2.2 Recognising Misleading Graphs (Foundation): 1-hour Pack

Total Marks

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A composite bar chart shows the number of adults and children for three categories. For each bar, the bottom segment shows the adults and the top segment shows the children. The vertical axis shows the number of people.

Bar	Bottom segment	Whole bar
Year 7	bottom segment (adults) reaches 46	whole bar reaches 68
Year 8	bottom segment (adults) reaches 14	whole bar reaches 65
Year 9	bottom segment (adults) reaches 21	whole bar reaches 42

(a) How many children are there in the bar for Year 8?
(b) Which bar has the greatest number of children, and how many children is this?
(c) Work out the total number of adults in all three bars.

(Total for Question 1 is 5 marks)

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2 A bar chart for a gym shows sales of 94 units in Year 1 and 103 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 2 is 4 marks)

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3 A bar chart for a bus company shows sales of 75 units in Year 1 and 83 units in Year 2. The vertical axis starts at 50, 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 3 is 4 marks)

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4 A composite bar chart shows the number of boys and girls for three categories. For each bar, the bottom segment shows the boys and the top segment shows the girls. The vertical axis shows the number of people.

Bar	Bottom segment	Whole bar
Monday	bottom segment (boys) reaches 24	whole bar reaches 43
Tuesday	bottom segment (boys) reaches 35	whole bar reaches 61
Wednesday	bottom segment (boys) reaches 39	whole bar reaches 64

(a) How many girls are there in the bar for Wednesday?

(b) Which bar has the greatest number of girls, and how many girls is this?

(c) Work out the total number of boys in all three bars.

(Total for Question 4 is 5 marks)

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5 A bank chart for a school shows a customer total of 146 against a total of 121 one month earlier, but the chart only shows these two months out of a year in which numbers fell by 17 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 5 is 3 marks)

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6 A bank chart for a bakery shows a customer total of 319 against a total of 289 one month earlier, but the chart only shows these two months out of a year in which numbers fell by 10 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 6 is 3 marks)

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7 A composite bar chart shows the number of boys and girls for three categories. For each bar, the bottom segment shows the boys and the top segment shows the girls. The vertical axis shows the number of people.

Bar	Bottom segment	Whole bar
Year 7	bottom segment (boys) reaches 38	whole bar reaches 48
Year 8	bottom segment (boys) reaches 35	whole bar reaches 75
Year 9	bottom segment (boys) reaches 25	whole bar reaches 57

(a) How many girls are there in the bar for Year 9?

(b) Which bar has the greatest number of girls, and how many girls is this?

(c) Work out the total number of boys in all three bars.

(Total for Question 7 is 5 marks)

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8 In a pictorial chart for a phone company, a symbol for this year's profit is drawn k = 3 times as wide and 3 times as high as the symbol for last year's profit. The real profit is 3 times last year's.

(a) By what factor is the area of the symbol multiplied?

(b) Explain why this is misleading.

(Total for Question 8 is 3 marks)

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9 A bar chart for a gym shows sales of 91 units in Year 1 and 96 units in Year 2. The vertical axis starts at 50, 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 9 is 4 marks)

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10 A composite bar chart shows the number of train and bus for three categories. For each bar, the bottom segment shows the train and the top segment shows the bus. The vertical axis shows the number of people.

Bar	Bottom segment	Whole bar
Monday	bottom segment (train) reaches 17	whole bar reaches 72
Tuesday	bottom segment (train) reaches 41	whole bar reaches 89
Wednesday	bottom segment (train) reaches 32	whole bar reaches 65

(a) How many bus are there in the bar for Tuesday?

(b) Which bar has the greatest number of bus, and how many bus is this?

(c) Work out the total number of train in all three bars.

(Total for Question 10 is 5 marks)

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11 A bar chart for a bakery shows sales of 93 units in Year 1 and 95 units in Year 2. The vertical axis starts at 50, 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 11 is 4 marks)

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12 In a pictorial chart for a gym, a symbol for this year's profit is drawn k = 4 times as wide and 4 times as high as the symbol for last year's profit. The real profit is 4 times last year's.

(a) By what factor is the area of the symbol multiplied?

(b) Explain why this is misleading.

(Total for Question 12 is 3 marks)

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13 A composite bar chart shows the number of boys and girls for three categories. For each bar, the bottom segment shows the boys and the top segment shows the girls. The vertical axis shows the number of people.

