**Worksheet #4**

**Name: Period: Seat#:**

**Complete each problem. Some answers are included at the end of the question, underlined and in italics so you can check your work. Show work!**

1. The half-life of Zn-71 is 2.4 minutes. If one had 100.0 g at the beginning, how many grams would be left after 7.2 minutes has elapsed? *12.5 g remain*
2. Pd-100 has a half-life of 3.6 days. If one had 6.02 x 1023 atoms at the start, how many atoms would be present after 20.0 days?
3. Os-182 has a half-life of 21.5 hours. How many grams of a 10.0-gram sample would have decayed after exactly three half-lives? *8.75 g decayed*
4. After 24.0 days, 2.00 milligrams of an original 128.0-milligram sample remain. What is the half-life of the sample?
5. U-238 has a half-life of 4.46 x 109 years. How much U-238 should be present in a sample 2.5 x 109 years old, if 2.00 grams was present initially? *1.36 g remain*
6. How long will it take the 40.0 grams sample of I-131 (half-life = 8.040 days) to decay to 1/100 its original mass?
7. Fermium-253 has a half-life of 0.334 seconds. A radioactive sample is considered to be completely decayed after 10 half-lives. How much time will elapse for this sample to be considered gone?
8. At time zero, there are 10.0 grams of W-187. If the half-life is 23.9 hours, how much will be present at the end of one day? Two days? Seven days?
9. 100.0 grams of an isotope with a half-life of 36.0 hours is present at time zero. How much time will elapse before 50.0 grams remains? Before 5.00 grams remains?
10. How much time will be required for a sample of H-3 to lose 75% of its radioactivity? The half-life of tritium is 12.26 years. *24.52 years*
11. Rn-222 has a half-life of 3.82 days. How long before only 1/16 of the original sample remains? *15.3 days*
12. Iodine-131 has a half-life of 8.040 days. If we start with a 40.0 gram sample, how much will remain after 24.0 days? How much remains after 20 days? *24 days: 5.05 g*
13. If you start with 2.97 x 1022 atoms of molybdenum-99 (half-life = 65.94 hours), how many atoms will remain after one week? One (non-leap) year? *one week: 5.08E21*
14. How long will it take for a 64.0 g sample of Rn-222 (half-life = 3.8235 days) to decay to 8.00 g?
*11.4705 days*