

LEVEL 1 — GRAPHS

Note: Only turn back to page number if you have difficulty

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- Q1. The table below shows the growth of Australia's population since the turn of the century.

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Year	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
Population ('000)	3600	4500	5300	6500	7000	8400	10 300	12 600	14 500	16 500

- Draw a line graph to illustrate the information in the table.
- Which decade had the greatest increase in population?
- Calculate the percentage increase from 1950 to 1990.

- Q2. The population composition of the United Kingdom is as follows:

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Country	Population ('000)
England	45 374
Scotland	2 701
Wales	5 190
N. Ireland	1 484
Isle of Man/ Channel Islands	160

- Draw a column graph to represent the information.
- Draw a bar graph 10 cm in length.
- Draw a sector graph, calculating angles to the nearest degree.

- Q3. The following bar graph shows the distribution of my weekly income.

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Rent	Electricity & Water	Groceries	Entertainment	Loan Repayment	Savings
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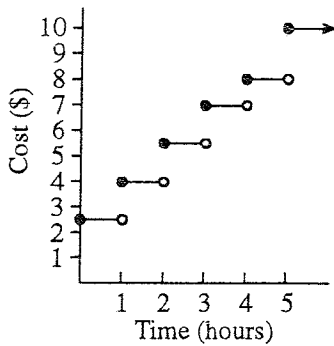
- What percentage of my income is put toward savings?
- What percentage is represented by spending on groceries and entertainment combined?
- If my wage is \$520 per week, what is my weekly rent expense?
- What angle would each category represent in a sector graph?

LEVEL 1 — GRAPHS CONTINUED

Note: Only turn back to page number if you have difficulty

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Q4.

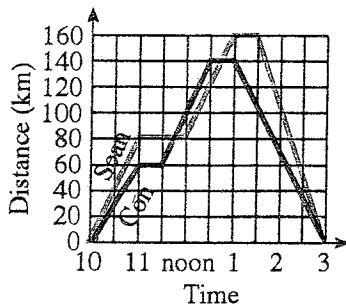


The graph shows the parking costs for an inner city parking station:

- What is the cost of parking for 1 hour?
- What is the cost for 2 h and 58 minutes?
- How long can the car be parked if the cost is to be \$8 or less?
- How much is the cost of parking 5 hours or more?

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Q5.



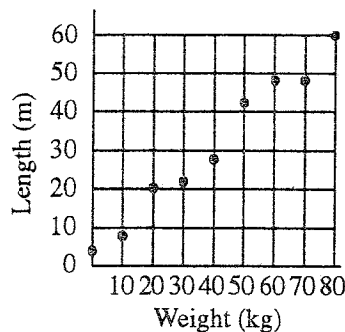
The graph shows the journeys of two motorists, Sean and Con, and gives their distances from town A.

- Who travels the fastest in the first hour?
- At what time do their paths cross?
- How far is Con from town A when Sean begins his return trip?
- How far apart are they at noon?
- How far does each motorist travel?

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Q6. An elastic bungy cord is tested with different weights, and the length of the cord recorded for each weight.

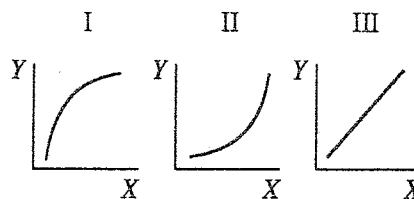
- Draw a line of best fit.
- Estimate the length of the cord if a 58 kg weight is attached.
- Estimate the weight that would produce a length of 25 m.
- Estimate the extension of the cord if a 71 kg weight is attached.



100

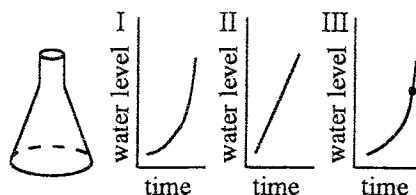
Q7. (a) In which of the graphs does:

- Y increase slowly at first then quickly?
- Y increase at a constant rate?
- Y increase quickly at first then slowly?



