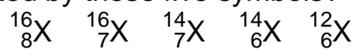


Complete each of the following problems. For numerical problems, you must show your work in order to possibly earn full credit.

1. Consider the isotope symbols below, where X replaces each element symbol. How many different **elements** are represented by these five symbols? Identify each element. (3 pts.)



2. Hydrogen gas can be made by decomposing methane (CH_4), the main component in natural gas. If the mass ratio for methane is 3.00 grams carbon (C) to 1.00 gram hydrogen (H), how many grams of hydrogen can be made from 90.0 grams of methane? (3 pts.)

3. A cube of gold (Au) that is 1.00 cm on each side has a mass of 19.32 g. How many gold atoms does this cube contain? (4 pts.)

Possibly Useful Information

density = mass/volume	$N_A = 6.022 \times 10^{23}$ anythings per mole
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To save some calculation time, you may round all atomic masses to two (2) decimal points.

		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
		1A		2A		3B		4B		5B		6B		7B		8B		9B		10B		11B		12B		3A		4A		5A		6A		7A		8A	
		1 H 1.00794		2 He 4.00260		3 Li 6.941		4 Be 9.01218		5 B 10.811		6 C 12.011		7 N 14.0067		8 O 15.9994		9 F 18.9984		10 Ne 20.1797		11 Na 22.9898		12 Mg 24.3050		13 Al 26.9815		14 Si 28.0855		15 P 30.9738		16 S 32.066		17 Cl 35.4527		18 Ar 39.948	
		19 K 39.0983		20 Ca 40.078		21 Sc 44.9559		22 Ti 47.88		23 V 50.9415		24 Cr 51.9961		25 Mn 54.9381		26 Fe 55.847		27 Co 58.9332		28 Ni 58.693		29 Cu 63.546		30 Zn 65.39		31 Ga 69.723		32 Ge 72.61		33 As 74.9216		34 Se 78.96		35 Br 79.904		36 Kr 83.80	
		37 Rb 85.4678		38 Sr 87.62		39 Y 88.9059		40 Zr 91.224		41 Nb 92.9064		42 Mo 95.94		43 Tc (98)		44 Ru 101.07		45 Rh 102.906		46 Pd 106.42		47 Ag 107.868		48 Cd 112.411		49 In 114.818		50 Sn 118.710		51 Sb 121.757		52 Te 127.60		53 I 126.904		54 Xe 131.29	
		55 Cs 132.905		56 Ba 137.327		57 *La 138.906		72 Hf 178.49		73 Ta 180.948		74 W 183.84		75 Re 186.207		76 Os 190.23		77 Ir 192.22		78 Pt 195.08		79 Au 196.967		80 Hg 200.59		81 Tl 204.383		82 Pb 207.2		83 Bi 208.980		84 Po (209)		85 At (210)		86 Rn (222)	
		87 Fr (223)		88 Ra 226.025		89 †Ac 227.028		104 Rf (261)		105 Db (262)		106 Sg (266)		107 Bh (264)		108 Hs (277)		109 Mt (268)		110 Ds (271)		111 Rg (272)		200.59		204.383		207.2		208.980		209		210		222	

*Lanthanide series		58 Ce 140.115	59 Pr 140.908	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.965	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.967
†Actinide series		90 Th 232.038	91 Pa 231.036	92 U 238.029	93 Np 237.048	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)