



H17-test Comparative and Proportional Pie Charts: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 25 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A gym surveyed 180 members to find out which exercise class was their favourite. The results are shown in the table below.

Class	Yoga	Spin	Pilates	Zumba
Frequency	45	63	27	45

A pie chart is going to be drawn to show this information.

- (a)** Work out the sector angle for the Spin category. (2)

-
(b) Work out the sector angle for the Pilates category. (2)

-
(c) Show that the four sector angles for the pie chart add up to 360 degrees. (1)

(Total for Question 1 is 5 marks)

2 For each statement about drawing comparative pie charts, write down whether it is True or False.

(i) To fairly compare two data sets of different totals using pie charts, the radii of the two circles should be drawn in direct proportion to the totals (for example, if one total is double the other, its radius should be double). **(1)**

.....
(ii) The correct method is to choose the radii so that the ratio of the two circles' areas is equal to the ratio of the two totals. **(1)**

.....
(iii) If $\text{total2} : \text{total1} = 9 : 1$, the two pie charts should be drawn with radii in the ratio $r_2 : r_1 = 3 : 1$. **(1)**

.....
(iv) Two categories that make up the same percentage of their own pie chart will always be drawn with sectors of the same angle, and the same area, even if the two pie charts have different radii. **(1)**

.....
(Total for Question 2 is 4 marks)

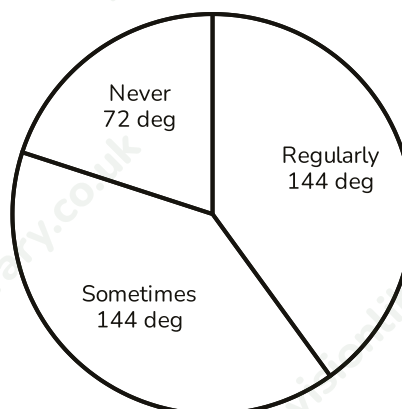
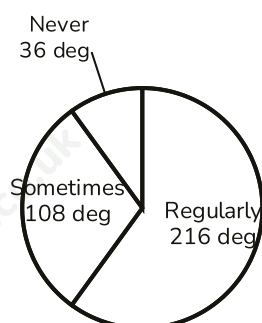
3 A student wants to draw two pie charts to compare the number of items sold last month in Shop A (total 40 items) and Shop B (total 160 items). She says: 'Shop B sold 4 times as many items as Shop A, so I will make the radius of Shop B's circle 4 times the radius of Shop A's circle.'

(a) Explain why the student's method will not give a fair visual comparison between the two shops. **(2)**

(b) Shop A's pie chart is drawn with radius 3 cm. Work out the radius that should be used for Shop B's pie chart. **(2)**

.....
(Total for Question 3 is 4 marks)

- 4 Town A (90 households, pie chart radius 3 cm) and Town B (250 households, pie chart radius 5 cm) were surveyed about how often they recycle paper. The comparative pie charts below show the results, with each sector angle marked.



Town A (90 households, radius 3 cm) Town B (250 households, radius 5 cm)

- (a) Use the pie chart to work out the percentage of households in Town A that recycle regularly. (2)
-
- (b) Use the pie chart to work out the number of households in Town B that recycle regularly. (2)
-
- (c) A student says: 'Town A's sector for Recycle regularly takes up a bigger share of its pie chart than Town B's, so more households in Town A recycle regularly than in Town B.' Using your answers to parts (a) and (b), comment on whether the student is correct. (3)
- (d) Given that Town A's pie chart has radius 3 cm, work out the radius that should be used for Town B's pie chart. (3)

(Total for Question 4 is 10 marks)

Mark scheme · H17-test Comparative and Proportional Pie Charts: Test Pack

Question 1

- (a) **M1** $63/180 \times 360$, oe
- (a) **A1** 126 (degrees) cao
- **(a) Answer: 126 degrees**
- (b) **M1** $27/180 \times 360$, oe
- (b) **A1** 54 (degrees) cao
- **(b) Answer: 54 degrees**
- (c) **B1** $90 + 126 + 54 + 90 = 360$, with the Yoga and Zumba angles (each $45/180 \times 360 = 90$) also shown
- **(c) Answer: $90 + 126 + 54 + 90 = 360$**

Question 2

- (i) **B1** False cao
- **(i) Answer: False**
- (ii) **B1** True cao
- **(ii) Answer: True**
- (iii) **B1** True cao
- **(iii) Answer: True**
- (iv) **B1** False cao
- **(iv) Answer: False**

Question 3

- (a) **E1** recognises that the area of a circle is proportional to the square of its radius, not the radius itself
- (a) **E1** so multiplying the radius by 4 multiplies the area (the apparent size of Shop B's data) by 4 squared = 16, not by 4, making Shop B look far bigger than is fair
- **(a) Answer: A radius 4 times as large gives an area 16 times as large, not 4 times, so Shop B's chart would look unfairly large.**
- (b) **M1** $\sqrt{160/40}$, oe
- (b) **A1** 6 cm cao
- **(b) Answer: 6 cm**

Question 4

- (a) **M1** $216/360 \times 100$, oe
- (a) **A1** 60% cao
- **(a) Answer: 60%**
- (b) **M1** $144/360 \times 250$, oe
- (b) **A1** 100 cao
- **(b) Answer: 100**
- (c) **B1** states the student is correct about the PROPORTION: Town A has a higher percentage of households recycling regularly (60%) than Town B (40%)
- (c) **B1** but Town B actually has more households recycling regularly in absolute number: 100 households (part b), compared with 54 in Town A (60% of 90), allow ft from (a)/(b)
- (c) **B1** concludes the student's overall claim about the NUMBER of households is incorrect, because Town B's total number of households surveyed is much larger, so a smaller percentage there still represents more people
- **(c) Answer: The student is right about the proportion (60% vs 40%) but wrong about the actual numbers: Town B has more households (100) recycling regularly than Town A (54).**
- (d) **M1** $250/90$, oe (= 25/9)
- (d) **M1** $\sqrt{25/9}$, dependent on the first mark (= 5/3)
- (d) **A1** 5 (cm) cao
- **(d) Answer: 5 cm**