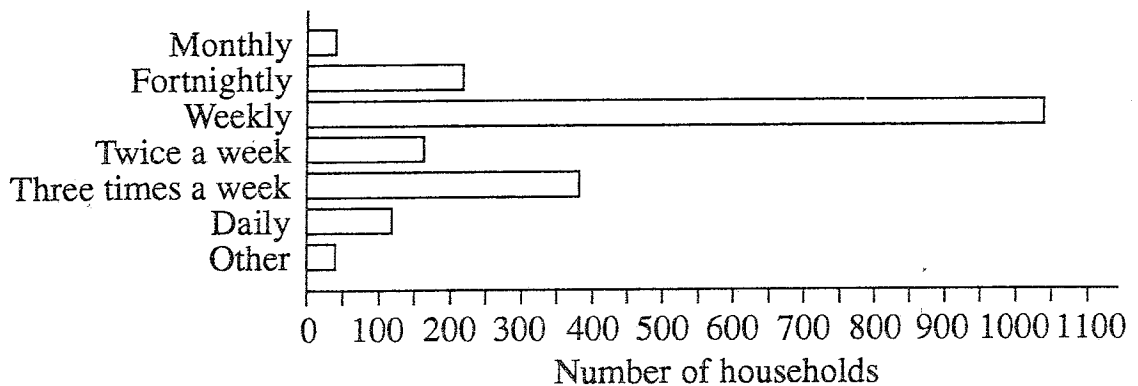
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- (b) The container pictured is filled with water at a steady rate. Which graph best represents the level of water in the container?



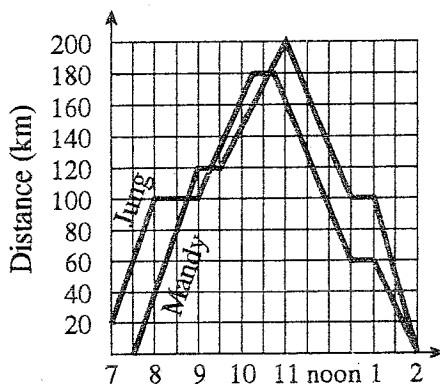
LEVEL 2 — GRAPHS

- Q1. 2000 households in NSW were asked how often they perform their grocery shopping. The results are shown in the graph below.



- (a) Convert the information shown in the column graph to: (i) a sector graph (correct to the nearest degree) (ii) a bar graph of total length 20 cm.
- (b) What percentage of households shop less frequently than twice a week?

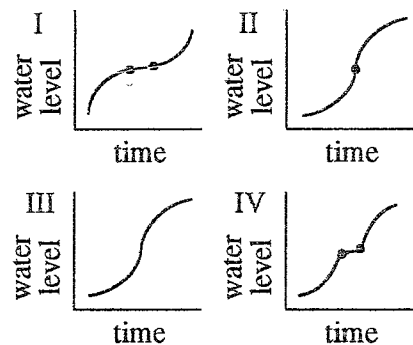
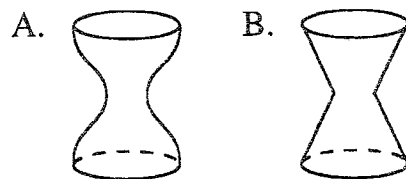
Q2.



The graph shows the journeys of two motorists, travelling on the same road in the same direction. Mandy leaves from town X and Jung leaves from town Y.

- (a) At what time do each of the motorists begin their journey?
- (b) At what time do they pass each other for the third time?
- (c) How far has Jung travelled when Mandy begins her return journey?
- (d) What is the average speed of each motorist? (Do not include rest time. Answer to 1 d.p.)

- Q3. (a) Which graph best represents the water level in each glass if they are both filled at a constant rate:



- (b) P is the point on the circumference of a wheel. Sketch a graph to show the height of P above the ground if the wheel is rotated clockwise from a position where P is on the ground.

LEVEL 1 — STATISTICS

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Q1. Five coins were tossed together 30 times, and on each throw the number of heads was recorded. The results were:

4	3	1	2	5	1	2	2	3	1
0	2	1	4	2	3	1	3	2	3
1	1	2	3	2	2	4	1	3	2

- (a) Organise the data into a frequency distribution table.
- (b) Draw a frequency histogram and polygon.
- (c) What is the frequency of 3 heads thrown?
- (d) What is the most frequent result?
- (e) How many throws showed at least 4 heads?

105

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Q2. Calculate the mean, median, mode and range for each set of scores:

108, 109

- | | | | | | | | | | | | |
|-----|---|---|---|---|---|-----|----|----|----|----|----|
| (a) | 6 | 3 | 5 | 6 | 2 | (b) | 19 | 15 | 13 | 14 | 16 |
| | 8 | 4 | 6 | 7 | 3 | | 17 | 12 | 14 | 13 | 18 |
| | | | | | | | 12 | 14 | 15 | 13 | 14 |

Q3. Calculate the mean for the scores in each table to 2 d.p.:

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(a)

x	f
9	5
10	7
11	14
12	10
13	6

(b)

x	f
15	9
16	13
17	14
18	19
19	15

Q4. Complete the table below and find:

112, 113

x	f	fx	c.f
12	3		
13	5		
14	9		
15	12		
16	18		
17	17		
18	14		
19	10		
20	4		

- (a) the mean
- (b) the mode
- (c) the median
- (d) the range
- (e) Draw a cumulative frequency histogram and ogive.

