

Trupia

Answers

Part 1 Math Review

- A.)
- 1.)  $.1 * 10^6$
  - 2.)  $4.8 * 10^4$
  - 3.)  $5.8783 * 10^6$
  - 4.)  $6 * 10^2$
  - 5.)  $1.5 * 10^{-2}$
  - 6.)  $3.95 * 10^3$
  - 7.)  $3.0 * 10^{-3}$
  - 8.)  $2.220 * 10^{-1}$
  - 9.)  $1.267 * 10^3$
  - 10.)  $5 * 10^{-4}$

- B.
- 1.) 24,500
  - 2.) 0.091
  - 3.) 0.00075469
  - 4.) 19,700
  - 5.) 8
  - 6.) 0.8556
  - 7.) 0.000000123456
  - 8.) 0.005000
  - 9.) 944.4
  - 10.) 6080

C.) Add Exponents for multiplication  
Subtract Exponents for division

1.) step 1 =  $6.235 * 6.7 = 41.7745$

step 2 =  $-8 + 2 = -6$

step 3 =  $41.7745 * 10^{-6}$

step 4 =  $4.17745 * 10^{-5}$  (number must be between 1 + 9)

2.) step 1 =  $2.456 \div 1.436 = 1.710$

step 2 =  $4 - 13 = -9$

step 3 =  $1.710 * 10^{-9}$

3.) step 1 = Convert to regular notation.

$$0.00000234 + 33,000 =$$

$$33,000.00000234$$

step 2 = Convert back to scientific notation.

$$3.300000000234 * 10^4$$

step 3 = Use sig figs =  $3.30 * 10^4$

4.) Same steps as #3

$$1.4499999977 * 10^6$$

sig figs =  $1.45 * 10^6$

5.) Same steps as #1

$$3.94362 * 10^{16}$$

sig figs =  $3.94 * 10^{16}$

D.) 1.) 1

2.) 2

3.) 1

4.) 3

5.) 3

6.) 2

7.) 4

8.) 2

9.) 6

10.) 1

E.) 1.)  $4.19666 * 10^5$  or 419,666

2.) 20 (actual answer 24,0006)

3.)  $6.78 * 10^{10}$

4.)  $1.260 * 10^3$

5.)  $1 * 10^6$  (actual answer 1,132,800)

\* note

$$F.) 1.) \left( \frac{8640 \text{ mm}}{1} \right) \left( \frac{1 \text{ m}}{1,000 \text{ mm}} \right) \left( \frac{100 \text{ cm}}{1 \text{ m}} \right) = \frac{864 \cancel{\text{mm}} \cancel{\text{mm}} \cancel{\text{mm}}}{1, \cancel{\text{mm}} \cancel{\text{mm}} \cancel{\text{mm}}} =$$

$$\frac{864}{1} = 864 \text{ cm}$$

$$2.) \left( \frac{175 \text{ lbs}}{1} \right) \left( \frac{1 \cancel{\text{kg}}}{0.002 \cancel{\text{lbs}} \underset{\text{lbs}}{\text{kg}}} \right) \left( \frac{1 \text{ kg}}{1,000 \cancel{\text{g}}} \right) = \frac{175}{\cancel{2}} = 87.5 \text{ kg}$$

$$* 0.002 * 1,000$$

↑ move decimal

3 to right, because of 3 zeros from 1,000

$$3.) \left( \frac{33.2 \text{ kg}}{1 \cancel{\text{L}}} \right) \left( \frac{1 \cancel{\text{L}}}{1,000 \text{ mL}} \right) = * 0.0332 \text{ kg/mL}$$

\* when dividing move decimal to left, the number of zeros in the bottom #.

$$4.) \left( \frac{3.8 \text{ km}}{1 \text{ sec}} \right) \left( \frac{0.621 \text{ mi}}{1 \cancel{\text{km}}} \right) \left( \frac{60 \text{ sec}}{1 \text{ min}} \right) \left( \frac{60 \text{ min}}{1 \text{ hr}} \right) \left( \frac{24 \text{ hrs}}{1 \text{ day}} \right) \left( \frac{365 \text{ day}}{1 \text{ yr}} \right) =$$

$$= 74,418,652.8 \text{ mi/yr}$$

$$5.) \left( \frac{100 \text{ mi}^2}{1} \right) \left( \frac{640 \text{ acre}}{1 \cancel{\text{mi}^2}} \right) \left( \frac{0.4 \text{ ha}}{1 \text{ acre}} \right) = 25,600 \text{ ha}$$

$$6.) \left( \frac{4 * 10^6 \text{ BTU}}{1} \right) \left( \frac{1 \text{ kWh}}{3413 \text{ BTU}} \right) = 1,172 \text{ kWh}$$

