CUMULATIVE FREQUENCY GRAPHS

Pearson Edexcel - Tuesday 19 May 2020 - Paper 1 (Non-Calculator) Higher Tier

1.

12	(a)	5,15,35,55,70,80	B1	cao		
	(b)	Graph drawn	M1	for 5 or 6 of their points plotted correctly from a cf table		Ignore to the left of the first point and right of the last point
			A1	for a fully correct graph SC B1 if 5 or 6 of their points plotted not at end but consistent within each interval and joined by a curve or line segments providing no gradient is negative		If histograms drawn, points must be identified Accept a smooth curve or line segments
	(c)	Correct decision and correct figures	M1	for 60 ÷ 100 × 80 (=48) oe	reading value from graph at wage = 360 (=40) **or** for $35 + \frac{1}{5} \times 20$ (=39)	ft from a cum freq graph
			M1	reading value from graph at cf = 48 (=380)	for "40" ÷ 80 × 100 (=50(%)) **or** for 60 ÷ 100 × 80 (=48)	
			C1	ft for correct decision and correct figures, eg No with 48 and "380" **or** with "40" and "50"(%) **or** with "40" and 48		

Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

2.

11	(a)	5, 35, 55, 70, 78, 80	B1	cao	
	(b)	cf graph	M1	for 5 or 6 of their points plotted correctly from a cf table	Ignore to the left of the first point and right of the last point
			A1	for a fully correct graph SCB1 if 5 or 6 of their points plotted not at end but consistent within each interval and joined by a curve or line segments providing no gradient is negative	Accept a smooth curve or line segments
	(c)	7.5	M1	for a clear method to read off the cf graph at 90	Sight of 74 or 6 implies M1
			M1	for a full method to find the percentage eg (80 − "74") ÷ 80 × 100 (=7.5)	The following readings give the following percentages
			A1	for 7.5 **or** ft cf graph	72 = 10% 73 = 8.75% 74 = 7.5% 75 = 6.25% 76 = 5%

Pearson Edexcel - Wednesday 5 November 2014 - Paper 1 (Non-Calculator) Higher Tier

3.

16	(a)		correct graph	2	M1 for 5 or 6 or 7 points plotted correctly at the ends of the intervals (overlay) A1 cao for correct graph with points joined by curve or straight line segments [SC: B1 if the shape of the graph is correct and 5 or 6 or 7 of their points are **not** at the ends but are plotted consistently within (10,20) (20,30) (30,40) etc.]
	(b)		No with supporting figures	2	M1 for 0.1 × 200 (=20) **or** 0.9×200 (=180) **or** sight of 180 used on cf axis **or** 200 – 186 (=14) A1 ft for correct decision with 20 and "9" **or** 20 and 14 **or** "age" from reading graph at 180 **OR** M1 for method to find percentage of workers who are over 65, eg $\frac{200-"191"}{200} \times 100$ (=4.5%) **or** method to find percentage of workers who are over 60 (from table), eg $\frac{200-186}{200} \times 100$ (=7%) or $\frac{200-190}{200} \times 100$ (=5%) A1 ft for correct decision with "4.5"% or 7% or 5%

Pearson Edexcel - Tuesday 11 June 2013 - Paper 1 (Non-Calculator) Higher Tier

4.

21	(a)	Cf table: 4, 9, 25, 52, 57,60 cf graph	Correct Cf graph	3	B1 Correct cumulative frequencies (may be implied by correct heights on the grid) M1 for at least 5 of "6 points" plotted consistently within each interval A1 for a fully correct CF graph
	(b)(i)		172	3	B1 for 172 or read off at cf = 30 or 30.5 from a cf graph, ft provided M1 is awarded in (a)
	(ii)	IQR = UQ – LQ	12 - 14		M1 for readings from graph at cf = 15 or 15.25 and cf = 45or 45.75 from a cf graph with at least one of LQ or UQ correct from graph (± ½ square). A1ft provided M1 is awarded in (a)

Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier

5.

