2.8 Recognising Misleading Graphs (Higher): 1-hour Pack

Total Marks

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A histogram shows the amount, in pounds, spent in a shop. The frequency densities of the bars are given in the table.

Class (pounds)	Frequency density
$0 < x \leq 10$	4
$10 < x \leq 30$	2
$30 < x \leq 70$	1
$70 < x \leq 100$	2
$100 < x \leq 105$	2

(a) Work out the frequency for each class.

(b) Work out the total frequency.

(Total for Question 1 is 4 marks)

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2 A histogram shows the length, in minutes, of films watched. The frequency densities of the bars are given in the table.

Class (minutes)	Frequency density
$0 < x \leq 20$	3
$20 < x \leq 40$	0.5
$40 < x \leq 70$	2
$70 < x \leq 110$	4
$110 < x \leq 115$	4

(a) Work out the frequency for each class.
(b) Work out the total frequency.

(Total for Question 2 is 4 marks)

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3 The table shows the amount, in pounds, spent in a shop. A histogram is to be drawn.

Class (pounds)	Frequency	Class width
$0 < x \leq 40$	80	40
$40 < x \leq 50$	40	10
$50 < x \leq 60$	5	10
$60 < x \leq 80$	60	20
$80 < x \leq 100$	30	20

(a) Work out the frequency density for each class.
(b) State the class that has the tallest bar.

(Total for Question 3 is 4 marks)

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4 A bank chart for a bakery shows a customer total of 294 against a total of 264 one month earlier, but the chart only shows these two months out of a year in which numbers fell by 28 overall.

(a) Work out the percentage increase between the two months shown, to 1 decimal place.

(b) State one way the choice of period makes the chart misleading.

(Total for Question 4 is 3 marks)

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5 The table shows the mass, in kilograms, of parcels.

Class (kg)	Frequency
$0 < x \leq 40$	240
$40 < x \leq 60$	80
$60 < x \leq 65$	10
$65 < x \leq 95$	300
$95 < x \leq 105$	30

A histogram is drawn from this table. Use it to estimate the number of values greater than 100. Assume the values are spread evenly within each class.

(Total for Question 5 is 4 marks)

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6 The table shows the age, in years, of people at a swimming pool.

Class (years)	Frequency
$10 < x \leq 20$	30
$20 < x \leq 50$	240
$50 < x \leq 70$	100
$70 < x \leq 110$	200
$110 < x \leq 120$	50

A histogram is drawn from this table. Use it to estimate the number of values greater than 60. Assume the values are spread evenly within each class.

(Total for Question 6 is 4 marks)

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7 A bar chart for a bakery shows sales of 59 units in Year 1 and 64 units in Year 2. The vertical axis starts at 45, not at 0.

(a) Work out how many times taller the Year 2 bar looks than the Year 1 bar.

(b) Work out the true ratio of Year 2 sales to Year 1 sales, to 2 decimal places.

(c) Explain why the graph is misleading.

(Total for Question 7 is 4 marks)

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8 The table shows the length, in minutes, of films watched. A histogram is to be drawn.

Class (minutes)	Frequency	Class width
$10 < x \leq 30$	20	20
$30 < x \leq 50$	80	20
$50 < x \leq 80$	30	30
$80 < x \leq 85$	5	5
$85 < x \leq 125$	40	40

(a) Work out the frequency density for each class.
(b) State the class that has the tallest bar.

(Total for Question 8 is 4 marks)

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9 The table shows the time, in minutes, that customers waited. A histogram is to be drawn.

Class (minutes)	Frequency	Class width
$10 < x \leq 30$	20	20
$30 < x \leq 60$	60	30
$60 < x \leq 70$	30	10
$70 < x \leq 80$	40	10
$80 < x \leq 120$	120	40

(a) Work out the frequency density for each class.
(b) State the class that has the tallest bar.

(Total for Question 9 is 4 marks)

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10 A bank chart for a bus company shows a customer total of 318 against a total of 302 one month earlier, but the chart only shows these two months out of a year in which numbers fell by 29 overall.

(a) Work out the percentage increase between the two months shown, to 1 decimal place.

(b) State one way the choice of period makes the chart misleading.

(Total for Question 10 is 3 marks)

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11 A histogram shows the amount, in pounds, spent in a shop. The frequency densities of the bars are given in the table.

Class (pounds)	Frequency density
$0 < x \leq 10$	2
$10 < x \leq 15$	6
$15 < x \leq 55$	2
$55 < x \leq 75$	2
$75 < x \leq 105$	2

(a) Work out the frequency for each class.

(b) Work out the total frequency.

(Total for Question 11 is 4 marks)

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12 The table shows the age, in years, of people at a swimming pool. A histogram is to be drawn.

Class (years)	Frequency	Class width
$0 < x \leq 40$	60	40
$40 < x \leq 70$	60	30
$70 < x \leq 90$	10	20
$90 < x \leq 100$	10	10
$100 < x \leq 110$	10	10

(a) Work out the frequency density for each class.

(b) State the class that has the tallest bar.

