# Cumulative Frequency Diagrams

## Mark Scheme

| Level | IGCSE |
|---|---|
| Subject | Maths |
| Exam Board | Edexcel |
| Topic | Handling Data Statistics |
| Sub Topic | Cumulative Frequency Diagrams(Graphical representation of data) |
| Booklet | Mark Scheme |

**Time Allowed:** minutes

**Score:** /

**Percentage:** /100

**Grade Boundaries:**

| A* | A | B | C | D | E | U |
|---|---|---|---|---|---|---|
| >85% | 75% | 70% | 60% | 55% | 50% | <50% |

| Question Number | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 1. (a) | 1 × 8 + 3 × 14 + 5 × 26 + 7 × 17 + 9 × 10 + 11 × 5<br><br>or 8 + 42 + 130 + 119 + 90 + 55 | | 3 | M1 for finding at least four products $f \times x$ consistently within intervals (inc end points) and summing them |
| | | | | M1 (dep) for use of halfway values |
| | | 444 | | A1 Cao |
| (b) | | 8 22 48 65 75 80 | 1 | B1 Cao |
| (c) | | Points correct | 2 | B1 $\pm$ ½ sq ft from sensible table |
| | | Curve or line segments | | B1 ft from points if 4 or 5 correct or if points are plotted consistently within each interval at the correct heights<br>Accept curve which is not joined to the origin |
| (d) | 5.2 indicated on cf graph | | 2 | M1 for 5.2 indicated on cf graph |
| | | approx 36-40 from correct graph | | A1 If M1 scored, ft from cf graph<br>If M1 not scored, ft only from correct curve & if answer is correct ($\pm$ ½ sq tolerance), award M1 A1 |
| | | | | **Total 8 marks** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2.** | (a) | | 55  115  155  177  190  200 | | 1 | B1 | cao |
| | (b) | | Points correct | | 2 | B1 | $\pm$ ½ sq ft from sensible table ie clear attempt to add frequencies |
| | | | Curve or line segments | | | B1 | ft from points if 4 or 5 correct or ft correctly from sensible table or if points are plotted consistently within each interval at the correct heights Accept curve which is not joined to the origin |
| | (c) | 26 indicated on cf graph | | | 2 | M1 | for 26 indicated on cf graph – accept 26-27 inc |
| | | | approx 60 from correct graph | | | A1 | If M1 scored, ft from cf graph If M1 not scored, ft only from correct curve & if answer is correct ($\pm$ ½ sq tolerance) award M1 A1 |
| | | | | | | | **Total 5 marks** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **3.** | (a) | $l = 15$ indicated on graph or 70-72 inc stated | | | 2 | M1 | |
| | | | | 9 | | A1 | Accept 8-10 inc |
| | (b) | 20 and 60 or $20\frac{1}{4}$ and $60\frac{3}{4}$ indicated on cumulative frequency axis or stated or 6-6.5 and 11-11.5 stated | | | 2 | M1 | |
| | | | | 4.5-6 inc | | A1 | An answer in the range 5-6 inc with **no** indication of method scores 2 marks BUT do not award A1 if an answer in the range 5-6 inc has **clearly** been obtained by finding the difference between two values, one or both of which are outside the ranges 6-6.5 and 11-11.5 For example, if working is 12 − 7 or 12 − 6 do not award A1. |
| | | | | | | | **Total 4 marks** |

| 4. | (a) | | 4  12  28  60  132  160 | 1 | B1 | cao |
|----|-----|-----|-----|-----|-----|-----|
| | (b) | | Points correct | 2 | B1 | $\pm$ ½ sq ft from sensible table ie clear attempt to add frequencies |
| | | Curve or line segments | | | B1 | ft from points if 4 or 5 correct or if all points are plotted consistently within each interval at the correct heights Accept curve which is not joined to the origin |
| | (c) | 80 (or 80.5) indicated on cf graph or stated | | 2 | M1 | for 80 (or 80.5) indicated on cf axis or stated |
| | | | approx 4.3 | | A1 | If M1 scored, ft from cf graph If no indication of method, ft only from correct curve & if answer is correct ($\pm$ ½ sq tolerance) award M1 A1 |
| | | | | | | **Total 5 marks** |

