Name

Avogadro's number = 6.022X10^{23}
One dozen = 12

A mole is 6.022X10^{23} of anything. If you have one mole of marbles then you have 6.022X10^{23} marbles. If you have one mole of pencils, then you have 6.022 X 10^{23} pencils.

1. If you have two dozen donuts, how many donuts do you have? 24 donuts
2. If you have two moles of donuts, how many donuts do you have? 6.022X10^{23} x 2 = 1.2 X 10^{24} donuts
3. If you have a half-dozen jellybeans, how many jellybeans do you have? 6 jelly beans
4. If you have half a mole of jellybeans, how many jellybeans do you have? 3 X 10^{23} jelly beans
5. If you have 24 gold atoms, how many dozen gold atoms do you have? 2 dozen gold atoms
6. If you have 12.044X10^{23} atoms of gold, how many moles of gold do you have? 2 moles gold atoms
7. If you have 6 atoms of silver, how many dozen silver atoms do you have? 1/2 dozen or .5 dozen
8. If you have 3.011X10^{23} atoms of silver, how many moles of silver do you have? 1/2 mol or .5 mol silver
9. If you have one dozen cars, how many wheels would you have? 48 wheels
10. If you have one mole of cars, how many wheels would you have? 6.022 X 10^{23} x 4 = 2.4 X 10^{24} wheels
11. The formula for methane gas is CH_{4}. How many atoms are in one molecule of methane? 5
12. Is methane an element or a compound?
13. How many different kinds of elements is methane composed of? 2
14. How many carbon atoms are in one molecule of methane? 1
15. How many carbon atoms are in one mole of methane? 6.022 X 10^{23} C atoms
16. How many hydrogen atoms are in one molecule of methane? 4
17. How many hydrogen atoms are in one mole of methane? 6.022 X 10^{23} x 4 = 2.4 X 10^{24} H atoms
18. How many methane molecules are in one mole of methane? 6.022 X 10^{23} CH_{4} molecules
Grants/moles/atoms

Name ____________  KEY ____________

1. If you have 4.3 grams of potassium (K), how many moles of potassium do you have?
\[
\frac{4.3 \text{ g K}}{39.0983 \text{ g K/mol}} = 0.11 \text{ mol K} \quad \text{2 s.f.}
\]

2. If you have 2.8 moles of K, how many grams of K do you have?
\[
\frac{2.8 \text{ mol K}}{1 \text{ mol K}} \times 39.0983 \text{ g K/mol} = 109.47 \text{ g K} \quad \text{2 s.f.}
\]

3. If you have \(6.1 \times 10^{25}\) atoms of K, how many moles of K do you have?
\[
\frac{6.1 \times 10^{25} \text{ atoms K}}{6.022 \times 10^{23} \text{ atoms} \cdot \text{mol}^{-1}} = 101.29 \text{ mol K} \quad \text{1.0} \times 10^2 \text{ moles K}
\]

4. If you have 5.5 moles of K, how many atoms of K do you have?
\[
\frac{5.5 \text{ mol K}}{1 \text{ mol K}} \times 6.022 \times 10^{23} \text{ atoms} \cdot \text{mol}^{-1} = 3.3 \times 10^{24} \text{ atoms K} \quad \text{2 s.f.}
\]

5. If you have 3.2 grams of K, how many atoms of K do you have?
\[
\frac{3.2 \text{ g K}}{39.0983 \text{ g K/mol}} \times 6.022 \times 10^{23} \text{ atoms} \cdot \text{mol}^{-1} = 4.9 \times 10^{22} \text{ atoms K} \quad \text{2 s.f.}
\]

6. If you have \(7.2 \times 10^{21}\) atoms of K, how many grams of K do you have?
\[
\left( \frac{7.2 \times 10^{21} \text{ atoms K}}{6.022 \times 10^{23} \text{ atoms} \cdot \text{mol}^{-1}} \right) \times \frac{1 \text{ mol K}}{39.0983 \text{ g K/mol}} = 0.47 \text{ g K} \quad \text{2 s.f.}
\]

7. If you have 5.9 grams of sodium (Na), how many moles of sodium do you have?
\[
\frac{5.9 \text{ g Na}}{22.990 \text{ g Na/mol}} = 0.26 \text{ mol Na}
\]

8. If you have 1.3 grams of sodium, how many atoms of sodium do you have?
\[
\frac{1.3 \text{ g Na}}{22.990 \text{ g Na/mol}} \times 6.022 \times 10^{23} \text{ atoms} \cdot \text{mol}^{-1} = 3.4 \times 10^{22} \text{ atoms Na} \quad \text{3 s.f.}
\]