14	(a)		8, 23, 53, 70, 77, 80	1	B1 cao
	(b)		graph	2	M1 ft from their table for at least 5 points plotted correctly at the ends of the intervals provided table values are cumulative, condoning one arithmetic error A1 cao for correct graph with points joined by curve or straight line segments [SC B1 if the shape of the graph is correct and 5 points of their points are **not** at the ends but consistently within each interval **and** joined.]
	(c)	Readings at 60 and 20 420 to 440 – 280 to 295	120 – 160	2	M1 (dep on cf graph) for use of either cf = 20 or cf = 60 A1 ft from a cf graph
	(d)	80 – 71 to 74	6 – 9	2	M1 (dep on cf graph) for evidence of reading off the cf axis from £530 0n the wages axis (could be the answer) A1ft for 6 - 9

Pearson Edexcel - Tuesday 6 November 2012 - Paper 1 (Non-Calculator) Higher Tier

6.

21	(a)		11, 34, 65, 92, 100	1	B1 cao
	(b)		cf graph	2	B1 for 5 or 6 points plotted correctly ±1 full 2 mm square at the upper end of the interval dep on sensible table (condone one error in addition) B1 (dep) for points joined by curve or line segments provided no gradient is negative. Ignore any point or graph outside range of their points. SC B1 for 5 or 6 points plotted not at end but consistently within each interval and joined.
	(c)		18 – 24	2	M1 for indication of taking a reading from 90 or ft from their cf graph A1 for 18 – 24

Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

7.

16	(a)		12, 27, 45, 57, 60	1	B1 cao
	(b)		Correct cumulative frequency diagram	2	B1 ft for all five points plotted correctly (±1sq) at top end of intervals dep on sensible table (condone 1 addition error) B1 ft (dep on previous B1) for points joined by curve/line segments (SC B1 for all five points plotted not at ends but consistent within each interval and joined)
	(c)		42	2	M1 for attempt to draw line across at 30 or 30.5 on cf graph A1 for answer in the range 41 to 43 or ft from cf graph
	(d)	60 – 52	8	2	M1 for 51 or 52 or 53 seen or line drawn up to cf graph at 55 or correct reading at 55 (±½ sq) A1 for 7 or 8 or 9 or ft from graph

Pearson Edexcel - Wednesday 9 November 2011 - Paper 3 (Non-Calculator) Higher Tier

8.

15	(a)		$200 < C \leq 400$	1	B1 cao
	(b)		7, 18, 27, 37, 45, 50	1	B1 cao
	(c)		correct cumulative frequency diagram	2	B1 ft for all 6 points plotted correctly (± 1 sq) at top end of intervals dep on sensible table B1 ft (dep on previous B1) for points joined by curve/line segments [SC: B1 ft from sensible table for 6 points plotted not at ends but consistently within each interval **and** joined or 5 'points' correctly plotted at the top end of intervals]
	(d)	50 – 32	17 – 19	2	M1 Line drawn up to the cumulative frequency graph at 700 or correct reading at 700 ± ½ square or 31 – 33 seen A1 ft graph

Pearson Edexcel - Monday 6 June 2011 - Paper 3 (Non-Calculator) Higher Tier

9.

18	(a)		$90 < m \leq 100$	1	B1 cao
	(b)		(4), 16, 50, 82, 108, 120	1	B1 cao
	(c)		Cumulative frequency graph	2	B2 ft for "all 6 points" plotted and drawn correctly as a cf graph (B1 ft for 5 or 6 points plotted correctly (± 0.5 sq) at the end of intervals dep on sensible table (condone one addition error) SC B1 if 5 or 6 points plotted not at ends but consistent within each interval and joined.
	(d)		103	1	B1 for 101 – 105 otherwise ft their cf graph

Pearson Edexcel - Friday 12 November 2010 - Paper 4 (Calculator) Higher Tier

10.

19	(a)		61, 82, 94, 100	1	B1 cao
	(b)		Points plotted and joined	2	B2 ft (dep on sensible table - condone 1 addition error) for 5 points plotted correctly, ± 1 square, at ends of interval **and** joined by curve or line segments provided no gradient is negative - ignore any part of graph outside range of their points (B1 ft for 4 points plotted correctly **and** joined or for 5 points plotted correctly) (SC B1 if 5 points plotted not at end but consistent within each interval **and** joined)

Pearson Edexcel - Monday 7 June 2010 - Paper 3 (Non-Calculator) Higher Tier

11.

