Show **all** of your work on this assignment and answer each question fully in the given context. You have 20 minutes. Each problem is designed to take 10 minutes. All answers in a topic must be correct for any credit for that topic. You may attempt multiple topics. You may use a calculator on this competency quiz.

1. **Competency Topic: Discrete Random Variables**

   Let X be a random variable following a binomial distribution with probability function

   $$f(x) = \frac{4!}{x!(4-x)!}(0.6)^x(0.4)^{4-x}$$

   .

   a. Complete the probability table for X.

x	$P(X = x)$
0	
1	
2	
3	
4	

   b. Find the value of $E(X)$.

   c. Sketch the cumulative probability function, $F(x)$.

2. **Competency Topic: Continuous Random Variables**

Let X be a random variable with the following probability density function:

$$f(x) = \begin{cases} k \cdot x^3 & 0 \le x \le 2 \\ 0 & o.w. \end{cases}$$

for some constant k.

   a. Find the value of k that makes $f(x)$ a valid pdf.

   b. Sketch the probability density function and illustrate the region corresponding to the value of $P(1 \le X \le 2)$.

   c. Find the value of $E(X)$.