

CONTINUOUS RANDOM VARIABLES: PRACTICE 2; EXPONENTIAL DISTRIBUTION

STUDENT LEARNING OUTCOMES:

- THE STUDENT WILL EXPLORE THE PROPERTIES OF DATA WITH A EXPONENTIAL DISTRIBUTION.

GIVEN:

Carbon-14 is a radioactive element with a half-life of about 5730 years. Carbon-14 is said to decay exponentially. The decay rate is 0.000121 . We start with 1 gram of carbon-14. We are interested in the time (years) it takes to decay carbon-14.

DATA

1. What is being measured here?
2. Are the data discrete or continuous?
3. In words, define the Random Variable X.

X = _____

4. What is the decay rate? $m =$ _____

5. The distribution for X is: $X \sim$ _____

GRAPHING

6. Find the amount (percent of 1 gram) of carbon-14 lasting less than 5730 years. This means, find $P(X < 5730)$.
 - a. Sketch the graph. Shade the area of interest.



b. Find the probability. $P(X < 5730) =$ _____

7. Find the percent of carbon-14 lasting longer than 10,000 years.

a. Sketch the graph. Shade the area of interest.



b. Find the probability. $P(X > 10,000) =$ _____

8. 30 percent of carbon-14 will decay within how many years?

a. Sketch the graph. Shade the area of interest.



b. Find the value k such that $P(X < k) = 0.30$. $k =$ _____