Q1. The table gives some information about the weights, in kg, of 50 suitcases at an airport check-in desk.

Weight (w kg)	Frequency
$0 < w \leq 10$	16
$10 < w \leq 15$	18
$15 < w \leq 20$	10
$20 < w \leq 35$	6

(a) Work out an estimate for the mean weight.

..... kg

(4)

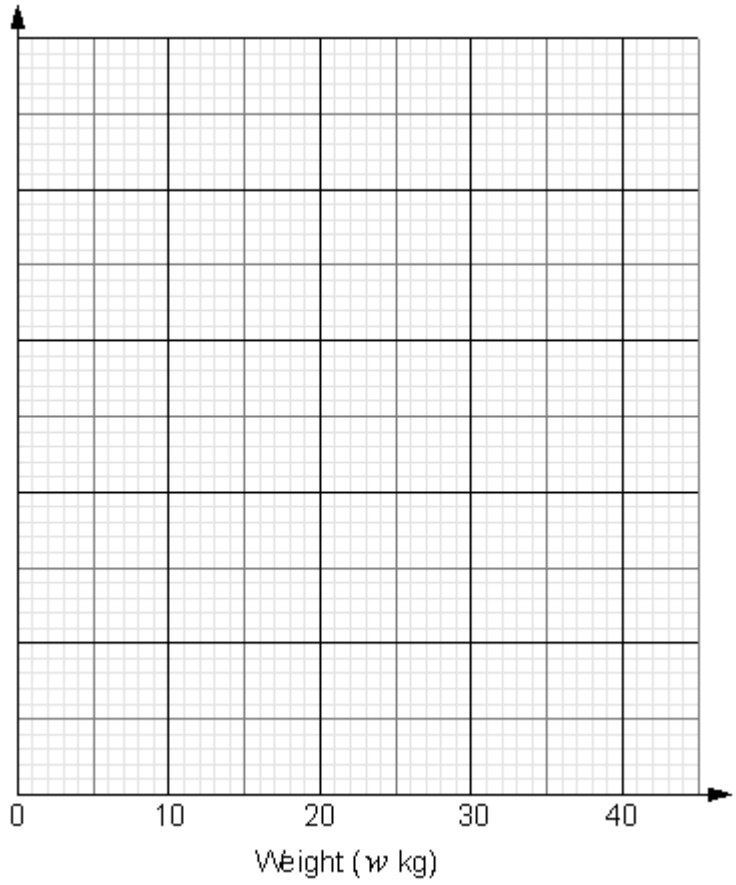
Passengers have to pay extra money for any suitcase that weighs more than 20 kg.
Two of the 50 suitcases are chosen at random.

(b) Work out the probability that both suitcases weigh more than 20 kg.

.....

(2)

(c) On the grid, draw a histogram for the information in the table.



(3)
(Total 9 marks)

Q2. The table shows some information about the weights, in grams, of 60 eggs.

Weight (w grams)	**Frequency**		
$0 < w \leq 30$	0		
$30 < w \leq 50$	14		

$50 < w \leq 60$	16		
$60 < w \leq 70$	21		
$70 < w \leq 100$	9		

(a) Calculate an estimate for the mean weight of an egg.