22	(a)		$20 < n \leq 30$	1	B1 for $20 < n \leq 30$ Accept 20 to 30, 20 - 30 oe but **not** 26 Accept an indication of chosen interval on the diagram (circling) if no answer on the answer line
	(b)		16,42,65,75,80	1	B1 cao
	(c)		Points plotted and joined	2	B1 ft for at least 4 of "5 points" plotted correctly ±2 mm at end of interval dep on sensible table (condone 1 addition error) B1 ft (dep on previous B1) for points joined by curve or line segments provided no gradient is negative - ignore any part of graph outside range of their points (SC B1 if 4 or 5 pts plotted not at end but consistent within each interval **and** joined)
	(d)(i)		28 - 30	3	B1 for an answer in the range 28 - 30 or from "cf graph"
	(ii)		15 - 17		M1 for horizontal lines drawn at cf = 20 and cf = 60 oe and vertical lines drawn to '***x***'-axis or 'correct' marks drawn on '***x***'-axis only or for UQ = 36 - 38 **and** LQ = 20.5 - 23 or ft "cf graph" A1 For answer in the range of 15-17 or ft from "cf graph"

OCR GSCE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

12.

15	**(a)**		22	**2**	**B1** for [UQ=] 74 or [LQ=] 52	e.g. answer 74 alone scores B0
15	**(b)**		48 to 49	**3**	**B2** for 16 **seen** or **M1** for 80 ÷ (4 + 1)	For B2 accept 16/80

OCR GSCE – Tuesday 6 November 2017 – Paper 5 (Non - Calculator) Higher Tier

13.

15	**(a)**	**(i)**	90	**1**		
		(ii)	22	**2**	**M1** for [UQ =]100 or [LQ =] 77 to 79	Accept 21 to 23

	(b)		No with 18 to 20 and 30 OR No with 8% to 10% [and 15%] OR No with [£] 110 to112 [which is less than 120] OR No with 170 and 180 to 184	**2**	**M1** for 18 to 20 or 8% to 10% or 110 to 112 or for 30 or 170 or 180 to 184	Could be written on graph for M1
	(c)		Families in the south spent less on average as their median was lower **oe** Families in the south were more spread in their spending as their IQR was larger **oe**	**2** **2**	**Strict FT** their median in (a)(i) **M1** for Families in the South spent less **oe nfww** **Strict FT** their IQR in (a)(ii) **M1** for Spending varies more in the South **oe nfww**	Allow either way around but do not allow M1 if wrong reason given e.g. in first reason mentions IQR for spending less Ignore ref to figures For M1 allow spread oe associated with IQR without comparison

OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

14.

10			71 000 000 to 89 000 000 in figs or words **and** people/year	**2** **and** **1**	**M1** for attempt to find 'gradient' using figures from the graph e.g. (7.4 – 2.6) ÷ (2015 – 1951)	Could be in billions Eg. (7 400 000 000 – 2 600 000 000) ÷ (2015 – 1951) For **M1,** condone incorrect conversion used consistently for both population figures.

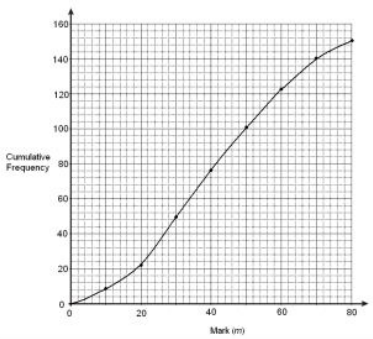
OCR GSCE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

15.

12			55 soi by 25 80 – *their*55 soi 25 [0].3[0] × 80 soi 24 25 and 24 so yes oe	**B1** **M1** **M1** **A1**	condone if written on graph or *their* 25 ÷ 80 or 31[%] or 31.2 to 31.3[%] 31[%] or 31.2 to 31.3[%][and 30] so yes **A1dep** on both **M1**s and **A1FT** follow through from *their* 55	accept any correct method e.g **B1** for 55 **M2** for [0].7 × 80 soi 56 or **M1** for [0].3 × 80 soi 24 **A1** for 55 and 56 so yes

OCR GSCE – Sample Papers – Paper 4 (Calculator) Higher Tier

16.

