

M1.

- (a) Four correct cumulative frequencies

*23, 48, 87 and 100***B1**

Five correct heights plotted

*(..., 12), (... , 23), (... , 48), (... , 87) and (... , 100)***B1**

Five points plotted at correct upper boundaries

*(15, ...), (20, ...), (40, ...), (55, ...) and (70, ...)**Must be an increasing function***B1**

Straight lines or smooth curve going through the five points

*ft **their** 5 plotted points.**Must be an increasing function***B1ft****Additional Guidance**Ignore anything to the left of *their* (15, 12)Ignore anything to the right of *their* (70, 100), must be an increasing functiontolerance $\pm \frac{1}{2}$ square

Accept histograms / bars for heights plotted but upper boundary points must be identified either by plots or curve / polygon

- (b)
- their*
- LQ plotted
-
- and
- their*
- median plotted
-
- and
- their*
- UQ plotted

*ft **their** cf graph provided increasing function**tolerance $\pm \frac{1}{2}$ square (± 1)**B1ft for 2 correctly plotted***B2ft**

Box plot with 8 and 69 correct

*Correct diagrammatic representation***B1****Additional Guidance**

Allow values plotted as points for B2ft

M2.(a) Fully correct box plot with

minimum = 65

LQ = 70

median = 80

UQ = 85

maximum = 95

B1 for 3 correct

B2

Additional Guidance

Minimum and maximum values can be marked with a cross or a plus

(b) LQ = 75

Need not be plotted

B1

UQ = 90

Need not be plotted

B1

Minimum = 60 **or** maximum = 100

or median = [75,90]

Need not be plotted

B1

Minimum = 60 **and** maximum = 100 **and** median = [75,90] **and** correct box plot drawn

B1

Additional Guidance

Box plot takes precedence over any written answers

[6]**M3.(a)** [64, 66]**B1**

(b) [53, 55]

B1**[2]****M4.**

(a) Cumulative frequencies attempted
8, 18, 32, 40, may be implied by heights on graph

M1

Their heights plotted
Must be increasing function

M1

Plots at correct horizontal position
Must be increasing function

M1

All correct and joined

A1

(b) Read off from their 20 (= 26)
Allow from 20.5
ft their increasing graph

B1 ft

(c) Read off from their 10 (= 21) and their 30 (= 29.5)
ft their increasing graph

M1

ft their UQ – their LQ

A1ft

- (d) Comparison of box plots:
Position of Median, UQ and LQ marked on diagram
ft their (b)

B1

UQ and LQ marked on diagram
ft their (c)

A1ft

(On average Jane) is faster due to lower median
oe ft their box plot

B1ft

Jane's times are less consistent due to larger IQR
oe ft their box plot

B1ft

Alternative

Jane's median = 23

B1

Jane's IQR = 13

IQR found from box plot

B1

(On average) Jane is faster due to lower median
oe ft 7(b) correct comparison of their median values

B1 ft

Jane's times are less consistent due to larger IQR
oe ft 7(c) and Jane's IQR

B1 ft

[11]

M5.(a) 5

B1

- (b) [100.5, 101.5]

B1

(c) [105.5, 106.5] or [92.5, 93.5]

M1

[12, 14]

A1

[4]

M6.(a) Correct box drawn and median and quartiles at 20, 50, 80

$\pm \frac{1}{2}$ square

B1

IQR box formed and whiskers correctly joined to 15 and 90

$\pm \frac{1}{2}$ square

B1

(b) 120 is $\frac{3}{4}$ or 40 is $\frac{1}{4}$ seen or implied

May be implied by M1 scored

Condone lower quartile = 40 or $Q_1 = 40$

B1

$120 \div 3 \times 4 (\div 2)$ or 160 seen oe

or $120 - 40$

$\frac{2}{3} \times 120$ or 40×2

M1

80

SC2 median linked with 80 in working

A1

[5]

M7.(a) 20

B1

(b) 9

B1

(c) 11 and 3 seen

Could be written on diagram

M1

8

A1

(d) Comment on average and the implication, eg waiting times decreased after new window as median lower

ft their medians if valid conclusion reached

B1

Comment on range or inter-quartile range and the implication, eg Spread of waiting times decreased after new window as range decreased **or** Not much effect on waiting times as IQR about the same

ft their values if a valid conclusion reached

B1

[6]

M8.(a) Correct box plot

B1 for three or four correct points

Tolerance $\pm \frac{1}{2}$ square

B2

- (b) Attempt at one frequency density

May be on diagram

$17 \div 10 (= 1.7)$

or $12 \div 5 (= 2.4)$

or $3 \div 15 (= 0.2)$

or $9 \div 30 (=0.3)$

$$\text{Tolerance } \pm \frac{1}{2} \text{ square}$$

M1

Three or four correct frequency densities

At least three from 1.7, 2.4, 0.2 and 0.3

A1

Fully correct histogram

A1

[5]

M9.

- (a)
- $0.25 \times 20 (=5)$
-
- Or It represents 25% (or
- $\frac{1}{4}$
-) of the meetings / distribution
-
- oe
-
- Comment referring to 25% or 1 / 4*

B1

- (b)
- 15×3

M1

$5 + 45 (= 50)$

A1

- (c)
- 5×1.6
- or
- 10×2.4
- or
- 5×3.2
-
- 0.25×1.6
- or
- 0.5×2.4
- or
- 0.25×3.2

M1

$8 + 24 + 16$

0.4 + 1.2 + 0.8 at least 2 correct

M1

48 and B

2.4 and 2.5 and B

A1

[6]

M10.1

B

B2 for 2 correct

2

D

B1 for 1 correct but not all the same

3

A

4

C

B3

[3]