$$7.) \left( \frac{1,200 \text{ t}}{1} \right) \left( \frac{1,000 \text{ kg}}{1 \text{ t}} \right) = 1,200,000$$

$$8.) \left( \frac{3.73 * 10^8 \text{ km}^3}{1} \right) \left( \frac{1.0 * 10^9 \text{ m}^3}{1 \text{ km}^3} \right) = 3.73 * 10^{17} \text{ m}^3$$

note \*

$$1 \text{ km} = 1,000 \text{ m}$$

$$1 \text{ km}^3 = (1,000 \text{ m} * 1,000 \text{ m} * 1,000 \text{ m}) =$$

$$1 \text{ km}^3 = 1.0 * 10^9 \text{ m}^3$$

$$9.) \left( \frac{70 \text{ mi}}{1 \text{ hr}} \right) \left( \frac{1 \text{ hr}}{60 \text{ min}} \right) = \frac{70}{60} = 1.67 \text{ mi/min}$$

$$1.67 * 175 = 292.25 \text{ min}$$

$$10.) a.) \left( \frac{2.5 \text{ cups flour}}{1} \right) \left( \frac{0.237 \text{ L flour}}{1 \text{ cup flour}} \right) = 0.5 \text{ L flour}$$

correct →

$$\text{Incorrect } b.) \left( \frac{0.5 \text{ lbs}}{1} \right) \left( \frac{1 \text{ kg}}{2.2 \text{ lbs}} \right) \left( \frac{1,000 \text{ g}}{1 \text{ kg}} \right) = 227.3 \text{ g}$$

$$\text{Incorrect } c.) \text{ } ^\circ\text{C} = \frac{5}{9} (325 - 32) \quad | \quad 162.78 + 273 =$$

$$\text{ } ^\circ\text{C} = \frac{5}{9} (293) \quad | \quad \boxed{435 \text{ K}}$$

$$\text{ } ^\circ\text{C} = 162.78$$

$$G.) 1.) 35\% = \frac{500}{x} * 100 \Rightarrow \frac{0.35}{1} = \frac{500}{x} =$$

$$x = 1,428.6 \text{ acres}$$

$$2.) 65 \text{ ppm} = 7 \text{ ppm} = 58 \text{ ppm}$$

$$\frac{58 \text{ ppm}}{65 \text{ ppm}} * 100 = 89\%$$

$$3.) \frac{15,000,000}{300,000,000} \Rightarrow \frac{15}{300} * 100 = 5\%$$

$$4.) 0.20 * \$34.80 = \$6.96 \text{ rounded} \Rightarrow \$7.00$$

$$5.) 100,000 - 70,000 = 30,000 \text{ increase}$$

$$30,000 \text{ increase} + 30,000 \text{ immigrants} = 60,000 \text{ increase}$$

$$60,000 - 50,000 \text{ emigrants} = 10,000 \text{ Total increase}$$

$$\% \text{ growth} \Rightarrow \frac{10,000}{6,000,000} * 100 \Rightarrow \frac{1}{600} * 100 = 0.16\%$$

$$H.) 1.) \left( \frac{1,000 \text{ gal}}{1} \right) * \left( \frac{3.79 \text{ kg}}{1 \text{ gal}} \right) = 3,790 \text{ kg}$$

$$Q = m c \Delta t \Rightarrow Q = (3,790) (4.18) (-3.88^\circ\text{C})$$

$$Q = 61,608.56 \text{ J}$$

$$2.) \left( \frac{110,000 \text{ BTU}}{1} \right) \left( \frac{1 \text{ J}}{9.481 \times 10^{-4} \text{ BTU}} \right) = 1.168 \times 10^8 \text{ J}$$

$$1 \text{ metric ton} = 1,000 \text{ kg} \left( \frac{1,000 \text{ kg}}{1} \right) \left( \frac{1,000 \text{ g}}{1 \text{ kg}} \right) = 1 \times 10^6 \text{ g}$$

$$Q = mc \Delta t \Rightarrow 1.168 \times 10^8 = (1 \times 10^6 \text{ g}) (4.18 \text{ J/g}^\circ\text{C}) \Delta t$$

$$\Delta t = 27^\circ\text{C} \Rightarrow 80.6^\circ\text{F}$$

$$3.) \left( \frac{75 \text{ watts}}{1} \right) \left( \frac{3.413 \text{ BTU/hr}}{1 \text{ watt}} \right) \left( \frac{1 \text{ hr}}{60 \text{ min}} \right) \left( \frac{25 \text{ min}}{1} \right) \Rightarrow$$

$$\Rightarrow \left( \frac{1 \text{ J}}{9.481 \times 10^{-4} \text{ BTU}} \right) \left( \frac{1 \text{ kJ}}{1,000 \text{ J}} \right) = 112.5 \text{ kJ}$$