# DAY 2 - Measuring & Converting Between Units

1. ...ich units you would use to measure in each case.

   a) the volume contained in a thimble

       teaspoon or mL

   b) a glass

       cup or mL

   c) a swimming pool

       gal or L

   d) an ocean

       gal or L

   e) the weight of a sheet of paper

       oz or g

   f) a book

       oz or g

   g) a person

       lb or kg

   h) a car

       lb or kg

2. Refer to the ruler below. Read these measures in feet and inches to the nearest 16th of an inch.
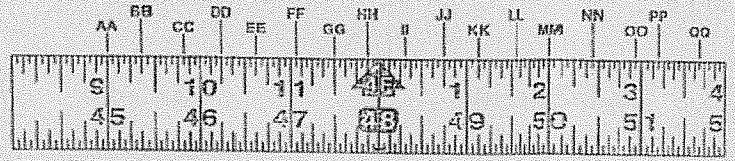
Just inches

JJ. $48\frac{12}{16} = 48\frac{3}{4}"$ KK. $49\frac{2}{16} = 49\frac{1}{8}"$ LL. $49\frac{9}{16}"$ MM. $50"$
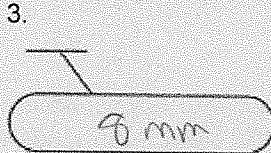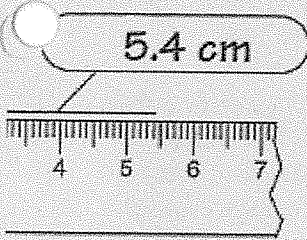
NN. $50\frac{7}{16}"$ OO. $50\frac{15}{16}"$ PP. $51\frac{3}{16}"$ QQ. $51\frac{11}{16}"$
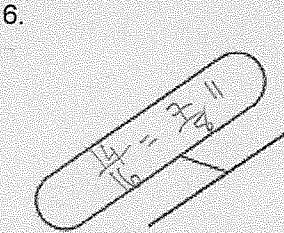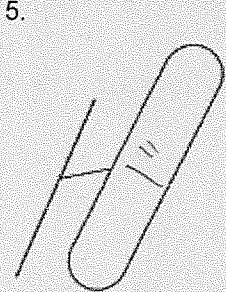
Now feet and inches

JJ. $4'\frac{3}{4}"$ KK. $4'1\frac{1}{8}"$ LL. $4'1\frac{9}{16}"$ MM. $4'2"$

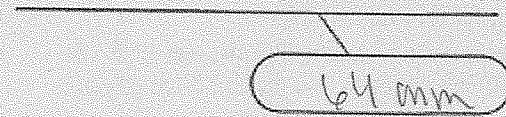NN. $4'2\frac{7}{16}"$ OO. $4'2\frac{15}{16}"$ PP. $4'3\frac{3}{16}"$ QQ. $4'3\frac{11}{16}"$
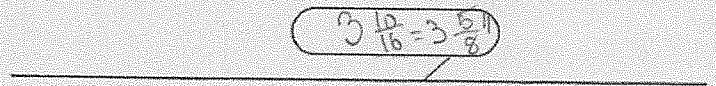
Measure each segment to the nearest centimeter, as shown

5.4 cm

3. 9 mm

4. 64 mm

Measure each segment in inches, to the nearest 16th of an inch

5. $1"$

6. $\frac{14}{16} = \frac{7}{8}"$

7. $3\frac{10}{16} = 3\frac{5}{8}"$

SINGLE & MULTI STEP CONVERSIONS

8. 60 cm   23.6 inches

$$60cm \times \frac{1\ in}{2.54\ cm} = \frac{60}{2.54}\ in = 23.6\ in$$

9. 3 m   3.3 yards

$$3m \cdot \frac{100\ cm}{1\ m} \cdot \frac{1\ ft}{30.48\ cm} \cdot \frac{1\ yd}{3\ ft} = \frac{300}{91.44}\ yd = 3.3\ yd$$

10. 600 g   1.3 pounds

$$600g \cdot \frac{1\ lb}{454\ g} = \frac{600}{454}\ lb = 1.3\ lb$$

11. 4 L   4.2 quarts

$$4L \cdot \frac{1\ pt}{0.473\ L} \cdot \frac{1\ qt}{2\ pt} = \frac{4}{0.946}\ qt = 4.2\ qt$$

MIX of UNITS CONVERSIONS

12. **80 km/h =** _____ **22.2 m/s**

$$80 \frac{km}{hr} \cdot \frac{1000\ m}{1\ km} \cdot \frac{1\ hr}{60\ min} \cdot \frac{1\ min}{60\ sec} = \frac{80\,000\ m}{3600\ sec}$$

13. **500 km/day =** _____ **5.8 m/s**

$$\frac{500\,km}{day} \cdot \frac{1\ day}{24\ hr} \cdot \frac{1\ hr}{60\ min} \cdot \frac{1\ min}{60\ sec} \cdot \frac{1000\ m}{1\ km} = \frac{500\,000\ m}{86400\ sec}$$

14. **11,232 in³ =** _____ **6.5 ft³**

$$11232\ in \cdot in \cdot in \cdot \frac{1\ ft}{12\ in} \cdot \frac{1\ ft}{12\ in} \cdot \frac{1\ ft}{12\ in} = \frac{11232\ ft^3}{1728}$$

