Sydney Bruce QBIO310 HW2 P2

Code

Run is *Cmd+Shift+Enter*. Insert chunk is *Cmd+Option+I*.

2a. 14% of men are color-blind. Calculate the probability that exactly 3 of 26 are color-blind Needs binomial distribution dbinom gives the exact probability of observing x successes in size trials with success probability prob

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```
dbinom(3,size=26,prob=.14)
```

```
[1] 0.2222398
```

```
Calculate the probability that 3 or fewer of the 26 are color-blind
pbinom gives the cumulative probability of observing x or fewer successes
```

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```
pbinom(3,size=26,prob=.14)
```

```
[1] 0.4965632
```

```
Calculate the probability that at least one of the 26 is color-blind
Finding P(X=0) then subtracting from 1 gives P(X>=1)
```

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```
1-pbinom(0,size=26,prob=.14)
```

```
[1] 0.9801866
```

2b. Sports team has 60% chance of winning every game Needs geometric distribution Calculate the probability the team's first win is the third game of the season use dgeom to return the probability that the first success occurs after x failures (on the x+1th trial)

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```
dgeom(2,0.6)
```

```
[1] 0.096
```

```
Calculate the probability the team's first win is the third game of the season or earlie
r
use pgeom to return the cumulative probability that the first success occurs on or befor
e the x+1th trial
```

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```
pgeom(2,0.6)
```

```
[1] 0.936
```

```
Calculate the probability the team's first win is after the third game of the season
subtract pgeom of 2 from 1 to get P(X>2) and remember the iteration is really x+1th
```

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```
1-pgeom(2,0.6)
```

```
[1] 0.064
```

2c. Assume babies' birth weights are normally distributed with a mean of 7.5lbs and a standard deviation of 1.1lbs. need cumulative distribution function of a normal distribution Calculate the probability that a randomly chosen baby weighs less than 7lbs. Need to use pnorm to calculate the probability that a normally distributed random variable is less than or equal to a given value

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```
pnorm(7,mean=7.5,sd=1.1)
```

```
[1] 0.3247181
```

```
Calculate the probability that a randomly chosen baby weighs between 7 and 8lbs.
```

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```
pnorm(8,mean=7.5,sd=1.1)-pnorm(7,mean=7.5,sd=1.1)
```

```
[1] 0.3505637
```

```
Calculate the probability that a randomly chosen baby weighs more than 8 pounds.
```

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```
1-pnorm(8,mean=7.5,sd=1.1)
```

```
[1] 0.3247181
```

2d. Berkelium-248m has an exponential decay rate, lambda = 0.03/hours. Caluclate the fraction that will have decayed within one hour.

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```
1-exp(-0.03*1)
```

```
[1] 0.02955447
```

Calculate the time in hours such that 50% will have decayed.

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```
log(2)/0.03
```

```
[1] 23.10491
```