1.(1 pt) You'll need to use the formatted text mode in order to do this problem: click the "formatted text" button on the bottom of the page and then click "submit answers".

Let X be a random variable with probability density function

$$f(x) = \begin{cases} c(7x - x^2) & \text{if } 0 < x < 7 \\ 0 & \text{otherwise} \end{cases}$$

Find the value of c:

$c =$ _____

Find the cumulative distribution function of X:

$$F(x) = \begin{cases} \_\_ & \text{if } x \leq 0 \\ \_\_ & \text{if } 0 < x < 7 \\ \_\_ & \text{if } x \geq 7 \end{cases}$$

2.(1 pt) You'll need to use the formatted text mode in order to do this problem: click the "formatted text" button on the bottom of the page and then click "submit answers".

The probability density function of X, the lifetime of a certain type of device (measured in months), is given by

$$f(x) = \begin{cases} 0 & \text{if } x < 13 \\ \frac{13}{x^2} & \text{if } x > 13 \end{cases}$$

Find the following:

$P(X > 29) =$ _____

The cumulative distribution function of X:

$$F(x) = \begin{cases} \_\_ & \text{if } x < 13 \\ \_\_ & \text{if } x > 13 \end{cases}$$

The probability that at least one out of 4 devices of this type will function for at least 20 months: _____

3.(1 pt) The density function of X is given by

$$f(x) = \begin{cases} a + bx^2 & \text{if } 0 \leq x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

If the expectation of X is $E(X) = -2.25$, find a and b.

$a =$ _____

$b =$ _____