 0.040 \text{ cm} + 2,300.0 \text{ cm} = \underline{2323.1 \text{ cm}}$

b. $450,600 \text{ L} - 0.4030 \text{ L} = \underline{\hspace{2cm}}$

c. $(\underline{2300} \text{ mm})(2.3080 \text{ mm}) = \underline{5300 \text{ mm}^2}$

d. $(0.00340 \text{ km})(\underline{3.4} \times 10^{-5} \text{ km}) = \underline{\hspace{2cm}}$

e. $(2.03 \times 10^{-6} \text{ m})(\underline{3.0} \times 10^7 \text{ m})(3.500 \times 10^{-2} \text{ m}) / 23.00 \text{ m} = \underline{0.093 \text{ m}^2}$

f. $201.2 \text{ kg} + 31.37 \text{ kg} = \underline{\hspace{2cm}}$

g. $\underline{410} \text{ s} - 22 \text{ s} = \underline{390 \text{ s}}$

h. $\underline{191} \text{ g} - 12.32 \text{ g} = \underline{\hspace{2cm}}$

i. $19.31 \text{ m} / \underline{0.107} \text{ s} = \underline{180. \text{ m/s}} \text{ or } \underline{1.80 \times 10^2 \text{ m/s}}$

6. Calculate the following conversions using dimensional analysis (see common unit conversions sheet):

a. 47.0 in = ? ft

$$47.0 \text{ in} \times \frac{1 \text{ ft}}{12 \text{ in}} = \boxed{3.92 \text{ ft}}$$

b. 2.30 mi = ? km

$$\boxed{3.70 \text{ km}}$$

c. 4.75 hr = ? min

$$4.75 \text{ hr} \times \frac{60 \text{ min}}{1 \text{ hr}} = \boxed{285 \text{ min}}$$

d. 87.0 min = ? days

$$\boxed{0.0604 \text{ days}}$$

e. 24.5 mi/hr = ? km/min

$$\frac{24.5 \text{ mi}}{1 \text{ hr}} \times \frac{1.61 \text{ km}}{1 \text{ mi}} \times \frac{1 \text{ hr}}{60 \text{ min}} = \boxed{0.657 \text{ km/min}}$$

f. 62.0 s/yr = ? hr/ft

$$\boxed{0.00574 \text{ hr/ft}}$$

g. 734 s = ? years

$$734 \text{ s} \times \frac{1 \text{ min}}{60 \text{ s}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ day}}{24 \text{ hr}} \times \frac{1 \text{ yr}}{365 \text{ days}} = \boxed{2.33 \times 10^{-5} \text{ yr}}$$

h. 95.0 mm = ? yd

$$\boxed{0.104 \text{ yd}}$$

7. Perform the following metric conversions (use metric conversion factors from notes):

a. 3.614 mg = ? g

$$3.614 \cancel{\text{mg}} \times \frac{1 \text{g}}{1000 \cancel{\text{mg}}} = \boxed{0.003614 \text{g}} \text{ or } 3.614 \times 10^{-3} \text{g}$$

b. 760 g = ? kg

$$\boxed{0.76 \text{kg}}$$

c. 14.4 μm = ? mm

$$14.4 \cancel{\mu\text{m}} \times \frac{1 \cancel{\text{m}}}{10^6 \cancel{\mu\text{m}}} \times \frac{1000 \text{mm}}{1 \cancel{\text{m}}} = \boxed{0.0144 \text{mm}}$$

d. 6.03×10^{-6} cg = ? ng

$$\boxed{60.3 \text{ng}}$$

e. 12 km = ? nm

$$12 \cancel{\text{km}} \times \frac{1000 \cancel{\text{m}}}{1 \cancel{\text{km}}} \times \frac{10^9 \text{nm}}{1 \cancel{\text{m}}} = \boxed{1.2 \times 10^{13} \text{nm}}$$

f. 6.4 mg = ? pg

$$\boxed{6.4 \times 10^9 \text{pg}}$$

g. 7.6 dm = ? Mm

$$7.6 \cancel{\text{dm}} \times \frac{1 \cancel{\text{m}}}{10 \cancel{\text{dm}}} \times \frac{1 \text{Mm}}{10^6 \cancel{\text{m}}} = \boxed{7.6 \times 10^{-7} \text{Mm}}$$

h. 5.6×10^3 cm = ? m

$$\boxed{56 \text{m}}$$