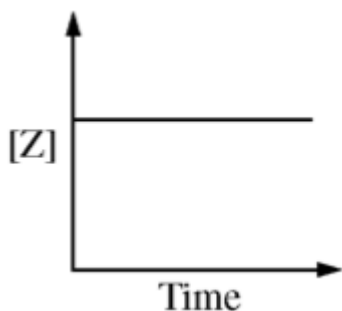


Directions: Answer the following question(s).

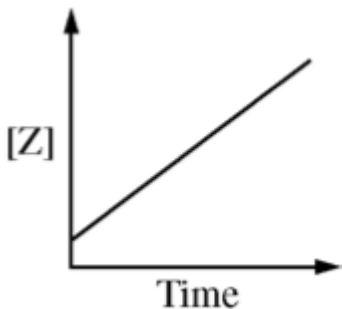


A pure substance Z decomposes into two products, X and Y, as shown by the equation above. Which of the following graphs of the concentration of Z versus time is consistent with the rate of the reaction being first order with respect to Z?

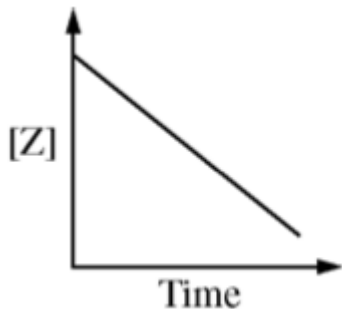
A.



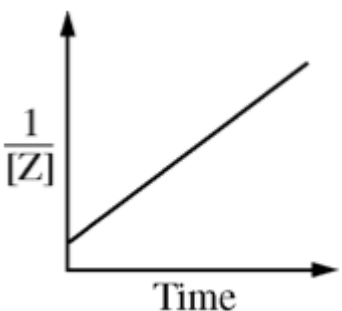
B.



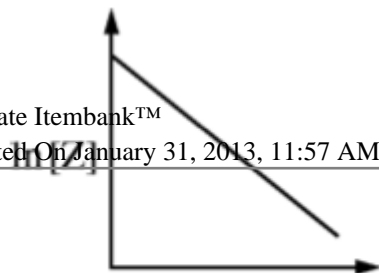
C.



D.



E.



2 After 195 days, a 10.0g sample of pure  $^{95}\text{Zr}$  has decayed to the extent that only 1.25 g of the original  $^{95}\text{Zr}$  remains. The half-life of the  $^{95}\text{Zr}$  is closest to

- A. 195 days
- B. 97.5 days
- C. 65.0 days
- D. 48.8 days
- E. 24.4 days

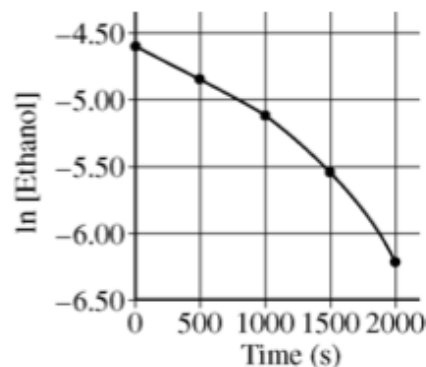
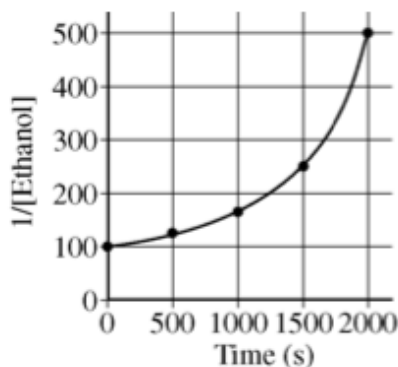
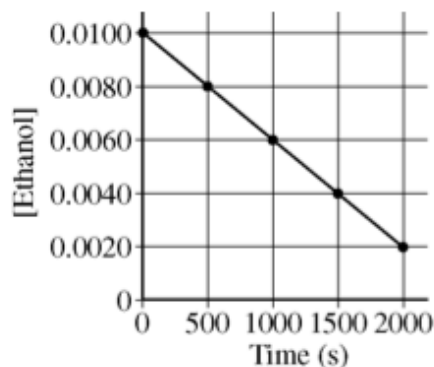
Directions: Read the passage below and answer the question(s) that follow.

### 2011 APQ #6

In an experiment a sample of ethanol gas and a copper catalyst are placed in a rigid, empty 1.0L flask. The temperature of the flask is held constant, and the initial concentration of the ethanol gas is 0.0100 M. The ethanol begins to decompose according to the chemical reaction represented below.



The concentration of the ethanol gas over time is used to create the three graphs below.



- 3 Determine the order of the reaction with respect to ethanol.
- A. 0  
B. 1  
C. 2
- 4 Enter the rate law for the reaction.
- 5 Determine the rate constant for the reaction, including units.
- 6 The pressure in the flask at the beginning of the experiment is 0.40 atm. If the ethanol completely decomposes, what is the final pressure in the flask?