Review Questions for Test #1

Use the order of operations to simplify the following expressions

1) $\dfrac{[|-8|-(-4\times 7\div 2)][-15-(14\div -2)]}{(647-254)^3-3^5\div 4}$

2) $14-[(-3)\times\sqrt{64}]+[31(54-873)(21-76)^3+45^0]$

Solve the following expressions using the methods we learned in class

3) $\dfrac{10^{-2}\times 10^{-6}\times 10^{3}}{10^{3}\times 10^{6}\times 10^{-4}}$

$$\frac{\left(\dfrac{10^{-34}}{10^{18}}\right)^{-2}}{\left(\dfrac{10^{28}}{10^{-37}}\right)^{6}}$$

4) $\dfrac{23.4\times 16\times 10^{7}}{12\times 10^{4}+\left(8.2\times 10^{2}\right)^{3}}$

5) $\dfrac{1}{6.284\times 10^{-5}}+\dfrac{1}{8340}-\sqrt{2916}$

6) $\dfrac{1}{\dfrac{1}{8140}-\dfrac{1}{3490}+\dfrac{1}{6540}}$

Convert to the following units, final answers should be in scientific notation

7) 28.5×10^{-6} J = _____TJ = _____ nJ

8) 364 ft/sec = _____hm/hour

9) 167.9×10^{8} fL = _____ tablespoons

Solve the following questions

10) Convert 2.64 to % = _____

11) Convert 6329% to decimal = _____

12) Convert 0.00000254 to scientific notation = _____

13) Convert 3.57×10^{8} to decimal = _____

14) Round 8643.256957 to the nearest thousandths = _____

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① $\dfrac{[|-8|-(-4\times7\div2)][-15-(14\div-2)]}{(647-254)^3-3^5\div4}$

$\dfrac{[8-(-28\div2)][-15-(-7)]}{(393)^3-3^5\div4}$

$\dfrac{[8-(-14)][-15+7]}{60698457-243\div4}$

$\dfrac{[8+14][-8]}{60698457-60.75}$

$\dfrac{(22)(-8)}{60698396.25}$

$\dfrac{-176}{60698396.25}$

② $14-[(-3)\times\sqrt{64}]+[31(54-873)(21-76)^3+45^\circ]$

$14-[-3\times8]+[31(-819)(-55)^3+1]$

$14-[-24]+[31(-819)(-166375)+1]$

$14+24+[4224094875+1]$

$38+4224094876$

4224094914

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(3) $\dfrac{10^{-2}\times10^{-6}\times10^{3}}{10^{3}\times10^{6}\times10^{-4}} = \dfrac{10^{3-6-2}}{10^{3+6-4}} = \dfrac{10^{-5}}{10^{5}} = 10^{-5-5} = \boxed{10^{-10}}$

$$\frac{\left(\dfrac{10^{-34}}{10^{18}}\right)^{-2}}{\left(\dfrac{10^{28}}{10^{-37}}\right)^{6}} = \frac{\left[10^{-34-18}\right]^{-2}}{\left[10^{28-(-37)}\right]^{6}} = \frac{\left[10^{-52}\right]^{-2}}{\left[10^{65}\right]^{6}} = \frac{10^{104}}{10^{390}} =$$

$$= 10^{104-390} = \boxed{10^{-286} = \frac{1}{10^{286}}}$$

(4) $\dfrac{23.4\times16\times10^{7}}{12\times10^{4}+(8.2\times10^{2})^{3}} = \dfrac{374.4\times10^{7}}{12\times10^{4}+8.2^{3}+(10^{2})^{3}}$

$$= \frac{374.4\times10^{7}}{12\times10^{4}+551.368\times10^{6}} = \frac{374.4\times10^{7}}{0.12\times10^{6}+551.368\times10^{6}}$$

$12\times10^{4}\times10^{2}$ (↓) 0.12×10^{6}

$$= \frac{374.4\times10^{7}}{551.488\times10^{6}}$$

$$= \frac{374.4}{551.488}\times10^{7}\times10^{-6}$$

$$= 0.67889\times10^{1}$$

$$= \boxed{6.8\times10^{0}}$$

2 sig. figs

ReTest 1

(5) $\frac{1}{6.284\times10^{-5}} + \frac{1}{8340} - \sqrt{2916}$

$\frac{1}{6.284} \times \frac{1}{10^{-5}} + 1.199\times10^{-4} - 54$

$0.1591\times10^{5} + 1.199\times10^{-4} - 54$

$15856.000 \Rightarrow \boxed{1.586\times10^{4}}$

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(6) $\frac{1}{\frac{1}{8140} - \frac{1}{3490} + \frac{1}{6540}} = \frac{1}{1.228\times10^{-4} - 2.865\times10^{-4} + 1.529\times10^{-4}}$

$= \frac{1}{-0.108\times10^{-4}}$

$= \frac{1}{-0.108} \times \frac{1}{10^{-4}} \Rightarrow \boxed{-9.259\times10^{4}}$

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(7) $28.5\times10^{-6}\ J \rightarrow TJ$ (convert to each one separately.)

