

1. A shop sells mobile phones.
The table shows the number of mobile phones sold each month from January to May.

Jan	Feb	Mar	Apr	May
70	64	73	85	91

- (a) Work out the percentage increase in the number of mobile phones sold from April to May.
Give your answer correct to 3 significant figures.

..... % (3)

- (b) Work out the 3-month moving averages for the information in the table.
The first one has been worked out for you.

.....69..... (2)
(Total 5 marks)

2. The table shows the number of computer games sold in a supermarket each month from January to June.

Jan	Feb	Mar	Apr	May	Jun
147	161	238	135	167	250

- (a) Work out the three month moving averages for this information.

.....

(2)

In a sale, a supermarket took 20% off its normal prices.
On Fun Friday, it took 30% off its sale prices.

Fred says, "That means there was 50% off the normal prices".

- (b) Fred is wrong. Explain why.

(2)
(Total 4 marks)

3. Bytes is a shop that sells computers and digital cameras.

In 2003, Bytes sold 620 computers.

In 2004, Bytes sold 708 computers.

- (a) Work out the percentage increase in the number of computers sold.
Give your answer to an appropriate degree of accuracy.

..... % (4)

In a sale, normal prices are reduced by 14%.

The sale price of a digital camera is £129.86

- (b) Work out the normal price of the digital camera.

£ (3)

The table shows the number of digital cameras Bytes sold each month in the first six months of 2005.

Month	January	February	March	April	May	June
Number of digital cameras sold	30	19	20	15	27	39

The first 3-month moving average for this data is 23

- (c) Work out the **second** 3-month moving average for this data.

.....

(2)
(Total 9 marks)

4.

Month	Jan	Feb	Mar	Apr	May	Jun
Number of Televisions	1240	1270	1330	1300	1330	x

The table shows the number of televisions sold in a shop in the first five months of 2006.

- (a) Work out the first 3-month moving average for the information in the table.

.....

(2)

The fourth 3-month moving average of the number of televisions sold in 2006 is 1350
 The number of televisions sold in the shop in June was x .

(b) Work out the value of x .

$x = \dots\dots\dots$

(2)
 (Total 4 marks)

5. The table shows the number of orders received each month by a small company.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Number of orders received	23	31	15	11	19	16	20	13

Work out the first two 4-month moving averages for this data.

$\dots\dots\dots$ and $\dots\dots\dots$

(Total 3 marks)

6. A shop sells DVD players.

The table shows the number of DVD players sold in every three-month period from January 2003 to June 2004.

Year	Months	Number of DVD players sold
2003	Jan – Mar	58
	Apr – Jun	64
	Jul – Sep	86
	Oct – Dec	104
2004	Jan – Mar	65
	Apr – Jun	70

- (a) Calculate the set of four-point moving averages for this data.

.....

(2)

- (b) What do your moving averages in part (a) tell you about the trend in the sale of DVD players?

.....

(1)

(Total 3 marks)

7. Paul and Carol open a new shop in the High Street.
The table shows the monthly takings in each of the first four months.

Month	Jan	Feb	March	April
Monthly takings (£)	9375	8907	9255	9420

Work out the 3-point moving averages for this information.

.....

(2)
(Total 2 marks)

8. The owner of a music shop recorded the number of CDs sold every 3 months.

The table shows his records from January 2004 to June 2005.

Year	Months	Number of CDs
2004	Jan – Mar	270
	Apr – Jun	324
	Jul – Sept	300
	Oct – Dec	258
2005	Jan – Mar	309
	Apr – Jun	335

- (a) Calculate the complete set of four-point moving averages for this information.

..... (2)

- (b) What trend do these moving averages suggest?

..... (1)
(Total 3 marks)

9. The table shows some information about student absences.

Term	Autumn 2003	Spring 2004	Summer 2004	Autumn 2004	Spring 2005	Summer 2005
Number of absences	408	543	351	435	582	372

Work out the three-point moving averages for this information. The first two have been done for you.

434, 443,,

(Total 2 marks)

10. The table shows the number of pairs of shoes sold in a shop each month from July to December.

July	August	September	October	November	December
248	255	235	260	261	298

- (a) Work out the 3-point moving averages for this information.
The first one has been worked out for you.

246,,,

(2)

- (b) What do your moving averages in part (a) tell you about the sale of shoes from July to December?

.....
.....

(1)

(Total 3 marks)

11. Jasmine sells soft drinks.
She recorded the number of drinks she sold from July to December.

The table shows this information.

July	August	September	October	November	December
340	352	336	272	256	264

Work out the 4-month moving averages for this information.

The first one has been worked out for you.

325,,

(Total 2 marks)

12. Joe owns a small shop.
The table shows his sales, in £, in the eight 3-month periods for the last two years.

		3-month period	Sales in £
Year 1	1	January to March	3420
	2	April to June	3370
	3	July to September	3750
	4	October to December	4020
Year 2	5	January to March	3940
	6	April to June	3810
	7	July to September	4230
	8	October to December	4560

