

Mole HW #1

ANSWERS

1. Describe the relationship between Avogadro's number & 1 mole of any substance.

A mole is just a very large number of things.

1 mole of atoms has 6.02×10^{23} atoms. 1 mole of ions has 6.02×10^{23} ions.

6.02×10^{23} is Avogadro's Number.

2. How many oxygen atoms are in a representative particle of each of these?

A. ammonium nitrate, a fertilizer - NH_4NO_3 **three**

B. acetylsalicylic acid, aspirin - $\text{C}_8\text{H}_8\text{O}_4$ **four**

C. ozone, a disinfectant and part of the air - O_3 **three**

D. nitroglycerine, explosive - $\text{C}_3\text{H}_5(\text{NO}_3)_3$ **nine**

3. How many moles in each of these (show the math)?

A. 1.50×10^{23} molecules NH_3 (ammonia)

$\frac{1.50 \times 10^{23} \text{ molecules } \text{NH}_3}{1}$	x	$\frac{1 \text{ mole } \text{NH}_3}{6.02 \times 10^{23} \text{ molecules } \text{NH}_3}$	=	0.249 moles NH_3
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B. 1 billion (1×10^9) molecules O_2 (oxygen) (USE 3SF)

$\frac{1 \times 10^9 \text{ molecules } \text{O}_2}{1}$	x	$\frac{1 \text{ mole } \text{O}_2}{6.02 \times 10^{23} \text{ molecules } \text{O}_2}$	=	1.66×10^{-15} moles O_2
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C. 6.02×10^{22} molecules of Br_2 (bromine)

$\frac{6.02 \times 10^{22} \text{ molecules } \text{Br}_2}{1}$	x	$\frac{1 \text{ mole } \text{Br}_2}{6.02 \times 10^{23} \text{ molecules } \text{Br}_2}$	=	1.00×10^{-1} moles Br_2
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D. 4.81×10^{24} atoms of Li (lithium)

$\frac{4.81 \times 10^{24} \text{ atoms } \text{Li}}{1}$	x	$\frac{1 \text{ mole } \text{Li}}{6.02 \times 10^{23} \text{ atoms } \text{Li}}$	=	0.799×10^1 moles Li = 7.99 moles Li
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