

Work each of the following problems. SHOW ALL WORK.

1. Write the symbolic notation for lead-207.

2. How many protons does lead-207 have? How do you know?

Lead has 82 protons because that is its atomic number. All atoms of lead have 82 protons.

3. How many neutrons does lead-207 have? How do you know?

Lead-207 has 125 neutrons.

The atomic number is 82, which is the number of protons.

The mass number is 207, which is the total number of protons and neutrons.

The number of neutrons equals the mass number minus the atomic number.

## 4. Complete the following table:

Isotope	Symbol	Mass #	Atomic #	# Protons	# Neutrons
boron-11	<sup>11</sup> <sub>5</sub> <b>B</b>	11	5	5	6
cobalt-59	<sup>59</sup> 27 <b>Co</b>	59	27	27	32
cesium-133	<sup>133</sup> <sub>55</sub> Cs	133	55	55	78
chlorine-35	<sup>35</sup> 17 <b>Cl</b>	35	17	17	18
argon-40	<sup>40</sup> <sub>18</sub> Ar	40	18	18	22

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Work each of the following problems. SHOW ALL WORK.

5. Write the element that is formed in the beta-minus decay of carbon-14.

$${}^{14}_{6}C \longrightarrow {}^{0}_{-1}\beta + {}^{14}_{7}N$$

6. Write the element that is formed in the alpha decay of radium-224.

$$^{224}_{88}Ra \longrightarrow ^{4}_{2}lpha + ^{220}_{86}Rn$$

7. Write the equation for the beta-minus decay of phosphorous-32.

$${}^{32}_{15}P \longrightarrow {}^{0}_{-1}\beta + {}^{32}_{16}S$$

8. Write the equation for the alpha decay of plutonium-238.

$$^{238}_{94}Pu \longrightarrow ^{4}_{2}\alpha + ^{234}_{92}U$$