1. A train arrives at a station uniformly between 8:00 a.m. and 8:40 a.m. Let the random variable X represent the number of minutes the train arrives after 8:00 a.m. What is the probability that the train arrives between 8:10 a.m. and 8:25 a.m.?

Source on Save

```r
#Exercise
#Q1
#P(25>=X>=10) --> P(X<=25) - P(X<=10)
punif(25, min=0, max=40, lower.tail = TRUE) - punif(10, min=0, max=40, lower.tail=TRUE)
```

8:29 (Top Level)

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```
> #Exercise
> #Q1
> #P(25>=X>=10) --> P(X<=25) - P(X<=10)
> punif(25, min=0, max=40, lower.tail = TRUE) - punif(10, min=0, max=40, lower.tail = TRUE)
[1] 0.375
```

2. The time (in hours) to complete a software update is exponentially distributed with rate $\lambda = \frac{1}{3}$. Find the probability that an update will take at most 2 hours.

```r
#Q2
#(X<=2)
pexp(2, rate=1/3, lower.tail=TRUE)
```

13:47 (Top Level)

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```
> #Q2
> #(X<=2)
> pexp(2, rate=1/3, lower.tail=TRUE)
[1] 0.4865829
>
```

3. Suppose IQ scores are normally distributed with a mean of 100 and a standard deviation of 15.

   i. What is the probability that a randomly selected person has an IQ above 130?

   ii. What IQ score represents the 95th percentile?

```r

#Q3
#i.
#mean = 100, #std = 15 P(X>130) --> 1-P(X<=130)
1-pnorm(130, mean=100, sd=15, lower.tail=TRUE)

#ii.
qnorm(0.95, mean=100, sd=15)
```

14:1 (Top Level)

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```
> #Q3
> #i.
> #mean = 100, #std = 15 P(X>130) --> 1-P(X<=130)
> 1-pnorm(130, mean=100, sd=15, lower.tail=TRUE)
[1] 0.02275013
>
> #ii.
> qnorm(0.95, mean=100, sd=15)
[1] 124.6728
>
```