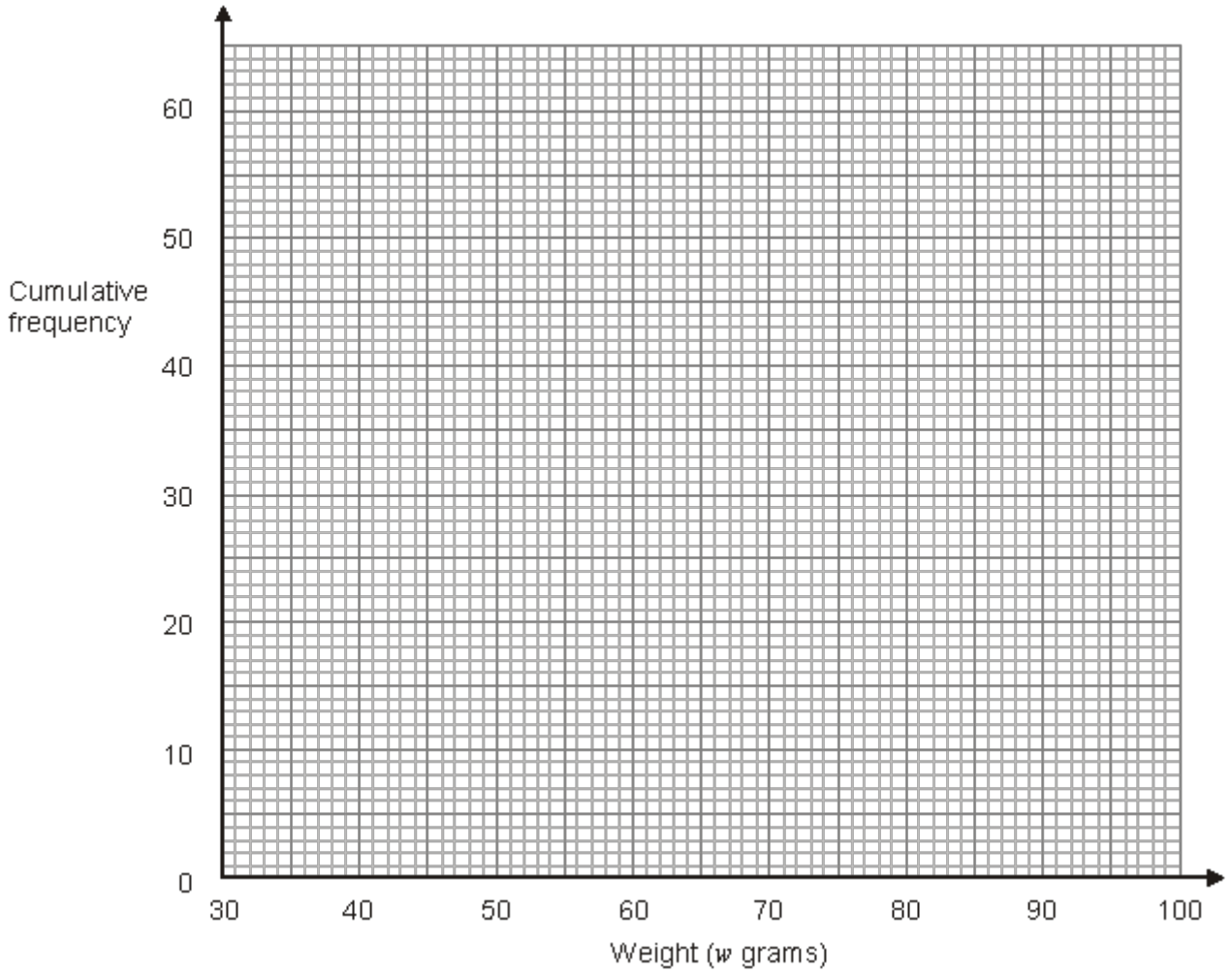
..... g

(4)

(b) Complete the cumulative frequency table.

Weight (w grams)	**Cumulative frequency**
$0 < w \leq 30$	0
$0 < w \leq 50$	
$0 < w \leq 60$	
$0 < w \leq 70$	
$0 < w \leq 100$	

(1)



(c) On the grid, draw a cumulative frequency graph for your table.

(2)

(d) Use your graph to find an estimate for the number of eggs with a weight greater than 63 grams.

.....

(2)
(Total 9 marks)

M1.

