Option	Description
pch	point character (pch=1, 2, ...)
lty	line type (lty=1, 2, ...)
lwd	line thickness (lwd= 1, 2,...)
col	color (col="red", "blue",...)
xlim	x-axis limits: xlim=c(min,max)
ylim	y-axis limits
xlab	x-axis label: xlab="my label"
ylab	y-axis label
main	main title
sub	sub title

To plot smooth curves, use the `curve` command. The first argument must be an expression in terms of x:

```
> curve(x^2, from = 0, to = 2)
> curve(cos(x), from = 0, to = pi)
> curve(cos(x), from = 0, to = pi, lty = 4, col = "red")
```

Low-level Plot Functions

Low-level plot functions can be executed only after a high-level plot has been created. For example,

```
> plot(Poverty ~ Unemp, data = States03, xlab = "Unemployment", ylab = "Poverty")
> abline(v = mean(States03$Unemp), lty = 2)  #vertical line at mean unemployment rate,
> text(30, 18, "mean unemployment rate")   #text at (30, 18)
> title("Data from 2003")
```

The `abline` function has several options:

`abline(3, 5)` adds the straight line $y = 3 + 5x$

`abline(v = 2)` adds the vertical line, $x = 2$

`abline(h = 0)` adds the horizontal line, $y = 0$

```
> plot(Poverty ~ ColGrad, data = States03, col = "blue", pch = 19, xlab = "College grad (%)",
   ylab = "Poverty (%)")
> points(Uninsured ~ ColGrad, data = States03, col = "red", pch = 19)
> mtext("Percent uninsured", side = 4)
> legend("bottomleft", legend = c("Y: Poverty","Y: Uninsured"), col = c("blue","red"),
  pch = c(16, 16))
```

You can also use different plotting symbols for different levels of a factor variable:

Probability Distributions in R

Continuous

Distributions	root
beta	`beta`
Cauchy	`cauchy`
chi-square	`chisq`
exponential	`exp`
F	`f`
gamma	`gamma`
normal	`norm`
student's t	`t`
uniform	`unif`
Weibull	`weibull`

In the continuous case, `d`*root* returns the density, `p`*root* a cumulative probability, `q`*root* a quantile, `r`*root* a random number.

Probability

If X follows $N(0,1)$, then to find $P(X \leq 1.25) = \Phi(1.25)$, that is, the amount of area under the standard normal density curve to the left of $x = 1.25$,

```
> pnorm(1.25)
```

By default, the `norm` function assumes $\mu = 0, \sigma = 1$ (that is, you are working with the standard normal distribution). For other means and standard deviations, specify them in the argument. For example, if $X \sim N(\mu = 2, \sigma = 3)$, then to find $F(2.8) = P(X \leq 2.8)$,

```
> pnorm(2.8, 2, 3)
```

If X follows a chi-square distribution with 25 degrees of freedom then to compute $F(13.9) = P(X \leq 13.9)$,

```
> pchisq(13.9, 25)
```

If X follows an exponential distribution with parameter $\lambda = 10$, then to compute $P(X > 4)$,

```
>  1 - pexp(4, 10)
```

or

```
> pexp(4, 10, lower.tail=FALSE)
```