(Total for Question 12 is 4 marks)

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13 A histogram shows the age, in years, of people at a swimming pool. The frequency densities of the bars are given in the table.

Class (years)	Frequency density
$0 < x \leq 20$	5
$20 < x \leq 30$	8
$30 < x \leq 50$	5
$50 < x \leq 80$	10
$80 < x \leq 85$	5

(a) Work out the frequency for each class.

(b) Work out the total frequency.

(Total for Question 13 is 4 marks)

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14 The table shows the mass, in kilograms, of parcels. A histogram is to be drawn.

Class (kg)	Frequency	Class width
$10 < x \leq 15$	25	5
$15 < x \leq 25$	30	10
$25 < x \leq 55$	120	30
$55 < x \leq 65$	20	10
$65 < x \leq 85$	40	20

(a) Work out the frequency density for each class.

(b) State the class that has the tallest bar.

(Total for Question 14 is 4 marks)

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15 A bar chart for a phone company shows sales of 77 units in Year 1 and 79 units in Year 2. The vertical axis starts at 40, not at 0.

(a) Work out how many times taller the Year 2 bar looks than the Year 1 bar.

(b) Work out the true ratio of Year 2 sales to Year 1 sales, to 2 decimal places.

(c) Explain why the graph is misleading.

(Total for Question 15 is 4 marks)

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Mark scheme · 2.8 Recognising Misleading Graphs (Higher): 1-hour Pack

Question 1

frequency = frequency density x class width	M1
at least 3 frequencies correct	A1
all frequencies 40, 40, 40, 60, 10 cao	A1
total 190	B1

Answer: (a) 40, 40, 40, 60, 10; (b) 190

Question 2

frequency = frequency density x class width	M1
at least 3 frequencies correct	A1
all frequencies 60, 10, 60, 160, 20 cao	A1
total 310	B1

Answer: (a) 60, 10, 60, 160, 20; (b) 310

Question 3

frequency divided by class width	M1
at least 3 frequency densities correct	A1
all frequency densities correct	A1
$40 < x \leq 50$	B1

Answer: (a) 2, 4, 0.5, 3, 1.5; (b) $40 < x \leq 50$

Question 4

30 / 264 x 100	M1
11.4% cao	A1
only a short period is shown, which hides the overall fall (cherry-picking)	B1

Answer: (a) 11.4%; (b) short period hides the overall trend

Question 5

frequency density for the class 95 to 105 = 30/10	M1
finds the width above 100 within the final class: 105 - 100 = 5, oe	M1
multiplies this width by the frequency density: 5 x 3, or equivalently 30 x (105 - 100)/(105 - 95); no later classes need adding	M1
15 cao	A1

Answer: 15

Question 6

frequency density for the class 50 to 70 = 100/20	M1
10 x 5 for the part of the class above 60	M1
adds the frequencies of all later classes	M1
300 cao	A1

Answer: 300

Question 7

(64 - 45) / (59 - 45)	M1
1.36 cao	A1
1.08 cao	B1
the vertical axis does not start at zero, which exaggerates the difference	B1

Answer: (a) 1.36; (b) 1.08; (c) axis does not start at zero, exaggerating the difference

Question 8

frequency divided by class width	M1
at least 3 frequency densities correct	A1
all frequency densities correct	A1
$30 < x \leq 50$	B1

Answer: (a) 1, 4, 1, 1, 1; (b) $30 < x \leq 50$

Question 9

frequency divided by class width	M1
at least 3 frequency densities correct	A1
all frequency densities correct	A1
$70 < x \leq 80$	B1

Answer: (a) 1, 2, 3, 4, 3; (b) $70 < x \leq 80$

Question 10

16 / 302 x 100	M1
5.3% cao	A1
only a short period is shown, which hides the overall fall (cherry-picking)	B1

Answer: (a) 5.3%; (b) short period hides the overall trend

Question 11

frequency = frequency density x class width	M1
at least 3 frequencies correct	A1
all frequencies 20, 30, 80, 40, 60 cao	A1
total 230	B1

Answer: (a) 20, 30, 80, 40, 60; (b) 230

Question 12

frequency divided by class width	M1
at least 3 frequency densities correct	A1
all frequency densities correct	A1
$40 < x \leq 70$	B1

Answer: (a) 1.5, 2, 0.5, 1, 1; (b) $40 < x \leq 70$

Question 13

frequency = frequency density x class width	M1
at least 3 frequencies correct	A1
all frequencies 100, 80, 100, 300, 25 cao	A1
total 605	B1

Answer: (a) 100, 80, 100, 300, 25; (b) 605

Question 14

frequency divided by class width	M1
at least 3 frequency densities correct	A1
all frequency densities correct	A1
$10 < x \leq 15$	B1

Answer: (a) 5, 3, 4, 2, 2; (b) $10 < x \leq 15$

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Question 15

(79 - 40) / (77 - 40)	**M1**
1.05 cao	**A1**
1.03 cao	**B1**
the vertical axis does not start at zero, which exaggerates the difference	**B1**

Answer: (a) 1.05; (b) 1.03; (c) axis does not start at zero, exaggerating the difference

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