	Working	Answer	Mark	Additional Guidance
(a)	5 × 16 = 80 12.5 × 18 = 225 17.5 × 10 = 175 27.5 × 6 = 165 645 ÷ 50 = 12.9 or 5.5 × 16 = 88 13 × 18 = 234 18 × 10 = 180 28 × 6 = 168 670 ÷ 50 = 13.4	12.9	4	**M1** for fx consistently within interval including ends (allow 1 error) **M1** consistently using appropriate midpoints **M1** (dep on first M1) for $\sum fx \div \sum f$ **A1** for 12.9 or 13.4
(b)	$\frac{6}{50} \times \frac{5}{49} = \frac{30}{2450}$	$\frac{3}{245}$	2	**M1** for $\frac{6}{50} \times \frac{5}{49}$ **A1** for $\frac{3}{245}$ oe If M0A0, SC B1 for $\frac{9}{625}$ oe
(c)	$0 \le d < 10$ fd 1.6 $10 \le d < 15$ fd 3.6 $15 \le d < 20$ fd 2 $20 \le d < 35$ fd 0.4	Correct histogram	3	**B2** for 4 correct histogram bars (±½ square) (B1 for 2 or 3 histogram bars of different widths correct) **B1** for frequency density label or key and consistent scaling SC if B0 then M1 for clear attempt to use frequency density or area
				Total for Question: 9 marks

M2.

	Working	Answer	Mark	Additional Guidance

(a)	15 × 0 = 0 40 × 14 = 560 55 × 16 = 880 65 × 21 = 1365 85 × 9 = 765 3570 ÷ 60	59.5	4	**M1** for finding at least 4 products fx consistently within interval (including end points) **M1** (dep) for use of at least 4 correct midpoints **M1** (dep on first M) for "Σfx" ÷ 60 **A1** for 59.5
(b)		14, 30, 51, 60	1	**B1** all 4 correct
(c)			2	**M1** for at least 4 of "5 points" plotted consistently within each interval, ± 0.5 full square, and joined by curve or line segments providing no gradient is negative. **A1** for a fully correct cf graph.
(d)			2	**B2** for answer in the range 21 – 25 (**B1** for answer in the range 35 – 39) **OR** **M1** (dep on graph being cf) for using w = 63 **A1** ft (± 0.5 square)
				Total for Question: 9 marks

##

Part (a) of this question was poorly attempted. About one third of candidates gained all four marks. Many candidates attempts were blighted by the inability to find the midpoint of each of the intervals in the table. It was common to see these recorded as 5, 13, 18 and 28. Some candidates used the lengths of the intervals, 10, 5, 5 and 15 to represent the weights of the suitcases. Other lower attaining candidates merely carried out the calculation “50 ÷ 4” or summed their midpoints and divided by 4. About one in every ten candidates gave a correct answer in part (b). Few candidates identified the need to use multiplication and there were many instances of fractions appearing on the answer line, most commonly 6/50 or equivalent, without any working shown. For part (c) a fair proportion of candidates worked out the frequency densities but only about one third were able to go on to use them in order to complete a histogram. Even the better candidates often failed to label/scale the vertical axes or provide a key for their graph. A large proportion of lower attaining candidates drew bars with heights representing the frequencies.

##

In part (a) many candidates scored the 2 marks for obtaining the products of the midpoints and the frequencies, showing correct calculations for at least 4 of the 5 products fx and using the correct midpoints. The most common error seemed to be
15 x 0 = 15. After gaining the first two marks many went on to add and then divide by 60 but division by 260 or 5 were common errors. In some cases it was clear that candidates did not know how to approach this question and instead used the columns to calculate cumulative frequency or frequency density.

Part (b) was answered correctly by a majority of candidates although a few did not seem to know what was required and listed midpoints or worked out frequency density. Even though candidates had a calculator, again arithmetic errors were seen.

In part (c) students generally managed to plot the points that they had identified in (b) correctly but many lost the marks as they failed to join the points. Points were sometimes badly joined particularly the last two often resulting in a curve which contained a negative gradient. Encouragingly the plotting at midpoints was rarely seen.

Many candidates who had a cumulative frequency graph understood what to do in part (d), although a few had difficulty reading the vertical axis with 36 or 37 being read as 46 or 47. Some failed to read the question carefully and so did not subtract their value from 60 so giving an answer for a weight less than 63 grams rather than more than.