Totals:

LEVEL 2 — STATISTICS

Q1. Ten dice were tossed and the number of sixes showing was recorded for each toss:

3	3	0	1	3	4	4	2	6	5	2	9
2	5	4	2	0	3	5	8	4	3	5	4
6	3	5	3	4	2	6	5	1	2	7	1
4	7	1	3	2	5	0	6	6	1	3	3
1	4	3	0	1	2	3	3	1	5	6	5

- Tabulate the data in a frequency distribution table.
- Calculate the mean, mode, median and range.
- How many tosses showed at least 5 sixes?
- Draw a frequency histogram and polygon.
- Draw a cumulative histogram and ogive.

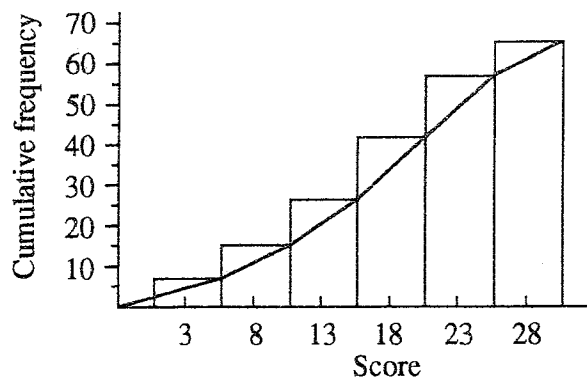
Q2. A tree farmer measured the height of newly planted saplings to the nearest centimetre. The results are shown below.

24	26	22	19	24	15	25	31	28	16	30	34
18	31	32	36	27	33	30	16	29	23	23	20
23	23	17	32	28	30	21	17	25	37	31	16
22	16	27	22	35	20	18	31	24	30	27	39
38	21	20	17	15	19	30	26	17	24	32	23

- By grouping the data into five equal class intervals, tabulate the data in a grouped frequency distribution table.
- Calculate the mean height of the saplings.
- Determine the modal class and the median class.
- What percentage of saplings are above mean height?
- Draw a cumulative histogram and ogive.

Q3. From the cumulative histogram to the right determine:

- the median class.
- the frequency of each class centre.
- the modal class.
- the mean (correct to 2 d.p.)



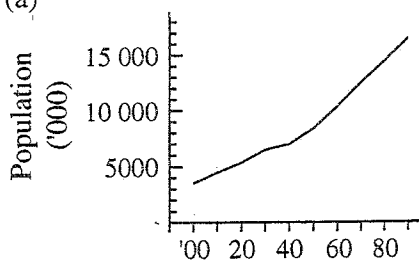
- Q8. (a) $y = 3x - 9$ (b) $y = -2x + 11$ (c) $y = 5x + 20$ (d) $y = -\frac{1}{2}x + \frac{1}{2}$
 (e) $y = \frac{2}{3}x + 5\frac{2}{3}$ (NOTE : Answers may also be written in general form)
- Q9. (a) $y = 2x - 3$ (b) $y = -2x + 5$ (c) $y = -4x + 8$ (d) $y = 3x + 2$
 (e) $y = -\frac{3}{2}x + 4$ (f) $y = \frac{1}{2}x - 2\frac{1}{2}$ (NOTE : Answers may also be written in general form)
- Q10. $2x - y + 1 = 0$ and $4x - 2y + 3 = 0$ Q11. $y = 4x - 3$ or $4x - y - 3 = 0$
- Q12. $3y - x + 3 = 0$ and $6y - 2x + 4 = 0$ Q13. $y = -\frac{3}{2}x + 5$ or $3x + 2y - 10 = 0$
- Q14. (3, 15), (8, 35) and (4, 19) Q15. Points lie on line $x - 2y - 6 = 0$

