

MOLES/MOLECULES/MASS CONVERSIONS PRACTICE

Avogadro's number = 6.022×10^{23}

	# of particles in sample	# of moles in sample	molar mass of substance (g/mol)	mass of sample
1	5.36×10^{25}			3.265 kg
2		22		927.6 g
3			168.9	46 g
4		659	98.6	
5	5.9×10^{26}		12.01	
6	8.05×10^{19}			0.2648 g
7		1.2		197.8 g
8			57.7	46 g
9		457	180.9	
10	1.28×10^{20}		562.7	
11	6.23×10^{19}			0.788 mg
12		1		112.4 g
13			469.8	568 g
14		6.0×10^{-6}	846.4	
15	9.9×10^{62}		112.5	
16	5.44×10^{22}			8.651 g
17		22		5978.4 g
18			225.2	135 g
19		4.2×10^{-4}	6485.5	
20	9.3×10^{22}		158.7	

21. How many carbon molecules are in a standard Advil® tablet that contains 200 mg of ibuprofen ($C_{13}H_{18}O_2$)?
22. Two ounces of gin are poured into a 6-ounce glass of tonic. Gin is 40% ethanol (C_2H_6O); ethanol has a density of 0.7854 g/ml. How many moles of ethanol are in the glass? (1 ounce = 28 ml)
23. A typical 8-oz cup of coffee contains 94.8 mg of caffeine ($C_8H_{10}N_4O_2$). If you consume a 20-ounce cup of coffee in preparation for your Monday morning math class, how many molecules of caffeine are you drinking?
24. Butter is approximately 1% lactose ($C_{12}H_{22}O_{11}$). How many moles of lactose are in a pound of butter?
25. Health Canada regulates natural health products and allows a maximum of 40 mg of aspartame ($C_{14}H_{18}N_2O_5$) per kg of body weight per day. If an average adult weighs 170 lbs, what is the maximum number of molecules of aspartame an adult should consume in a day?
26. Furfural ($C_5H_4O_2$) is an agricultural chemical derived from bran. How many atoms are in 1 gram of furfural?
27. Moronic acid ($C_{30}H_{46}O_3$) is a molecule derived from Sumac that has antiviral properties. How many moles of hydrogen atoms are in 2.5×10^{-10} moles of moronic acid?
28. Fucitol ($C_6H_{14}O_5$) is derived from the common seaweed *Fucus*. How many oxygen atoms are in 0.41 mg of fucitol?