

Ejercicios del Capítulo 3

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```
#librerias  
library(ggplot2)
```

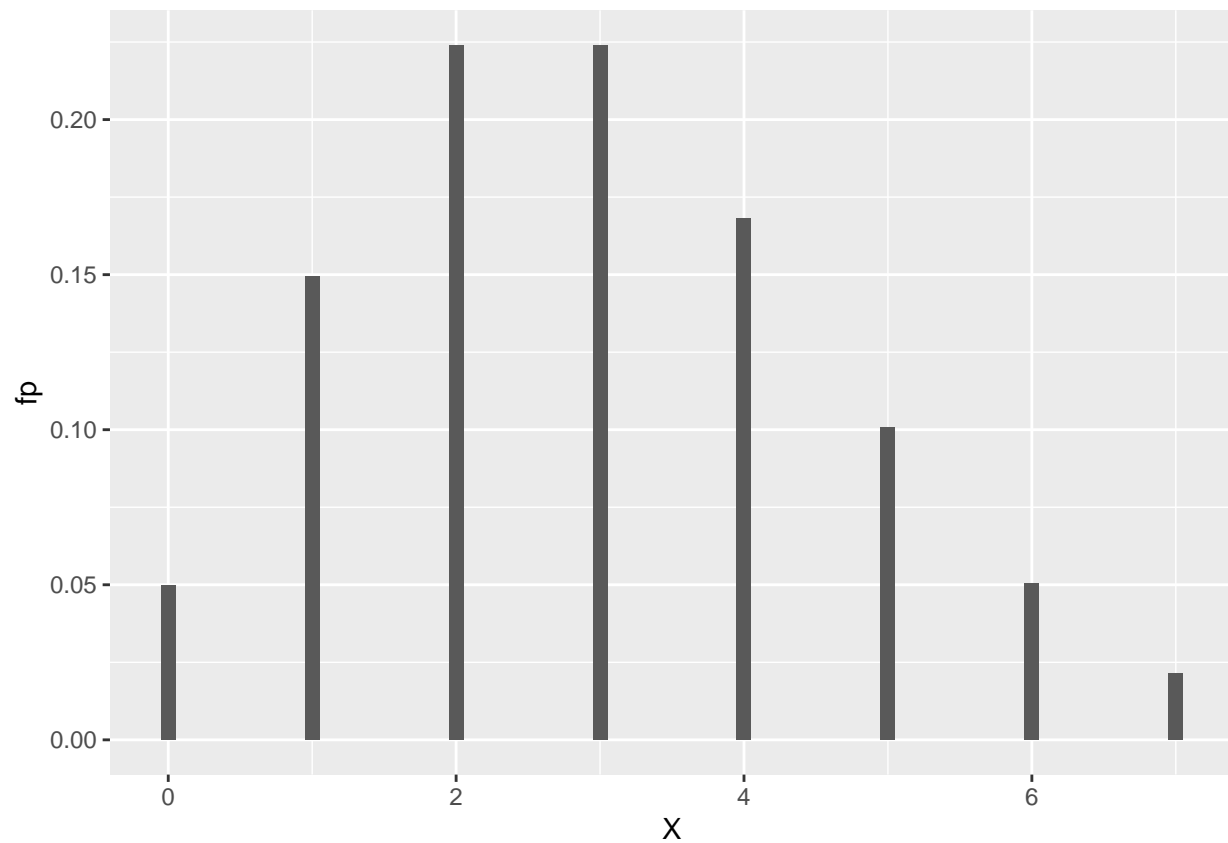
```
#1
```

a)

```
X <- c(0,1,2,3,4,5,6,7)  
fp <- c()  
for (x in 0:7) {  
  fp <- c(fp, exp(-3)*3^x / factorial(x))  
}  
df <- data.frame(X,fp)
```

b)