Level 2 — Coordinate geometry

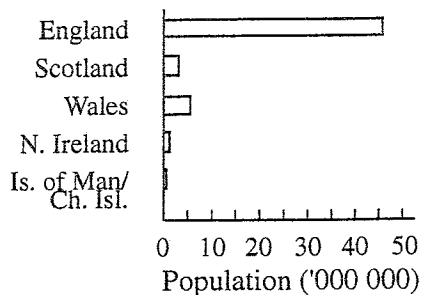
- Q1. (a) $y = \frac{2}{3}x + 2$ (b) $y = -\frac{1}{2}x - 1$ (c) $y = 4x - 2$
- Q2. $3x - 2y = 0$ Q3. $m = -4, n = -3$
- Q4. $\frac{\sqrt{117}}{2}$ units Q5. $2x - 3y - 24 = 0$
- Q6. $x - y + a = 0$ Q7. $2x - 5y + 39 = 0$
- Q8. $m_{CA} = \frac{1}{2}, m_{CB} = -2 \therefore$ perpendicular. Area = 30 units²
 (NOTE : Can also use Pythagoras' Theorem)
- Q9. $AB = CD = \sqrt{5}$ units; $BC = AD = \sqrt{17}$ units; $m_{AB} = m_{DC} = \frac{1}{2} \therefore AB \parallel DC$
 $m_{BC} = m_{AD} = -\frac{1}{4} \therefore BC \parallel AD$
- Q10. All sides are $5\sqrt{2}$ units; $m_{AB} = m_{CD} = \frac{1}{7} \therefore AB \parallel CD$; Q11. $y = 2x + 5$
 $m_{BC} = m_{AD} = 7 \therefore BC \parallel AD$. Q12. (-2, -7)
 Q13. $12x + 18y + 5 = 0$

Level 1 — Graphs

- Q1. (a) (b) 1960's
 (c) 96.4%



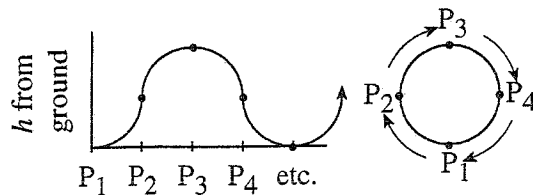
- Q2. (a) (b) England 8.26 cm, Scotland 0.49 cm, Wales 0.95 cm, N. Ireland 0.27 cm, Is. of Man/Ch. Isl. 0.03 cm. [Obviously a bar graph is not a good representation of the information as some of the figures are very small.]
 (c) England 297°, Scotland 18°, Wales 34°, N. Ireland 10°, Is. of Man/Ch. Isl. 1°.



- Q3. (a) 19% (b) 20% (c) \$166.40
 (d) Rent 115°, Elec./Water 47°, Groceries 14°, Loan 58°, Entertainment 58°, Savings 68°.
- Q4. (a) \$4.00 (b) \$5.50 (c) less than 5 hours (d) \$10
- Q5. (a) Sean (b) 11:45 a.m., 12:45 p.m. (c) 105 km (d) 20 km (e) Sean 320 km, Con 280 km
- Q6. (a) 44 m (b) 36 kg (c) 53 m
- Q7. (a) (i) II (ii) III (iii) I (b) III

Level 2 — Graphs

- Q1. (a) (i) Monthly 7°, Fortnightly 40°, Weekly 187°, Twice a week 29°, Three times/week 68°, Daily 22°, Other 7°
 (ii) Monthly 4 mm, Fortnightly 2.2 cm, Weekly 10.4 cm, Twice a week 1.6 cm, Three times/week 3.8 cm, Daily 1.2 cm, Other 4 mm
- (b) 65°
- Q2. (a) Jung 7 a.m., Mandy 7:30 a.m. (b) 10:37 a.m. (c) 200 km
 (d) Jung 68 km/h, Mandy 72.7 km/h
- Q3. (a) A = III, B = II (b)



Level 1 — Statistics

- Q1. (a)
- | x | f | fx |
|-----|-----|------|
| 0 | 1 | 0 |
| 1 | 8 | 8 |
| 2 | 10 | 20 |
| 3 | 7 | 21 |
| 4 | 3 | 12 |
| 5 | 1 | 5 |
| | 30 | 66 |
- (b)
-
- (c) 7
 (d) 2 heads
 (e) 4

- Q2. (a) 5, 5.5, 6, 6 (b) 14.6, 14, 14, 7

- Q3. (a) 11.12 (b) 17.26

- Q4. (a) 16.37 (b) 16 (c) 16 (d) 8 (e)

x	f	fx	c. f.
12	3	36	3
13	5	65	8
14	9	126	17
15	12	180	29
16	18	288	47
17	17	289	64
18	14	252	78
19	10	190	88
20	4	80	92
	92	1506	

