

# Statistical Rethinking Chapter 4 problems

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**For 03/17/16**

**4E1**

the first one is the likelihood

**4E2**

two, mu and sigma

**4E3**

this formula should look very similar to the one on P83

**4M1 for the model definition below, simulate observed heights from the prior.**

```
library(rethinking)

## Loading required package: rstan

## Loading required package: ggplot2

## Warning: package 'ggplot2' was built under R version 3.2.4

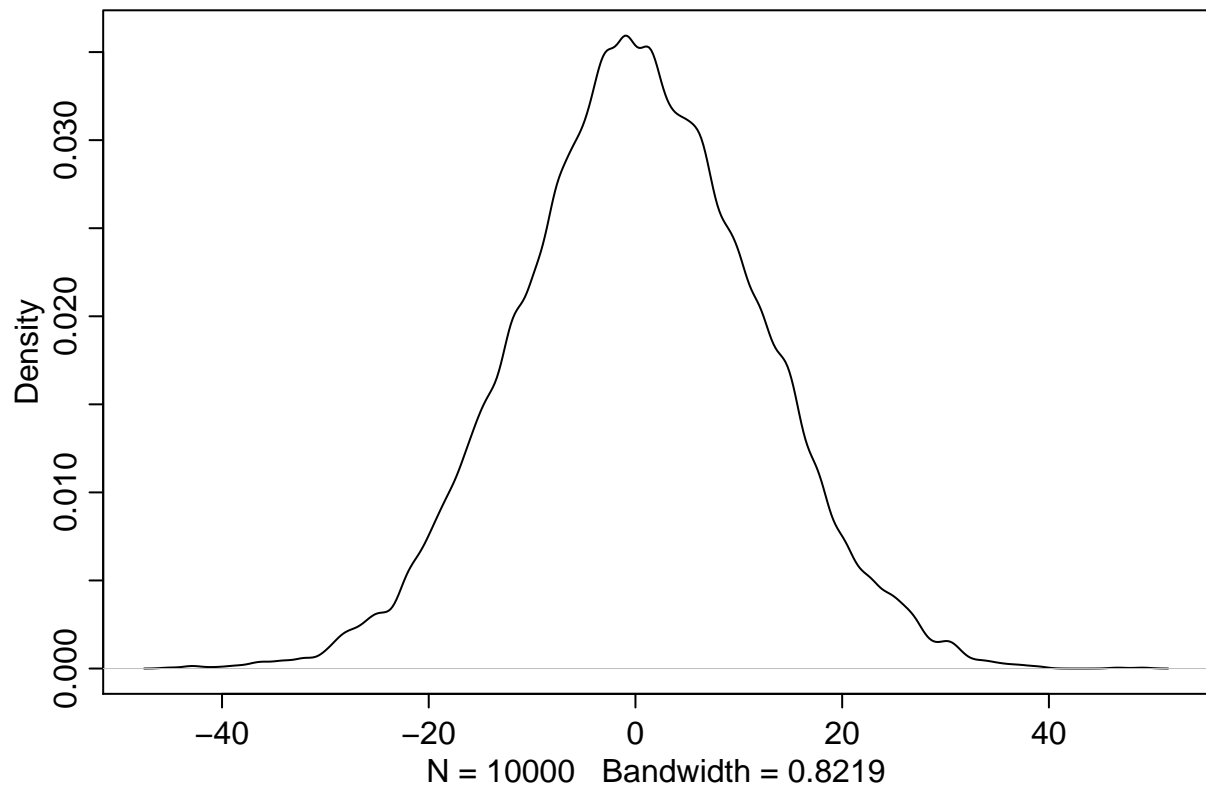
## rstan (Version 2.9.0-3, packaged: 2016-02-11 15:54:41 UTC, GitRev: 05c3d0058b6a)

## For execution on a local, multicore CPU with excess RAM we recommend calling
## rstan_options(auto_write = TRUE)
## options(mc.cores = parallel::detectCores())

## Loading required package: parallel

## rethinking (Version 1.58)

sample_mu <- rnorm(1e4, 0, 10)
sample_sigma <- runif(1e4, 0, 10)
prior <- rnorm(1e4, sample_mu, sample_sigma)
dens(prior)
```



4M2 translate the model into a map formula

```
data("Howell1")
d <- Howell1
d <- d[d$age >=18,]
m <- map(
  alist(
    height ~ dnorm(mu, sigma),
    mu ~ dnorm(0, 10),
    sigma ~ dunif(0, 10)
  ),
  data = d # prblem...
)
```

For 03/24/16

4E4

second line

4E5

three, alpha, beta, and sigma

### 4M3

$y_i \sim \text{Normal}(\mu_i, \sigma)$

$\mu_i = a + b \cdot x_i$

$a \sim \text{Normal}(0, 50)$

$b \sim \text{Normal}(0, 10)$

$\sigma \sim \text{Uniform}(0, 50)$

### 4M4

$h_i \sim \text{Normal}(\mu_i, \sigma_1)$

$\mu_i = a + b \cdot x_i$

$a \sim \text{Normal}(\mu_2, \sigma_2)$

$b \sim \text{Normal}(\mu_3, \sigma_3)$

$\sigma \sim \text{Uniform}(n, m)$

### 4M5

$\mu_2 = 120$

$b > 0$

### 4M6

$\sigma \leq 64$

$\sigma_2 \leq 64$

**For 03/31/16**

### 4H1

### 4H2

### 4H3