```
ggplot(data = df, mapping = aes(X,fp)) +  
  geom_col(width = 0.1)
```



c)

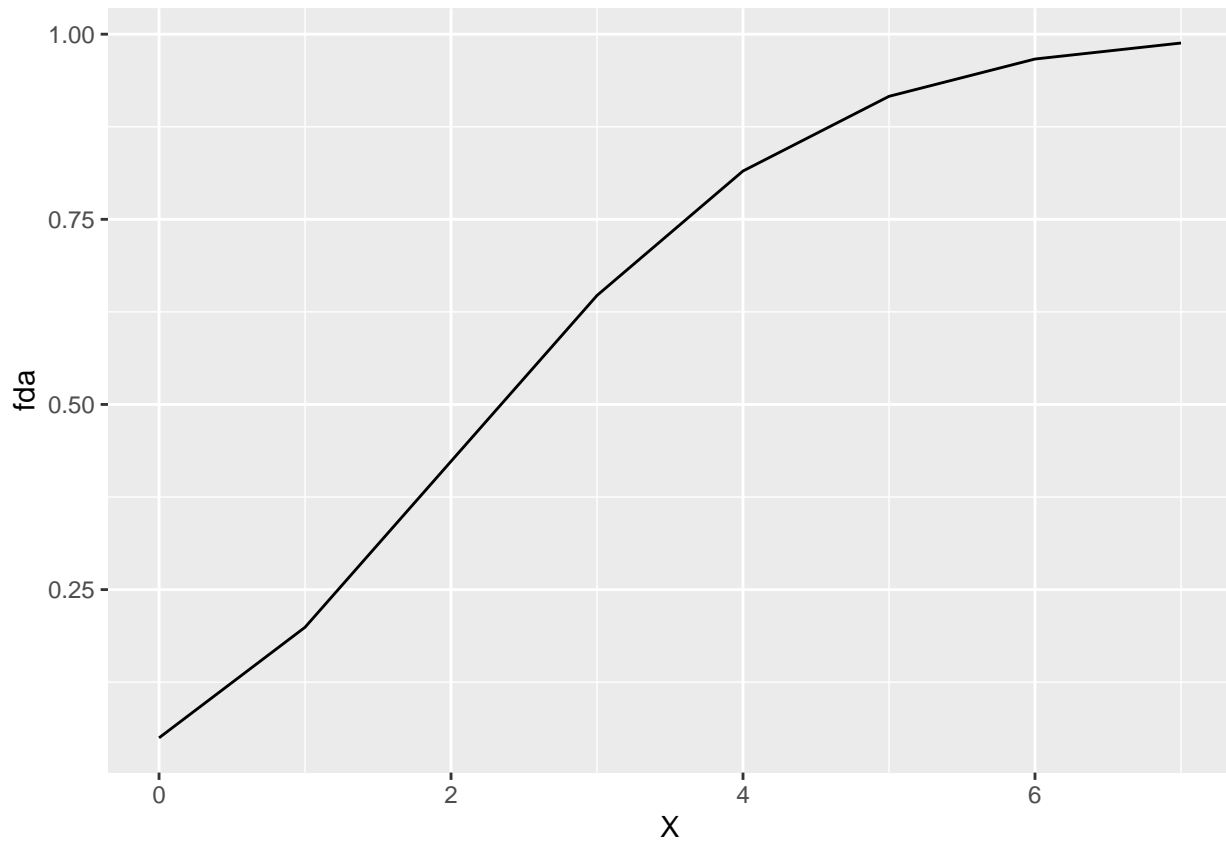
```
fda <- c()
sum <- 0
for (x in 0:7) {
  sum <- sum + (exp(-3)*3^x / factorial(x))
  fda <- c(fda,sum)
}
df <- data.frame(X,fp,fda)
print(fda)
```

```
## [1] 0.04978707 0.19914827 0.42319008 0.64723189 0.81526324 0.91608206 0.96649146
## [8] 0.98809550
```

d)

```
ggplot(data = df, mapping = aes(X,fda)) +
  geom_line(width = 2)
```

```
## Warning: Ignoring unknown parameters: width
```



2.

Por definición 3.4, sea

$$k + \frac{k}{2} + \frac{k}{3} + \frac{k}{4} = 1 \implies k = \frac{12}{25}$$

entonces la función de probabilidad de una variable aleatoria discreta X estará dada por:

$$p(x) = \begin{cases} \frac{12}{25} & \text{si } x = 1 \\ \frac{6}{25} & \text{si } x = 2 \\ \frac{4}{25} & \text{si } x = 3 \\ \frac{3}{25} & \text{si } x = 4 \end{cases}$$

Así, la probabilidad de $P(1 \leq X \leq 3)$ será,

$$P(1 \leq X \leq 3) = 1 - P(X = 4) = 1 - \frac{3}{25} = \frac{22}{25} = 0.88$$

3.

a)

Según la definición 3.6 se tiene,

$$\int_{-1}^1 kx^2 dx = 1 \implies k = \frac{3}{2}$$

```
integrate(function(x) 3/2*x^2, lower = -1, upper = 1)
```

```
## 1 with absolute error < 1.1e-14
```

b)

$$f(x) = \begin{cases} \frac{3}{2} \cdot x^2 & -1 \leq x \leq 1 \\ 0 & \text{para cualquier otro valor} \end{cases}$$

```
ggplot() +  
  xlim(-10, 10) +  
  geom_function(  
    aes(color = "Normal"),  
    fun = ~ 3/2 * .x^2  
  )
```



c)

```
integrate(function(x) 3/2*x^2, lower = 0, upper = 5)
```

```
## 62.5 with absolute error < 6.9e-13
```