ICA7

Tiancheng Liu

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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.