

Please write ***Your name:*** _____

Show all work. You should either write at a sentence explaining your reasoning, or annotate your math work with brief explanations. There is no need to simplify, and no calculators are needed.

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(1) Let X be the time that a car can run until a major repair. If $\mathbb{E}X = 2$, and X is exponentially distributed, what is $\mathbb{P}(2 < X < 5)$?

(2) Given that this car has ran 2 years without a repair, what is the conditional probability that it will run 3 more years without a major repair?

(3) What is the probability density function of $Y = X^2$?

