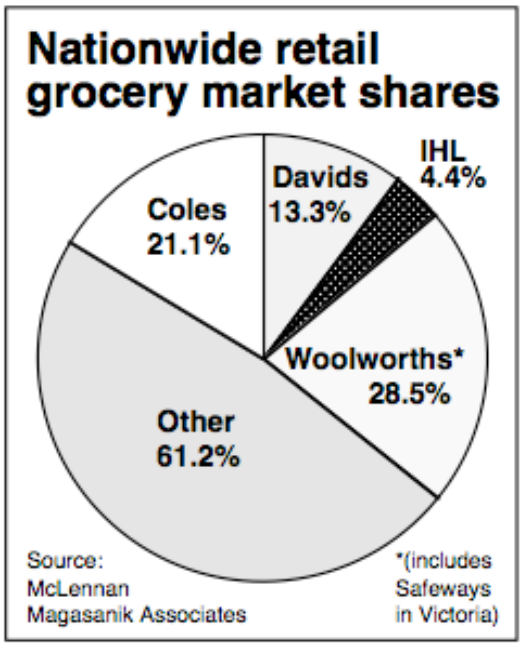
Pie graphs: Answers

http://topdrawer.aamt.edu.au/Statistics/Good-teaching/Data-representation/Creating-pie-graphs/Sleuthing-pie-graphs



Source: Fairfax Syndication.

1. What is the context for this pie graph?

   The context concerns the percentage of the retail market (sales to consumers) of the major grocery outlets in Australia.

2. Is there anything unusual about this graph?

   Among the comments students are likely to make are the following:
   'Other' is very big.
   What is IHL?
   I thought Coles and Woolies would be bigger.
   Who works for McLennan Magasanik Associates and where did they learn mathematics?

3. Using your understanding of percentage, what can you tell visually by looking at this graph?

   Students who understand percentage should SEE that 61.2% is represented as less than half of the pie graph when it should be larger than half.

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4. How can you check mathematically whether the definition of a pie graph is satisfied or not? (Show your work.)

   Summing the values in the pie graph gives a percentage much larger than 100%: 21.1% + 13.3% + 4.4% + 28.5% + 61.2% = 128.5%

5. How might the error have occurred?

   Perhaps the original data were presented in millions of dollars for a given year (e.g. $21 100 000 + $13 300 000 + $4 400 000 + $28 500 000 + $61 200 000 = $128 500 000).
   Then perhaps the person creating the graph in a computer program forgot to tell it to translate the numbers to percentages.

6. What are the recalculated values for the percentages in the pie graph given the original numbers?

   In the order the numbers appear in the sum above, the percentages become: 16.4% + 10.4% + 3.4% + 22.2% + 47.6% = 100%, and for example, the 47.6% agrees with the visual impression of just less than half of the pie graph.

Rubric for first two questions

What is the context for this pie graph?		
Code 0	Non-response; tautology	"Don't know." "What are shares?" Repeat of title
Code 1	Details without recognition of part-whole relationship	"It's about Coles, and Davids, and IHL, and others." "It's about supermarkets."
Code 2	Context with recognition of the part-whole relationship	"It's about what part of the whole market share each company has." "It is about what percentage of grocery sales each store has."
Is there anything unusual about this graph?		
Code 0	Non-response; irrelevant feature	No/Yes "The different colours and IHL in black."
Code 1	Graphical feature not related to percentage.	"Large 'Other'" "Other not named." "The headline doesn't say 'percentage'." "The decimal places."
Code 2	Recognition of error with reason	"The %s sum to > 100%." "61.2% is less than half of the pie."