15. **980 cm² =** _____ **0.098 m²**

$$980\,cm \cdot cm \cdot \frac{1\ m}{100\ cm} \cdot \frac{1\ m}{100\ cm} = \frac{980\ m^2}{10000}$$

16. Ilya was watching an American news broadcast. It spoke of gas prices being $3.20/gal. What was the price per litre?

$$\frac{\$3.20}{gal} \cdot \frac{1\ gal}{3.785\ L} = \frac{\$3.20}{3.785\ L} = \$0.85/L$$

17. If the density of carbon tetrachloride is 0.793 g/mL, and a sample has a volume of 9.29 mL, what is the mass?

$$\frac{0.793\ g}{mL} \cdot 9.29\ mL = 7.4\ g$$

18. The Art Club is tiling a wall 8 feet tall by 10 feet long. Each tile is a 3-inch square and costs $0.59. What is the cost of tiling the wall?

$$8\ ft \times 10\ ft = 80\ ft^2$$
$$80\ ft \cdot ft \cdot \frac{12\ in}{1\ ft} \cdot \frac{12\ in}{1\ ft} = 11520\ in^2$$
$$\frac{\$0.59}{3\ in^2} \cdot 11520\ in^2 = \$2265.60 \text{ is the cost.}$$

19. Donald bought 3 bags of milk for $15. Each bag had 4 litres of milk. What was the cost of milk per gallon?

$$\frac{\$15}{3\ bags} \cdot \frac{1\ bag}{4\ L} \cdot \frac{3.785\ L}{1\ gal}$$
$$= \frac{\$56.775}{12\ gal} = \$4.73/gal$$

20. TEMPERATURE CONVERSIONS

Yesterday, the high temperature in Orlando, Florida, was 87°F. The high temperature in Stouffville, Ontario, was 28°C. Which city had the greater high temperature? How do you know?

* choose to convert ONE then compare

$$°F = 1.8C + 32$$
$$F = 1.8(28) + 32$$
$$F = 82.4 \leftarrow Ontario$$

$$C = \frac{5}{9}(F-32)$$
$$= \frac{5}{9}(87-32)$$
$$= \frac{5}{9}(55) = \frac{275}{9} = 30.6°C$$

∴ Florida had higher temperature. 87°F versus 82.4°F

21.

a) The temperature range in which most bacteria grow is from 5°C to 60°C. What is this range in degrees Fahrenheit?

b) *Salmonella* bacteria are destroyed at cooking temperatures above 150°F. What is this temperature in degrees Celsius?

(a) $F = 1.8C + 32$
$F = 1.8(5) + 32$
$F = 41$ and $F = 1.8(60) + 32$
$F = 140$
∴ range is 41°F to 140°F

(b) $C = \frac{5}{9}(F-32)$
$C = \frac{5}{9}(150-32) = \frac{5}{9}(118) = \frac{590}{9} = 66°C$

22. COMPARING CONVERSIONS

The Sun Supermarket charges $3.25 for 2 lb of strawberries, while the Golden Supermarket charges $1.80 for 450 g of strawberries. Which store gives the better value for strawberries?

$2\ lb \cdot \frac{454\ g}{lb} = 908\ g$

* choose to convert ONE then compare.

$$450\ g \cdot \frac{1\ lb}{454\ g} = \frac{450\ lb}{454} = 0.9911\ lb$$

compare $ /lb

Sun : $\frac{\$3.25}{2\ lb}$ 0.0036

Golden : $\frac{\$1.80}{0.9911\ lb}$ 0.004

23. Herman's Grocery charges $4.50 for 3 lb of apples, while Chi's Grocery charges $3.50 for 900 g. Which store has the better deal for apples? Show your work.

$3\ lb \cdot \frac{454\ g}{lb} = 1362\ g$

* choose convert one!

$$900\ g \cdot \frac{1\ lb}{454\ g} = \frac{900\ lb}{454} = 1.98\ lb$$

compare $/lb

Herman $\frac{\$4.50}{3\ lb}$ 0.0033   Chi $\frac{\$3.50}{1.98\ lb}$ 0.0039
$= \$1.50/lb$ $= \$1.76/lL$

16. CONVERT

a) 105 mL   tablespoons

$$\frac{105 \text{ mL}}{1} \cdot \boxed{\frac{1 \text{ tbsp}}{15 \text{ mL}}} = \frac{105 \text{ tbsp}}{15} = 7 \text{ tbsp}$$

b) 19 gal   litres

$$\frac{19 \text{ gal}}{1} \cdot \boxed{\frac{3.785 \text{ L}}{1 \text{ gal}}} = \frac{71.915 \text{ L}}{1} \doteq 72 \text{ L}$$

c) 12 L   quarts

$$\frac{12 \text{ L}}{1} \cdot \boxed{\frac{1 \text{ pt}}{0.473 \text{ L}}} \cdot \boxed{\frac{1 \text{ qt}}{2 \text{ pt}}} = \frac{12}{0.946} \text{ qt}$$
$$= 12.7 \text{ qt}$$

d) 30 mi   kilometres

$$\frac{30 \text{ mi}}{} \cdot \boxed{\frac{1.6 \text{ km}}{1 \text{ mi}}} = 48 \text{ km}$$