

Problem 11 $N(14)=1, N(15)=1, N(16)=3, N(22)=2$
 $N(24)=2, N(25)=5$

(a) compute $\langle f_2^2 \rangle$ and $\langle f_1^2 \rangle$

$f_2: 196, 225, 256, 484, 576, 625$

$$\langle f_2^2 \rangle = \frac{196 \cdot 1 + 225 \cdot 1 + 256 \cdot 3 + 484 \cdot 2 + 576 \cdot 2 + 625 \cdot 5}{1 + 1 + 3 + 2 + 2 + 5}$$

$$= \frac{6334}{14} = 452.428$$

for $\langle f_1 \rangle = f_1: 14, 15, 16, 22, 24, 25$

$$\langle f_1 \rangle = \frac{14 + 15 + 3 \cdot 16 + 2 \cdot 22 + 2 \cdot 24 + 5 \cdot 25}{14} = 21$$

$$\langle f_1^2 \rangle = 441$$

(b) $\Delta f = f - \langle f \rangle = -7, -6, -5, 1, 3, 4$

$$\sigma = \sqrt{\langle (\Delta f)^2 \rangle} = \sqrt{49 + 36 + 3 \cdot 25 + 2 + 2 \cdot 9 + 5 \cdot 16} = 18.5714$$

$$\langle (\Delta f)^2 \rangle = (49 + 36 + 3 \cdot 25 + 2 + 2 \cdot 9 + 5 \cdot 16) / 14 = 18.5714$$

$$\sigma = \sqrt{18.5714} = 4.31$$

$$\textcircled{c} \sigma = \sqrt{\langle f^2 \rangle - \langle f \rangle^2} = \sqrt{18.5714}$$