

Median for Grouped Data

Data Group	Freq.	Cumulative Freq.
$0 < h \leq 10$	14	14
$10 < h \leq 20$	23	37
$20 < h \leq 40$	30	67
$40 < h \leq 60$	44	111
$60 < h \leq 70$	27	138
$70 < h \leq 80$	19	157
$80 < h \leq 100$	8	165

$$\Sigma f = 165$$

Median is item $\frac{165+1}{2} = 83^{\text{rd}}$

$$83 - 67 = 16$$

Require 16th item in interval $40 < h \leq 60$

$$\text{Estimate Median} = 40 + \frac{16}{44} \times 20 = 42.3$$

$$\text{UQ } 3 \left(\frac{165+1}{4} \right) = 124.5^{\text{th}} \text{ item}$$

$$124.5 - 111 = 13.5$$

$$\text{Est UQ} = 60 + \frac{13.5}{27} \times 10 = 65$$

$$\text{LQ} \left(\frac{165+1}{4} \right) = 41.5^{\text{th}} \text{ item}$$

$$41.5 - 37 = 4.5$$

$$\text{LQ} = 20 + \frac{4.5}{30} \times 20 = 23$$

$$\text{IQR estimate} = 65 - 23 = 42$$

Exercise 2C Q4

Weight 299.5 - 349.5 349.5 - 399.5 399.5 - 449.5 449.5 - 499.5 499.5 - 549.5

cf	3	9	19	26	31
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$$\text{Median item } \frac{31+1}{2} = 16^{\text{th}}$$

$$= 399.5 + \frac{7}{10} \times 50 = 434.5 \text{ kg}$$

$$\text{LQ } \frac{31+1}{4} = 8^{\text{th}} \text{ item} \quad 8 - 3 = 5$$

$$\text{LQ} = 349.5 + \frac{5}{9} \times 50 = 377.3 \text{ kg}$$

$$\text{UQ } \frac{3(31+1)}{4} = 24^{\text{th}} \text{ item} \quad 24 - 19 = 5$$

$$\text{UQ} = 449.5 + \frac{5}{7} \times 50 = 485.2 \text{ kg}$$

Textbook says use

$\frac{n}{2}$	$\frac{n}{4}$	$\frac{3n}{4}$	for grouped data
Median	LQ	UQ	