Bar	Bottom segment	Whole bar
Monday	bottom segment (boys) reaches 13	whole bar reaches 42
Tuesday	bottom segment (boys) reaches 18	whole bar reaches 73
Wednesday	bottom segment (boys) reaches 38	whole bar reaches 87

(a) How many girls are there in the bar for Wednesday?

(b) Which bar has the greatest number of girls, and how many girls is this?

(c) Work out the total number of boys in all three bars.

(Total for Question 13 is 5 marks)

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14 A bar chart for a bus company shows sales of 59 units in Year 1 and 68 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 14 is 4 marks)

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Mark scheme · 2.2 Recognising Misleading Graphs (Foundation): 1-hour Pack

Question 1

whole bar minus bottom segment	**M1**
51 cao	**A1**
finds the top segment of each bar	**M1**
Year 8 with 51	**A1**
81 cao	**B1**

Answer: (a) 51; (b) Year 8, 51; (c) 81

Question 2

(103 - 40) / (94 - 40)	**M1**
1.17 cao	**A1**
1.10 cao	**B1**
the vertical axis does not start at zero, which exaggerates the difference	**B1**

Answer: (a) 1.17; (b) 1.10; (c) axis does not start at zero, exaggerating the difference

Question 3

(83 - 50) / (75 - 50)	**M1**
1.32 cao	**A1**
1.11 cao	**B1**
the vertical axis does not start at zero, which exaggerates the difference	**B1**

Answer: (a) 1.32; (b) 1.11; (c) axis does not start at zero, exaggerating the difference

Question 4

whole bar minus bottom segment	**M1**
25 cao	**A1**
finds the top segment of each bar	**M1**
Tuesday with 26	**A1**
98 cao	**B1**

Answer: (a) 25; (b) Tuesday, 26; (c) 98

Question 5

25 / 121 x 100	**M1**
20.7% cao	**A1**
only a short period is shown, which hides the overall fall (cherry-picking)	**B1**

Answer: (a) 20.7%; (b) short period hides the overall trend

Question 6

30 / 289 x 100	**M1**
10.4% cao	**A1**
only a short period is shown, which hides the overall fall (cherry-picking)	**B1**

Answer: (a) 10.4%; (b) short period hides the overall trend

Question 7

whole bar minus bottom segment	**M1**
32 cao	**A1**
finds the top segment of each bar	**M1**
Year 8 with 40	**A1**
98 cao	**B1**

Answer: (a) 32; (b) Year 8, 40; (c) 98

Question 8

3 x 3	**M1**
9 cao	**A1**
the area is 9 times larger, so the increase looks bigger than 3 times	**B1**

Answer: (a) 9; (b) the area grows 9 times, exaggerating a 3 times increase

Question 9

(96 - 50) / (91 - 50)	**M1**
1.12 cao	**A1**
1.05 cao	**B1**
the vertical axis does not start at zero, which exaggerates the difference	**B1**

Answer: (a) 1.12; (b) 1.05; (c) axis does not start at zero, exaggerating the difference

Question 10

whole bar minus bottom segment	**M1**
48 cao	**A1**
finds the top segment of each bar	**M1**
Monday with 55	**A1**
90 cao	**B1**

Answer: (a) 48; (b) Monday, 55; (c) 90

Question 11

(95 - 50) / (93 - 50)	**M1**
1.05 cao	**A1**
1.02 cao	**B1**
the vertical axis does not start at zero, which exaggerates the difference	**B1**

Answer: (a) 1.05; (b) 1.02; (c) axis does not start at zero, exaggerating the difference

Question 12

4 x 4	**M1**
16 cao	**A1**
the area is 16 times larger, so the increase looks bigger than 4 times	**B1**

Answer: (a) 16; (b) the area grows 16 times, exaggerating a 4 times increase

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Question 13

whole bar minus bottom segment	**M1**
49 cao	**A1**
finds the top segment of each bar	**M1**
Tuesday with 55	**A1**
69 cao	**B1**

Answer: (a) 49; (b) Tuesday, 55; (c) 69

Question 14

(68 - 40) / (59 - 40)	**M1**
1.47 cao	**A1**
1.15 cao	**B1**
the vertical axis does not start at zero, which exaggerates the difference	**B1**

Answer: (a) 1.47; (b) 1.15; (c) axis does not start at zero, exaggerating the difference

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