$\searrow nJ$

$1\,TJ = 10^{12}\,J$

$1\,nJ = 10^{-9}\,J$

$\left(\frac{28.5\times10^{-6}\,J}{1}\right)\left(\frac{1\,TJ}{10^{12}\,J}\right) = \frac{28.5\times10^{-6}\,TJ}{10^{12}} = 28.5\times10^{-6}\times10^{-12}\,TJ$

$= 28.5\times10^{-18}\,TJ$

$= 28.5\times10^{-18}\times10^{1}$

$= \boxed{2.85\times10^{-17}\,TJ}$

$\left(\frac{28.5\times10^{-6}\,J}{1}\right)\left(\frac{1\,nJ}{10^{-9}\,J}\right) = \frac{28.5\times10^{-6}\,nJ}{10^{-9}} = 28.5\times10^{-6}\times10^{9}\,nJ$

$= 28.5\times10^{3}\ nJ$

$= 28.5\times10^{3}\times10^{1}\,nJ$

$= \boxed{2.85\times10^{4}\,nJ}$

(8) $\frac{364\ ft}{sec} \rightarrow \frac{km}{hour}$

12 inches = 1 ft | Rev Test 1
1 inch = 2.54 cm
1 cm = 10^{-2} m
1 km = 10^{3} m
60 sec = 1 min
60 min = 1 hr

$$\left(\frac{364\ ft}{sec}\right)\left(\frac{12\ inches}{1\ ft}\right)\left(\frac{2.54\ cm}{1\ inch}\right)\left(\frac{10^{-2}\ m}{1\ cm}\right)\left(\frac{1\ km}{10^{3}\ m}\right)\left(\frac{60\ sec}{1\ min}\right)\left(\frac{60\ min}{1\ hr}\right)$$

$$\frac{364 \times 12 \times 2.54 \times 10^{-2} \times 60 \times 60\ km}{10^{3}\ hr} = \frac{3994.092\ km}{10^{3}\ hr}$$

$$= 3994.099\ \frac{km}{hr} = 3.99 \times 10^{3}\ \frac{km}{hr}$$

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(9) $167.9 \times 10^{8}\ fL \rightarrow tbsp$

3 tsp = 1 tbsp
1 tsp = 4.93 mL
1 mL = 10^{-3} L
1 fL = 10^{-15} L

$$\left(\frac{167.9 \times 10^{8}\ fL}{1}\right)\left(\frac{10^{-15}\ L}{1\ fL}\right) = \frac{167.9 \times 10^{8} \times 10^{-15}\ L}{1} = 167.9 \times 10^{-7}\ L$$

$$\left(\frac{167.9 \times 10^{-7}\ L}{1}\right)\left(\frac{1\ mL}{10^{-3}\ L}\right) = \frac{167.9 \times 10^{-7}\ mL}{10^{-3}} = 167.9 \times 10^{-7} \times 10^{3}\ mL = 167.9 \times 10^{-4}\ mL$$

$$\left(\frac{167.9 \times 10^{-4}\ mL}{1}\right)\left(\frac{1\ tsp}{4.93\ mL}\right) = \frac{167.9 \times 10^{-4}\ tsp}{4.93} = 3.406 \times 10^{-3}\ tsp$$

$$\left(\frac{3.406 \times 10^{-3}\ tsp}{1}\right)\left(\frac{1\ tbsp}{3\ tsp}\right) = \frac{3.406 \times 10^{-3}\ tbsp}{3}$$

$$= 1.135 \times 10^{-3}\ tbsp$$

$$\left(\frac{167.9 \times 10^{8}\ fL}{1}\right)\left(\frac{10^{-15}\ L}{1\ fL}\right)\left(\frac{1\ mL}{10^{-3}\ L}\right)\left(\frac{1\ tsp}{4.93\ mL}\right)\left(\frac{1\ tbsp}{3\ tsp}\right) =$$

$$\frac{167.9 \times 10^{8} \times 10^{-15}\ tbsp}{3 \times 4.93 \times 10^{-3}} = \frac{167.9 \times 10^{-7}}{14.79 \times 10^{-3}}\ tbsp = \frac{167.9}{14.79} \times 10^{-7} \times 10^{+3} = 11.352 \times 10^{-4}$$

$$= 11.35 \times 10^{-4} \times 10^{1}$$

$$= 1.135 \times 10^{-3}\ tbsp$$

Review Test 1

(10) Convert 2.64 to % $2.64 \times 100 = 264\%$

(11) Convert 6329 % to decimal $6329\% \div 100 = 63.29$

(12) Convert 0.00000254 to sci. not.

0.00000254

2.54×10^{-6}

(13) Convert 3.57×10^{8} to decimal

3.57×10^{8}

$357000000.$

357000000

(14) Round to nearest thousandths

8643.256957

8643.257000