

Math 1303 - Math in the Liberal Arts

Exam #4 - 2014.11.21

Solutions

Metric Units

Prefix	Symbol	Meaning
kilo	k	$1000\times$ base unit
hecto	h	$100\times$ base unit
deka	da	$10\times$ base unit
—	—	base unit
deci	d	$\frac{1}{10}$ of base unit
centi	c	$\frac{1}{100}$ of base unit
milli	m	$\frac{1}{1000}$ of base unit

Water

Volume (cubic)	Volume (litres)	Mass
1 cm ³	1 ml	1 g
1 dm ³	1 l	1 kg
1 m ³	1 kl	1000 kg

Length

1 inch (in)	= 2.54 centimeters (cm)
1 foot (ft)	= 30 centimeters (cm)
1 yard (yd)	= 0.9 meter (m)
1 mile (mi)	= 1.6 kilometers (km)

Area

1 square inch (in ²)	= 6.5 square centimeters (cm ²)
1 square yard (yd ²)	= 0.8 square meters (m ²)
1 square mile (mi ²)	= 2.6 square kilometers (km ²)
1 acre	= 0.4 hectare (ha)
1 hectare (ha)	= 10000 square meters (m ²)

Volume

1 teaspoon (tsp)	= 5 milliliters (ml)
1 tablespoon (tbsp)	= 15 milliliters (ml)
1 fluid ounce (fl oz)	= 30 milliliters (ml)
1 cup (c)	= 0.24 liters (l)
1 pint (pt)	= 0.47 liters (l)
1 quart (qt)	= 0.95 liters (l)
1 gallon (gal)	= 3.8 liters (l)
1 cubic foot (ft ³)	= 0.03 cubic meters (m ³)
1 cubic yard (yd ³)	= 0.76 cubic meters (m ³)

Weight

1 ounce (oz)	= 28 grams (g)
1 pound (lb)	= 0.45 kilograms (kg)
1 ton (T)	= 0.9 tonne (t)

1. Convert the following:

(a) 86 cm to inches

$$86 \text{ cm} \times \frac{1 \text{ inch}}{2.54 \text{ cm}} = 33.86 \text{ in}$$

(b) 42 liters to quarts

$$42 \text{ liters} \times \frac{1 \text{ qt}}{0.95 \text{ liters}} = 44.21 \text{ qts}$$

(c) 45 miles to kilometers

$$45 \text{ miles} \times \frac{1.6 \text{ km}}{1 \text{ mi}} = 72 \text{ km}$$

(d) 34000 square yards to acres

$$34000 \text{ yd}^2 \times \frac{0.8 \text{ m}^2}{1 \text{ yd}^2} \times \frac{1 \text{ ha}}{10000 \text{ m}^2} \times \frac{1 \text{ acre}}{0.4 \text{ ha}} = 6.8 \text{ acres}$$

(e) 245 cubic feet to cubic yards

$$245 \text{ ft}^3 \times \frac{0.03 \text{ m}^3}{1 \text{ ft}^3} \times \frac{1 \text{ yd}^3}{0.76 \text{ m}^3} = 9.67 \text{ yd}^3$$

(f) 45 miles per hour to centimeters per second

$$\frac{45 \text{ miles}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{3600 \text{ seconds}} \times \frac{1.6 \text{ km}}{1 \text{ mile}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{100 \text{ cm}}{1 \text{ m}} = 2000 \text{ cm/s}$$

2. You run around a 400 m track 11 times. How many kilometers have you run?

$$11 \text{ laps} \times \frac{400 \text{ m}}{1 \text{ lap}} \times \frac{1 \text{ km}}{1000 \text{ m}} = 4.4 \text{ km}$$

3. A rectangular fish tank at an aquarium is 20 m long by 20 m wide by 8 m deep.

(a) Determine the volume of the tank in m^3 .

$$V = 20 \times 20 \times 8 \text{ m}^3 = 3200 \text{ m}^3$$

(b) Determine the volume of the tank in liters.

$$3200 \text{ m}^3 \times \frac{1 \text{ kl}}{1 \text{ m}^3} \times \frac{1000 \text{ l}}{1 \text{ kl}} = 3200000 \text{ l}$$

(c) Determine the weight of the volume of water in kilograms.

$$3200 \text{ m}^3 \times \frac{1000 \text{ kg}}{1 \text{ m}^3} = 3200000 \text{ kg}$$

(d) Determine the weight of the volume of water in pounds (lbs).

$$3200000 \text{ kg} \times \frac{1 \text{ lb}}{0.45 \text{ kg}} = 7111111 \text{ lbs}$$

4. The distance from Durant to Norman (by highways) is 132.8 miles. Convert this distance to millimeters, expressing your answer in scientific notation.

$$132.8 \text{ miles} \times \frac{1.6 \text{ km}}{1 \text{ mile}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1000 \text{ mm}}{1 \text{ m}} = 2.13 \times 10^8 \text{ mm}$$