14	**(a)**	**(i)**	Table: 9 23 49 76 101 123 140 150	**2** **2 AO1.3a**	**M1** for attempt to accumulate the values	
		(ii)		**4** **1 AO1.3b** **3 AO2.3b**	**B1** for labelling axes **B1** for correct curve through points **B1** for at least six points correctly plotted	
	(b)		28 – 32	**3** **2 AO2.1b** **1 AO2.3a**	**M1** for 45 or 105 seen **A1** for corresponding answer **FT** *their* graph	
	(c)		The boundaries are set from approximations based on grouped data, not the actual scores obtained by the students	**1** **1 AO2.5b**		

AQA GSCE – Thursday 4 June 2020 – Paper 2 (Calculator) Higher Tier

17.

17(a)	[82.5, 83.5]	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
17(b)	156	B1	accept 155 or 157
	their 156 × (0.)32 or 4992 or 49.92 and (200 – their 156) × (0.)39 or 44 × (0.)39 or 1716 or 17.16	M1	0 < their 156 < 200 but their 156 cannot be 90 6708 implies B1M1
	67.08	A1ft	ft their 156
	Additional Guidance		
	155 155 × 0.32 + 45 × 0.39 = 49.60 + 17.55 = 67.15		B1 M1 A1
	157 157 × 0.32 + 43 × 0.39 = 50.24 + 16.77 = 67.01		B1 M1 A1
	158 158 × 0.32 + 42 × 0.39 = 50.56 + 16.38 = 66.94		B0 M1 A1ft
	90 90 × 0.32 + 110 × 0.39 = 28.80 + 42.90 = 71.70		B0 M0 A0

AQA GSCE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier

18.

15(a)	20 48 88 108 120	B1	

15(b)	All 5 points plotted using upper class bounds and their cf values	M1	$\pm \frac{1}{2}$ small square must be increasing
	Smooth curve or polygon for their cf values	A1ft	$\pm \frac{1}{2}$ small square must be increasing
	Additional Guidance		
	If (a) is correct, points should be at (10, 20), (20, 48), (30, 88), (40, 108) and (50, 120)		
	For A1, the graph should start at (0, 0) or (1, 0) or (10, 20)		
	For A1, the graph should end at $m = 50$ unless it followed by a horizontal line adjoining (50, 120)		
	Histogram only		M0A0
	Histogram and graph		Mark curve

15(c)	Line from 15 marks to their graph	M1	$\pm \frac{1}{2}$ small square implied by mark at correct place on the graph or on the vertical axis (but not on the horizontal axis) or by correct reading from their graph
	Correct reading from their graph for 15 marks	A1ft	$\pm \frac{1}{2}$ small square
	Additional Guidance		
	Correct reading for their graph, with or without evidence of using graph		M1A1
	No graph in (b)		M0A0
	For M1 and A1ft the domain of their graph must be at least $10 \leqslant m \leqslant 20$ and their graph must be increasing in the domain $10 \leqslant m \leqslant 50$ or from $m = 10$ if their graph does not extend to $m = 50$		

AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

19.

25	8 + 19 or 27	M1	may be seen in the table
	$\frac{2}{5} \times 5$ (× 1) or 2	M1	oe eg $\frac{55-53}{5} \times 5$ or $\frac{50}{5\times10+10\times20+5\times26+15\times8} \times 2 \times 10$ or 0.1 × 20 may be seen on the histogram
	$\frac{8}{10} \times 10 \times 2$ or 16	M1	oe eg $\frac{63-55}{10} \times 10 \times 2$ or $\frac{50}{5\times10+10\times20+5\times26+15\times8} \times 8 \times 20$ or 0.1 × 160 may be seen on the histogram
	9	A1	
	Additional Guidance		
	18 (medium eggs) for Farm B with no incorrect working implies 2nd and 3rd M1		
	(19 + 8 – 2 – 16 = 19 + 8 – 18) 19 – 10 = 9		M3A1
	$\frac{27}{50} - \frac{2}{50} - \frac{16}{50} = \frac{9}{50}$		M3A0
	8 + 19 + 15 + 8 does not score the 1st M1		
	8 27 42 50 is M0 unless they select 27		

AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

20.

16(a)	106	B1	
	Additional Guidance		

16(b)	50 – 42 or 8 or $\frac{42}{50}$ or $\frac{21}{25}$ or 0.84 or 84%	M1	oe
	$\frac{8}{50}$ or $\frac{4}{25}$ or 0.16 or 16%	A1	oe
	Additional Guidance		
	Ignore incorrect conversion if correct answer seen		
	$\frac{8}{42}$		M1A0

AQA GSCE – Monday 24 May 2018 – Paper 1 (Non - Calculator) Higher Tier

21.

