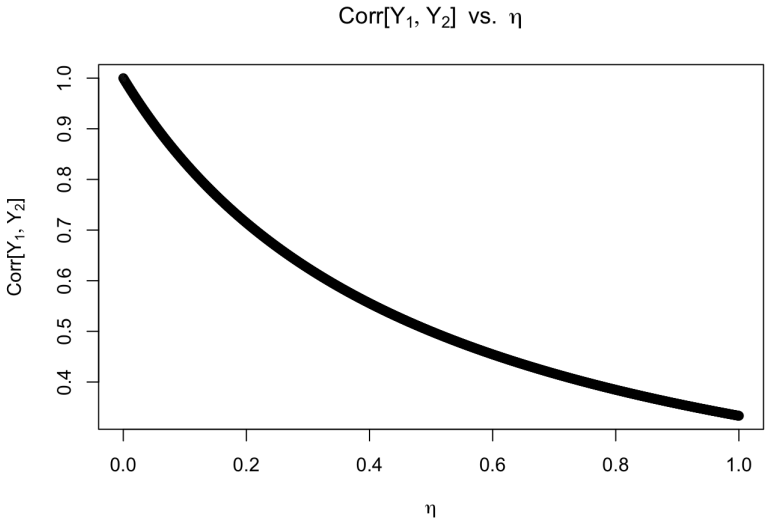
```
library(latex2exp)
```

#1

c.

```
eta <- seq(0, 1, length.out = 1000)
corr <- 1/(2*eta+1)
plot(eta, corr,
     main = TeX('$Corr[Y_1, Y_2] \\ vs. \\ \\eta$'),
     xlab = TeX('$\\eta$'),
     ylab = TeX('$Corr[Y_1, Y_2]$'))
```



#3

a.

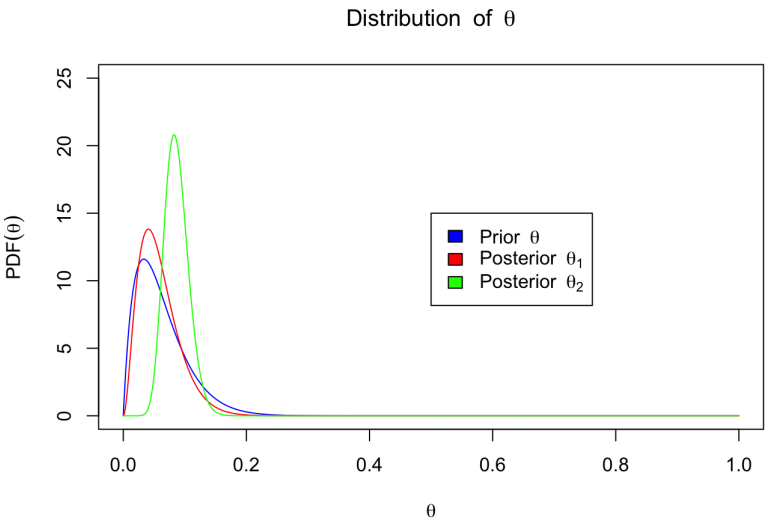
```
theta <- seq(0, 1, length.out = 1000)

# prior theta
plot(theta, dbeta(theta, 2, 30),
     col = 'blue',
     type = 'l',
     main = TeX('$Distribution \\ of \\ \\theta$'),
     xlab = TeX('$\\theta$'),
     ylab = TeX('$PDF(\\theta)$'),
     ylim = c(0, 25))

# posterior theta_1
lines(theta, dbeta(theta, 3, 48),
      col = 'red')

# posterior theta_2
lines(theta, dbeta(theta, 18, 190),
      col = 'green')

legend(0.5,15,
       legend = c(TeX('$Prior \\ \\theta$'), TeX('$Posterior \\ \\theta_1'), TeX('$Posterior \\ \\theta_2')),
       fill = c('blue', 'red', 'green'))
```



#3

b.

```
# posterior theta_1
a1 <- 3
b1 <- 48
mean1 <- a1/(a1+b1)
CI1 <- qbeta(c(0.025, 0.975), a1, b1)
print(mean1)
```

```
## [1] 0.05882353
```

```
print(CI1)
```

```
## [1] 0.01254859 0.13713763
```

```
# posterior theta_2
a2 <- 18
b2 <- 190
mean2 <- a2/(a2+b2)
CI2 <- qbeta(c(0.025, 0.975), a2, b2)
print(mean2)
```

```
## [1] 0.08653846
```

```
print(CI2)
```

```
## [1] 0.05235135 0.12823530
```