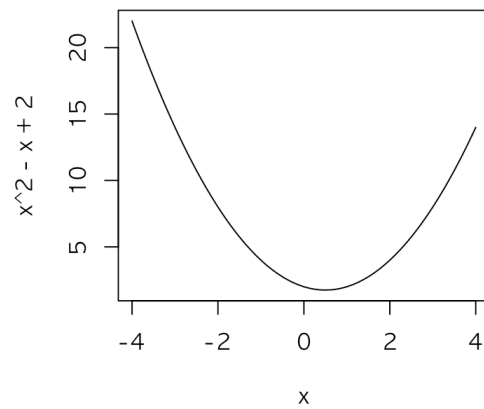# Part I Chapter 2
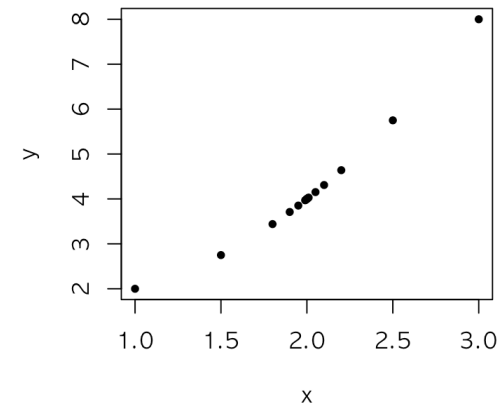
```
options(scipen = 7)
```

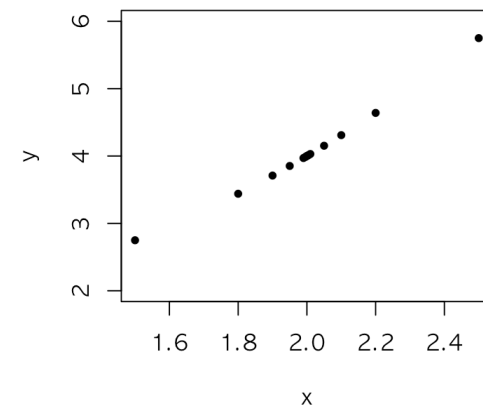**13쪽 설명**

```
x <- c(1.0, 1.5, 1.8, 1.9, 1.95, 1.99, 1.995, 1.999, 3.0, 2.5, 2.2, 2.1, 2.05,
2.01, 2.005, 2.001)
y <- x^2 - x + 2
curve(x^2 - x + 2, -4, 4)
```
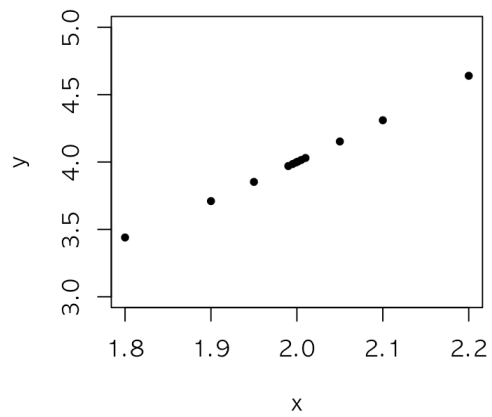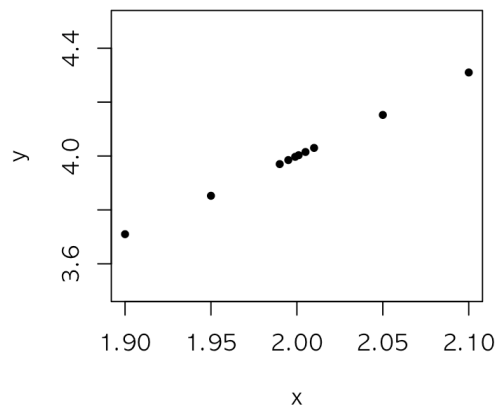


```
plot(x, y, pch = 20)
```



```
plot(x, y, xlim = c(1.5, 2.5), ylim = c(2, 6), pch = 20)
```



```
plot(x, y, xlim = c(1.8, 2.2), ylim = c(3, 5), pch = 20)
```
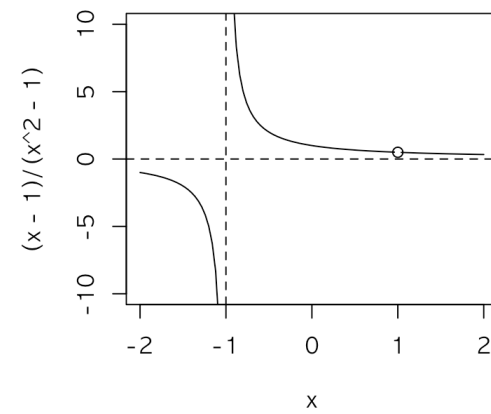
```
plot(x, y, xlim = c(1.9, 2.1), ylim = c(3.5, 4.5), pch = 20)
```



```
curve((x - 1)/(x^2 - 1), -2, 2, ylim = c(-10, 10))
points(1, 0.5)
abline(v = -1, h = 0, lty =2)
points(1, 2, pch = 20)
```
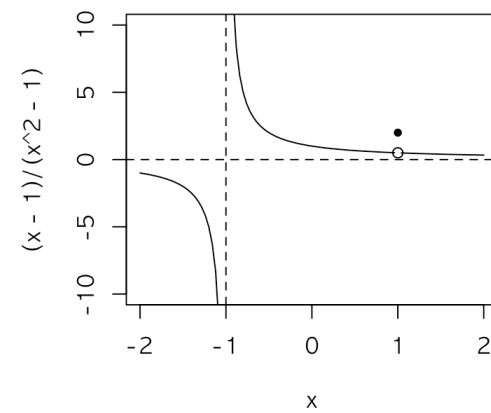

