

Lab 5: Continuous Distributions

75694189 16257626 13341225

Chen Wang, Junke Wang, Zhuozhi Xiong

due 11/6 at end of discussion

Exponential Distribution

The amount of time (in hours) a person spends waiting in a line at the DMV, X , follows an exponential distribution with rate 0.5.

Q1: What is the expected wait time of this person?

```
rate = 0.5  
1 / rate
```

```
## [1] 2
```

Q2: What is the probability that the person waits between 1.5 and 2.5 hours?

```
pexp(q = 2.5, rate = 0.5) - pexp(q = 1.5, rate = 0.5)
```

```
## [1] 0.1858618
```

Continuous Uniform Distribution

In the next 94 minutes an alarm will go off randomly.

Q3: What is the probability that the alarm goes off in the first 15 minutes?

```
15 / 94
```

```
## [1] 0.1595745
```

```
# or
```

```
punif(q = 15, min = 0, max = 94)
```

```
## [1] 0.1595745
```

Q4: what is the probability that the alarm goes off in the last 20 minutes?

```
20 / 94
```

```
## [1] 0.212766
```

```
# or
```

```
1 - punif(q = (94 - 20), min = 0, max = 94)
```

```
## [1] 0.212766
```

Normal Distribution:

The weights of female giraffes is believed to follow a normal distribution with a mean of 1815 pounds and standard deviation of 100 pounds.

Q5: What is the z-score of a randomly selected female giraffe the weighs 1600 pounds?

```
(1600 - 1815) / 100
```

```
## [1] -2.15
```

Q6: What is the probability that a randomly selected female giraffe is between 1740 lbs. and 2100 lbs.?

```
pnorm(q = 2100, mean = 1815, sd = 100) - pnorm(q = 1740, mean = 1815, sd = 100)
```

```
## [1] 0.7711867
```

Q7: What is the probability that a randomly selected giraffes weights over 1810 lbs.?

```
1 - pnorm(q = 1810, mean = 1815, sd = 100)
```

```
## [1] 0.5199388
```

Q8: What is the third quartile of female giraffe weights?

```
qnorm(p = 0.75, mean = 1815, sd = 100)
```

```
## [1] 1882.449
```

Q9: Fill in the blank: The top 10% heaviest female giraffes weigh more than _____ pounds.

```
qnorm(p = 0.9, mean = 1815, sd = 100)
```

```
## [1] 1943.155
```