19(a)	300	B2	B1 1100 or 1400 seen

19(b)	4	B1	
	Additional Guidance		
	Ignore incorrect 'units' eg 4 people		B1

19(c)	Ticks type B and gives valid reason	B2	eg valid reasons (median for A is) 1260 and (median for B is) 1300 median for B is 40 more (than A) B1 no or incorrect decision and (median for A is) 1260 and (median for B is) 1300 or no or incorrect decision and median for B is 40 more (than A) or ticks type B and (median for B is) 1300 and (median for A is) 1230 or 1280 or ticks type B and B has a larger median (than A) (if one median given it must be correct)
	Additional Guidance		
	If median values are not given in the wording, look for values on the graph and box plot		
	Ticks type B but gives no valid reason		B0
	Allow use of average or middle for median, or a correct description eg 'top 50%'. Do not accept 'mean' or 'mode' or other statistical measures for median		
	Ignore comments about measures other than the median		
	Ignore units given in explanation		

AQA GSCE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

22.

22(a)	(6) 22 50 60	B1	cumulative frequency values may be implied by points plotted (± 0.5 square)
	Points plotted with upper class boundaries and cf values (± 0.5 square)	B1ft	ft their cumulative frequencies must be increasing
	Smooth curve or polygon (± 0.5 square)	B1ft	ft their cumulative frequencies must be increasing and not a single straight line
	Additional Guidance		
	Graphs may start from their first plotted point or from (40, 0) If the points are plotted at mid-points, with a point at (45, 6), the graph may start at (35, 0) (± 0.5 square) If the points are plotted at the lower bounds, with a point at (40, 6), the graph may start at (0, 0)		
	Graph starting at (0, 0), but otherwise correct		B1B1B0
	Graph plotted at mid-points or lower class boundaries, but otherwise correct		B1B0B1
	Graph ascends or descends after $x = 80$		B0 for 3rd mark
	Bars drawn as well as correct graph		B1B1B0
	Bars drawn without correct graph		max B1

22(b)	One correct mpg reading for their graph from cf of 15(.25) or 45(.75) or horizontal lines from 15(.25) and 45(.75) only to their graph or 15(.25) and 45(.75) indicated as the cf values for the quartiles	M1	± 0.5 square ft their increasing graph may be on table
	Correct value for their increasing graph	A1ft	

AQA GSCE – Wednesday 25 May 2017 – Paper 1 (Non - Calculator) Higher Tier

23.

19(a)	(9) 25 45 53 60	B1	cumulative frequencies May be implied by points plotted (± 0.5 square)
	Points plotted with upper class boundaries and cf values (±0.5 square)	B1ft	ft their cumulative frequencies Must be increasing and not a single straight line
	Smooth curve or polygon starting at correct point for their points and going through all their points (±0.5 square)	B1ft	ft their cumulative frequencies Must be increasing and not a single straight line
	Additional Guidance		
	Graphs may start from their first plotted point or from (40, 0) If they have plotted their points at mid-points, with point at (45, 9), their graph may start at (35, 0) Graph starting at (0, 0), but otherwise correct		B1B1B0
	Curve plotted at mid-points or lower class boundaries, but otherwise correct		B1B0B1
	Ignore the graph after $m = 90$		
	Bars drawn as well as correct graph		B1B1B0
	Bars drawn without the correct graph		max B1

19(b)	**Alternative method 1**		
	$60 - 0.2 \times 60$ or 60×0.8 or 48	M1	oe implied by horizontal line from 48 on vertical axis
	Correct reading from their increasing graph	A1ft	$\pm \frac{1}{2}$ square
	Alternative method 2		
	$70 + \frac{3}{8} \times 10$	M1	
	[73, 75]	A1	
	Additional Guidance		
	The correct answer is likely to be [73, 75] from a correct graph		

AQA GSCE – Sample Paper 1 (Non - Calculator) Higher Tier

24.

11	$\frac{29+1}{2}$ or 15th value identified	M1	
	6	A1	

AQA GSCE – Sample Paper 3 (Calculator) Higher Tier

25.

13	Cumulative frequency 46 should be 48	B1	oe
	Points should be plotted at end of class intervals	B1	oe