Answers

Quiz 5

(Q5.1) **B** [ordered sample: 0,0,1,1,1,1,2,2,...];

(Q5.2) **D** [$\text{freq}(X \leqslant 2) = 12$, so $\hat{F}(2) = \frac{12}{20}$];

(Q5.3) **D** [since X is continuous, the cells are $(0.95 < x < 1.45)$, $(1.45 < x < 1.95)$, ...];

(Q5.4) **D** [linear interpolation between $\hat{F}(1.95) = 0.4$ and $\hat{F}(2.45) = 0.65$];

(Q5.5) **C** [for $(1.45 < x < 1.95)$, $\hat{f}(x) = \dfrac{\text{relfreq}}{\text{cellwidth}} = \dfrac{6/20}{0.5} = 0.6$].

Homework 5

(5.1) **D** [$\text{freq}(X \leqslant 2.2) = \text{freq}(X \leqslant 2) = 14$];

(5.2) **A** [calculation: $s = 1.65$];

(5.3) **B** [$\bar{x} \pm 2s$];

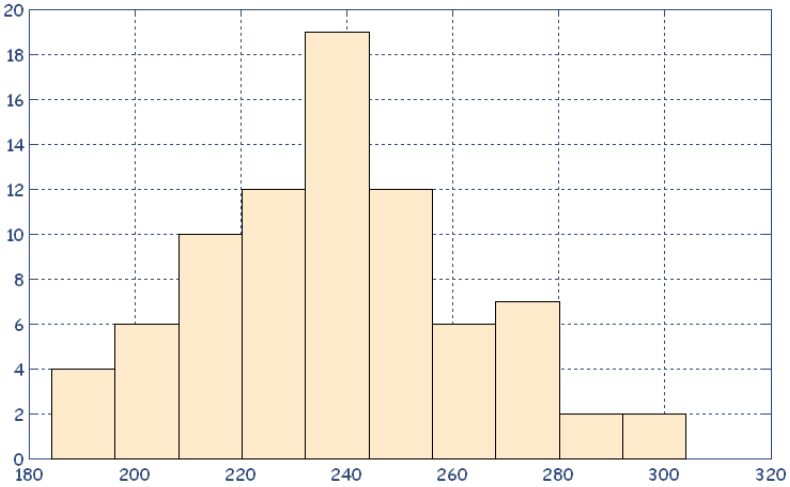
(5.4) **E** [$\text{Bi}(n, p) \approx \text{N}(np, npq)$ for large n, and $np > 5$, $nq > 5$];

(5.5) **C** [$\Pr(X^2 > 2) = \Pr(X > \sqrt{2}) + \Pr(X > -\sqrt{2}) = 0.385 + 0.044.$].

(5.6) (a) My simulation gave the following:

$n = 80$, $\bar{x} = 238.0$, $s = 25.6$;

$\min = 184.3$, $\text{Q1} = 221.1$, $\text{med} = 237.6$, $\text{Q3} = 254.7$, $\max = 304.0$



(b) $\bar{x}$ estimates $\mu = 240$; s estimates $\sigma = 25$;

$\Pr(X < 200) = \Pr(X_s < -1.6) = 0.0548$, so 'expected' frequency is $80 \times 0.0548 = 4.38$;

$\hat{c}_q$ estimates $c_q = 240 + 25\Phi^{-1}(q)$; for $q = 0.25, 0.5, 0.75$, $\Phi^{-1}(q) = -0.6745, 0, 0.6745$;

$\min \sim c_q$, where $q = 1/81$ and $\max \sim c_q$, where $q = 80/81$. This gives $240 \pm 2.246 \times 25$

statistic	my observed value	theoretical/expected (population) value
sample mean, $\bar{x}$	238.0	240
sample sd, s	25.6	25
$\text{freq}(X < 200)$	9	4.4
sample minimum, $x_{(1)}$	184.3	183.8
Q1 = $\hat{c}_{0.25}$	221.1	223.1
sample median, $\hat{c}_{0.5}$	237.6	240.0
Q3 = $\hat{c}_{0.75}$	254.7	256.9
sample maximum, $x_{(80)}$	304.0	296.2