| 5. | (a) | | Points correct | 2 | B1 | $\pm$ ½ sq |
|----|-----|-----|-----|-----|-----|-----|
| | | Curve or line segments | | | B1 | ft from points if 4 or 5 correct or if points are plotted consistently within 50-60, 60-70, 70-80 etc at the correct heights Ignore any attempt at curve to left of first plotted point |
| | (b) | 30 (or 30.5) indicated on cumulative frequency graph or stated | | 2 | M1 | for 30 (or 30.5) indicated on cumulative frequency axis or stated |
| | | | approx 66 | | A1 | If M1 scored, ft from *their* cumulative frequency graph

If M1 not scored, ft only from correct curve & if answer is correct ($\pm$ ½ sq tolerance) award M1 A1 |
| | | | | | | **Total 4 marks** |

| 6. | (a) | 15  40  87  157  175  180 | | 1 | B1 | cao |
|---|---|---|---|---|---|---|
| | (b) | | Points correct | 2 | B1 | $\pm$ ½ sq |
| | | | Curve or line segments | | B1 | ft from points if 4 or 5 correct or if points are plotted consistently within each interval at the correct heights<br>Accept curve which is not joined to the origin |
| | (c) | 135 or 135.75  indicated on cumulative frequency graph or stated | | 2 | M1 | for 135 to 135.75  indicated on cumulative frequency graph or stated |
| | | | approx 74 from correct graph | | A1 | If M1 scored, ft from cumulative frequency graph<br>If M1 not scored, ft only from correct curve & if answer is correct ($\pm$ ½ sq tolerance) award M1 A1 |
| | | | | | | **Total 5 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 7. (a) | $\dfrac{32+14+6}{80} \times 100$ oe | | 2 | M1 for $\dfrac{32+14+6}{80}$ or 0.65 |
| | | 65 | | A1 cao |
| (b) | $2.85 \times 2 + 2.95 \times 4 + 3.05 \times 22 + 3.15 \times 32 + 3.25 \times 14 + 3.35 \times 6$ or $5.7 + 11.8 + 67.1 + 100.8 + 45.5 + 20.1$ | | 3 | M1 for at least two products $f \times x$ consistently within intervals (inc end points) |
| | | | | M1 for complete correct method (condone any one error) NB. products do **not** need to be evaluated |
| | | 251 | | A1 cao |
| (c) | Use of $w = 3.25$ on graph | | 2 | M1 for correct use of $w = 3.25$ on graph or implied by any value in the range 68 – 70 stated |
| | | 10 or 11 or 12 | | A1 accept any value in range 10-12 inc |
| (d) | 20 and 60 or 20¼ and 60¾ indicated on cumulative frequency axis or stated | | 2 | M1 or 3.2 and 3.07 indicated on graph or in working space |
| | | 0.13 | | A1 accept an answer that follows through from their correct lines on graph and correct readings |
| | | | | **Total 9 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **8.** (a) | | 20   55   115   148   155   160 | 1 | B1 |
| (b) | | Points correct | 2 | B1   $\pm$ ½ sq |
| | | Curve or line segments | | B1   ft from points if 4 or 5 correct or if points are plotted consistently within each interval at the correct heights <br> Accept curve which is not joined to the origin |
| (c) | 40 or $40\frac{1}{4}$ indicated on cumulative frequency axis or stated | | 2 | M1   for 40 or $40\frac{1}{4}$ indicated on cumulative frequency axis or stated |
| | | approx 63 | | A1   If M1 scored, ft from cf graph <br> If M1 not scored, ft only from correct curve and, if answer is correct ($\pm$ ½ sq tolerance) award M1 A1 |
| | | | | **Total 5 marks** |