2.4.2.1 data dispersion

$$Q \quad var(X) = \frac{1}{N}\sum_{k=1}^{N} x^2(k) - \left(\frac{1}{N}\sum_{k=1}^{N} x(k)\right)^2 = \frac{1}{N}\sum x^2 - \frac{1}{N^2}\bar{x}^2$$

(1) 44   46   48   45   47

(2) 34   46   59   39   52

Solution (1)

$$var(X) = \frac{1}{5}(44^2 + 46^2 + 48^2 + 45^2 + 47^2)$$

$$- \left[\frac{1}{5}(44 + 46 + 48 + 45 + 47)\right]^2 \quad \bar{x} = 46$$

$$= \frac{1}{5} \times 10590 - 46^2$$

$$= 2118 - 2116$$

$$= 2$$

method 2.   44   46   48   45   47

$\bar{x} = 46$ -2 0   2 -1 1

$x - \bar{x}$

$$var(x) = \frac{1}{5} \times (4 + 0 + 4 + 1 + 1) = \frac{1}{5} \times 10 = 2$$

Same answer

Solution (b) $\bar{x} = 46$

	34	46	59	39	52
$x - \bar{x}$	-12	0	13	-7	6

$$\text{Var}(x) = \frac{1}{5} \times (144 + 169 + 49 + 36)$$

$$= \frac{1}{5} \times 398$$

$$= 79.6$$