ICA7

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## Question 1

### a

∫(0,4) 1/8\*x^2

1/24x^3|(0,4) = 64/24-0 = 8/3

### b

varance = E(X^2) – (E(X))^2

(E(X))^2 = 64/9

E(X^2) = ∫(0,4) 1/8\*x^3 = 1/32x^4|(0,4) = 8

varance = E(X^2) – (E(X))^2 = 8 - 64/9 = 8/9

## Question 2

### a

E <- 1\*0.1 + 2\*0.2 + 3\*0.1 + 4\*0.1 + 5\*0.1 + 6\*0.2 + 7\*0.1 + 8\*0.1  
  
E

## [1] 4.4

EX <- 1^2\*0.1 + 2^2\*0.2 + 3^2\*0.1 + 4^2\*0.1 + 5^2\*0.1 + 6^2\*0.2 + 7^2\*0.1 + 8^2\*0.1  
  
var <- EX - E^2  
  
var

## [1] 5.04

The expected value is 4.4, variance is 5.04.

## Question 3

### b

mean(rpois(1000,8))

## [1] 7.966

## Question 4

### a

mean(rbinom(1000000,24,0.3))

## [1] 7.200379

var(rbinom(1000000,24,0.3))

## [1] 5.044716

Expected value is 7.2, variance is 5.03.

### b

mean(rbinom(1000000,150,0.8))

## [1] 120.0018

var(rbinom(1000000,150,0.8))

## [1] 24.02922

Expected value is 120, variance is 23.99.

### d

mean(rexp(1000000,0.3))

## [1] 3.333814

var(rexp(1000000,0.3))

## [1] 11.1136

Expected value is 3.33 and variance is 11.11.

### e

mean(rexp(1000000,3))

## [1] 0.3332309

var(rexp(1000000,3))

## [1] 0.1111853

Expected value is 0.33 and variance is 0.11. ### f

mean(rnorm(1000000,4,1.4))

## [1] 4.000432

var(rnorm(1000000,4,1.4))

## [1] 1.961198

Expected value is 3.99 and variance is 1.96.