

Quiz #3

Name: Kex*You must show your work to get full credit.*Radioactive potassium, ^{40}K , has a half life of 1,248 billion years.

1. Give a formula for the percent of
- ^{40}K
- left in a sample after
- t
- billion years.

$$A(t) = A_0 a^t$$

$$A(1248) = A_0 a^{1248} = \frac{1}{2} A_0$$

$$a^{1248} = .5$$

$$a = (.5)^{(1/1248)} = .999445$$

$$A(t) = A_0 (.999445)^t$$

$$\text{or } 100 (.999445)^t \%$$

2. If a rock has 90% of its original
- ^{40}K
- left, then how old is it?

We want to solve The age is 189.7 billion years.

$$A(t) = A_0 (.999445)^t = .9 A_0$$

$$(.999445)^t = .9$$

$$t \ln(.999445) = \ln(.9)$$

$$t = \ln(.9) / \ln(.999445)$$

$$= 189.7$$