예제 1

```
x <- c(0.5, 0.9, 0.99, 0.999, 0.9999)
y <- (x - 1)/(x^2 - 1)
curve((x - 1)/(x^2 - 1), -2, 2, ylim = c(-10, 10))
points(1, 0.5)
abline(v = -1, h = 0, lty =2)
```


예제 2

```
x <- c(-1., -0.5, -0.1, -0.05, -0.01, -0.0005, -0.0001, -0.00005, -0.00001, 0.0
0001, 0.00005, 0.0001, 0.0005, 0.01, 0.05, 0.1, 0.5, 1.)
y <- (sqrt(x^2 + 9) - 3)/x^2
cbind(x, y)
```

```
##              x         y
##  [1,] -1.00000 0.1622777
##  [2,] -0.50000 0.1655251
##  [3,] -0.10000 0.1666204
##  [4,] -0.05000 0.1666551
##  [5,] -0.01000 0.1666662
##  [6,] -0.00050 0.1666667
##  [7,] -0.00010 0.1666667
##  [8,] -0.00005 0.1666667
##  [9,] -0.00001 0.1666667
## [10,]  0.00001 0.1666667
## [11,]  0.00005 0.1666667
## [12,]  0.00010 0.1666667
## [13,]  0.00050 0.1666667
## [14,]  0.01000 0.1666662
## [15,]  0.05000 0.1666551
## [16,]  0.10000 0.1666204
## [17,]  0.50000 0.1655251
## [18,]  1.00000 0.1622777
```
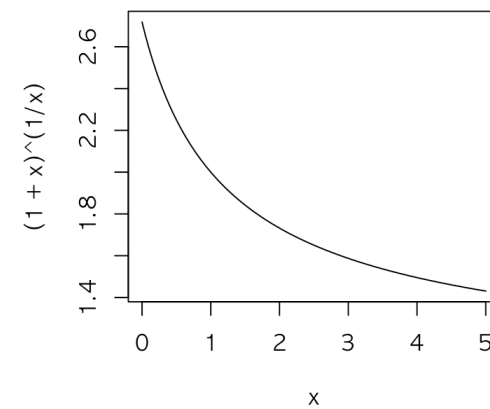
```
plot(x, y, pch = 20)
```
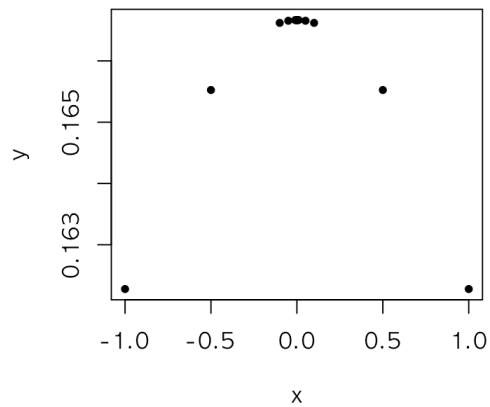


```
curve((sqrt(x^2 + 9) - 3)/x^2, -2, 2)
points(0, 1/6)
```
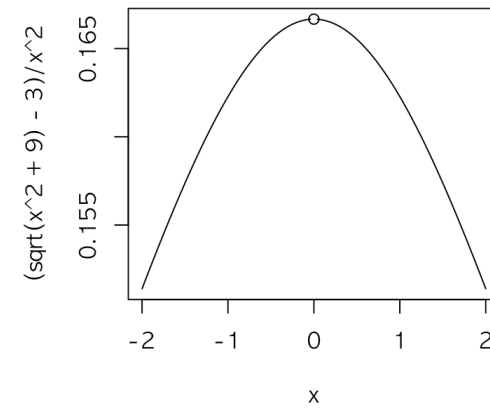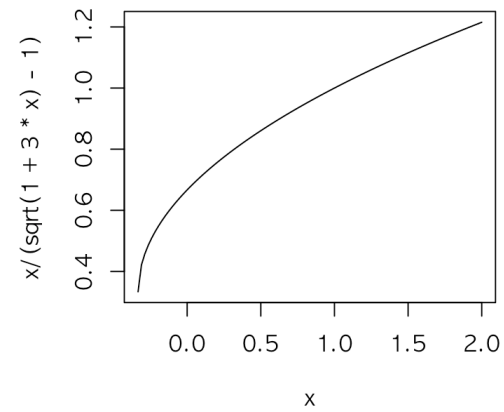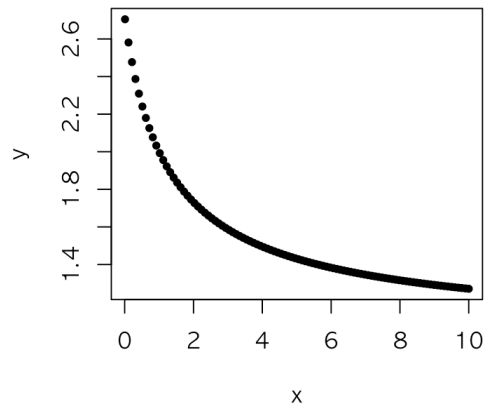

