Question 1

Consider the following R code:

X and Y are ind. exp(3) r.v.s

```
X <- rexp(1000, rate = 3)
Y <- rexp(1000, rate = 3)
Z <- X+Y
mean(Z)
mean(Z>2)
```

Z vector of length 1000

(a) What is the output of `mean(Z)` estimating? Express this as an expectation, integral, or probability.

(b) What is the output of `mean(Z>2)` estimating? Express this as an expectation, integral, or probability.

(c) What distribution is the most appropriate to model `mean(Z)` with? Is this an approximation or the exact distribution? Be sure to specify the parameters and justify your answer using any theorems or laws.

a) mean(Z) is estimating E(X+Y).