Normal Distribution

Normal Density Function

$$f(x;\mu,\sigma) = \frac{1}{\sqrt{2\pi\sigma}} e^{\frac{-(x-\mu)^2}{2\sigma^2}}$$

Draw 10 random numbers from $N(\mu,\sigma)$

```
rnorm(n=10,mean=100,sd=20)
```

```
 [1]  94.74432  97.74774 113.64494  71.38795 105.05797  89.01389 109.39635
 [8]  92.72916 116.07064 113.87932
```

Draw 100 from standard normal $N(0,1)$

```
rnorm100 <- rnorm(100)
head(rnorm100)
```

```
[1] -0.4793678 -1.3618140  0.5733047 -0.3936375 -0.7214296 -0.4145408
```

Revert 100 to density (probabilities)

```
library(tidyverse)

dnorm100<-dnorm(rnorm100)
head(dnorm100)
```

```
[1] 0.3556404 0.1578347 0.3384843 0.3692011 0.3075342 0.3660957
```

```r
df = data.frame(rnorm100, dnorm100)

ggplot(df, aes(x= rnorm100, y=dnorm100))+
  geom_point()
```