2.1-15

```
x <- seq(0.01, 10, length = 100)
y <- (1 + x)^(1/x)
curve((1 + x)^(1/x), 0.00001, 5)
```
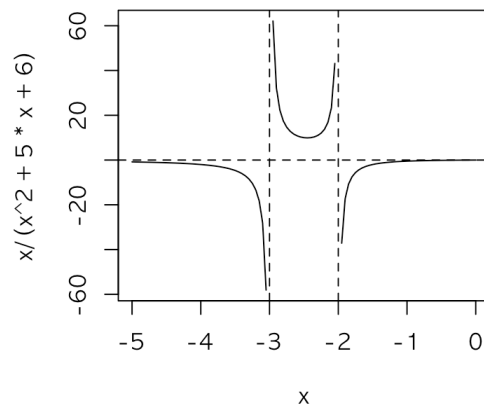


```
plot(x, y, pch = 20)
```

2.2-11

```
curve(x/(x^2 + 5*x + 6), -5, 0)
abline(v = c(-3, -2), h = 0, lty = 2)
```


2.3-16

```
curve(x/(sqrt(1 + 3*x) - 1), -1/3, 2)
```
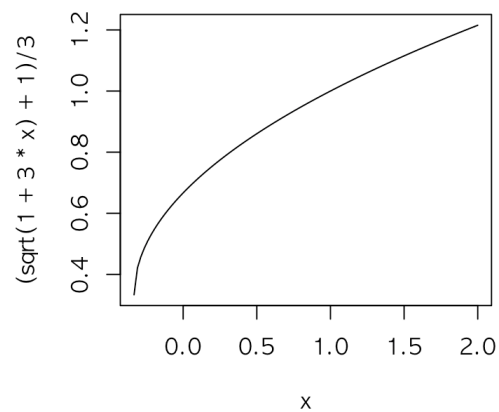


```
x <- c(-0.3, -0.1, -0.05, -0.01, -0.005, -0.001, -0.0005, -0.0001, 0.0001, 0.00
05, 0.001, 0.005, 0.01, 0.05, 0.1, 0.3)
y <- x/(sqrt(1 + 3*x) - 1)
cbind(x, y)
```

```
##               x         y
##  [1,] -0.3000 0.4387426
##  [2,] -0.1000 0.6122200
##  [3,] -0.0500 0.6406515
##  [4,] -0.0100 0.6616286
##  [5,] -0.0050 0.6641572
##  [6,] -0.0010 0.6661663
##  [7,] -0.0005 0.6664166
##  [8,] -0.0001 0.6666167
##  [9,]  0.0001 0.6667167
## [10,]  0.0005 0.6669166
## [11,]  0.0010 0.6671663
## [12,]  0.0050 0.6691574
## [13,]  0.0100 0.6716297
## [14,]  0.0500 0.6907935
## [15,]  0.1000 0.7133918
## [16,]  0.3000 0.7928016
```

```
curve((sqrt(1 + 3*x) + 1)/3, -1/3, 2)
```

2.4-12

```
(x <- seq(-3.2, -2.8, by = 0.01))
```

```
##  [1] -3.20 -3.19 -3.18 -3.17 -3.16 -3.15 -3.14 -3.13 -3.12 -3.11 -3.10
## [12] -3.09 -3.08 -3.07 -3.06 -3.05 -3.04 -3.03 -3.02 -3.01 -3.00 -2.99
## [23] -2.98 -2.97 -2.96 -2.95 -2.94 -2.93 -2.92 -2.91 -2.90 -2.89 -2.88
## [34] -2.87 -2.86 -2.85 -2.84 -2.83 -2.82 -2.81 -2.80
```

```
1/(x + 3)^4 > 10000
```

```
##  [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12]  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
## [23]  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
which(1/(x + 3)^4 > 10000)
```

```
##  [1] 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
```

```
x[1/(x + 3)^4 > 10000]
```

```
##  [1] -3.09 -3.08 -3.07 -3.06 -3.05 -3.04 -3.03 -3.02 -3.01 -3.00 -2.99
## [12] -2.98 -2.97 -2.96 -2.95 -2.94 -2.93 -2.92 -2.91 -2.90
```