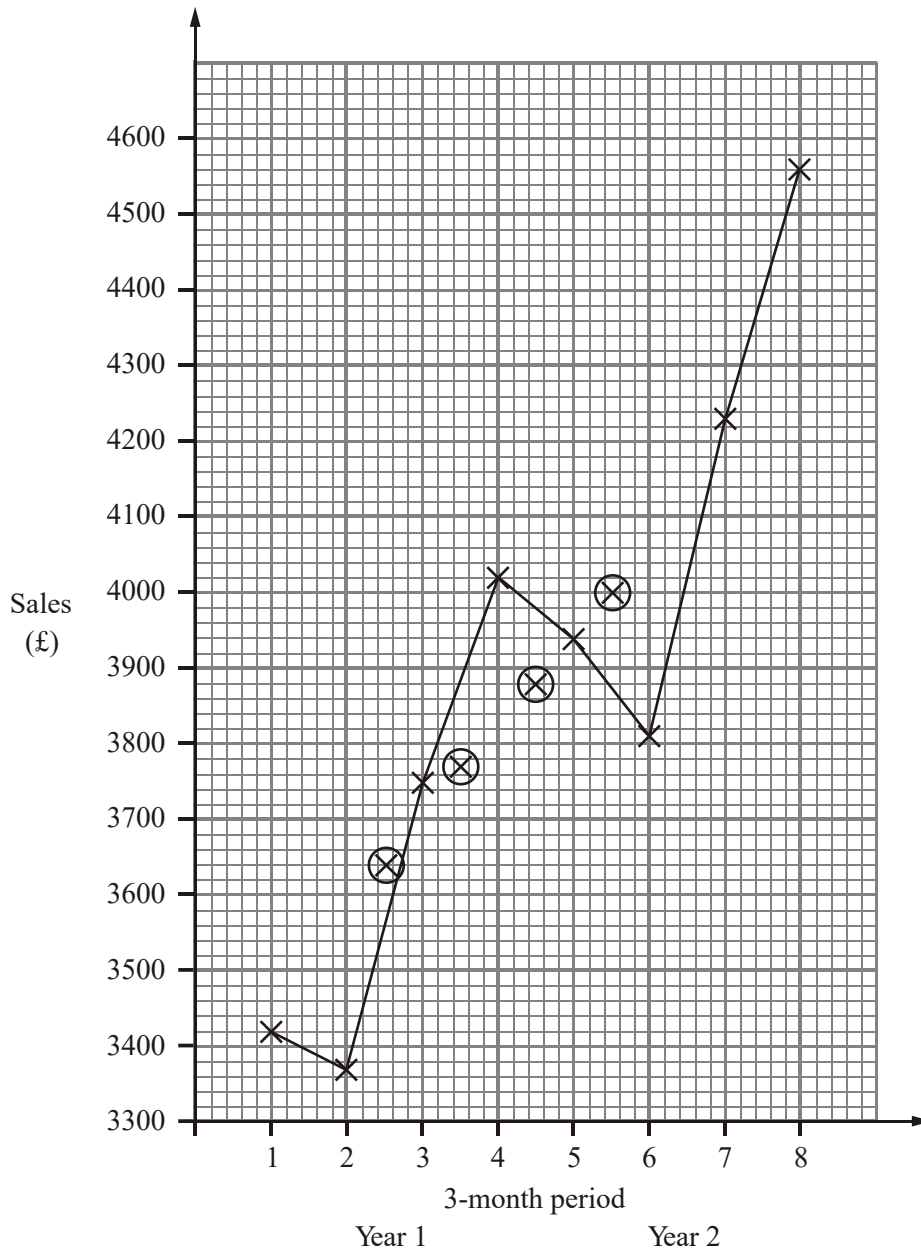
The first four 4-point moving averages have been worked out.

- (a) Work out the fifth 4-point moving average.

£3640, £3770, £3880, £4000, £.....

(2)

The time series graph shows Joe's sales for the last two years.
The first four 4-point moving averages have been plotted on the grid.



(b) Plot the fifth 4-point moving average.

(1)

(c) Draw a trend line for this data.

(1)

(Total 4 marks)

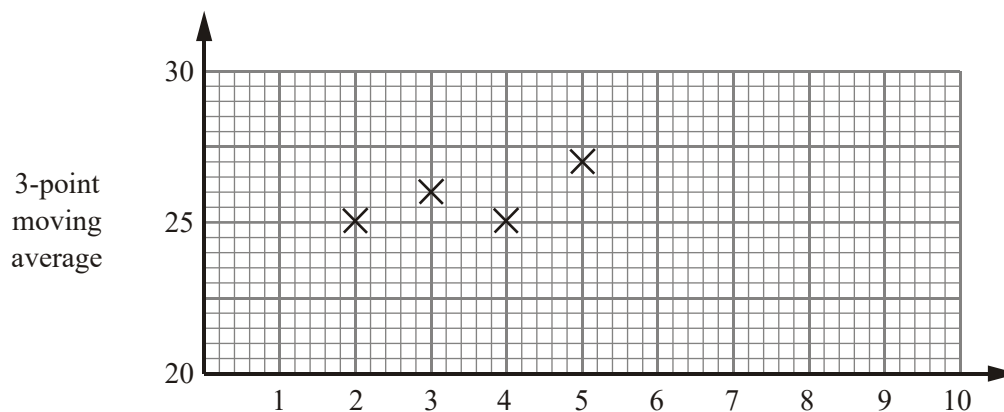
13. The table shows the number of pupils at a dance class each week for 10 weeks. The table also shows seven of the 3-point moving averages.

Week	1	2	3	4	5	6	7	8	9	10
Number of Pupils	23	25	27	26	22	33	23	25	30	29
3-point moving average		25	26	25	27	26	27	26		

- (a) Work out the missing 3-point moving average. Write your answer in the table.

(2)

- (b) On the grid, plot the 3-point moving averages from the table. The first four have been plotted for you.



(1)

- (c) On the grid, draw a trend line.

(1)

(d) Comment on the trend shown by your graph.

.....

(1)
 (Total 5 marks)

14. The table shows the number of televisions sold each month by a shop.

Month	April	May	June	July	Aug	Sept	Oct
Number of televisions	163	100	118	99	63	92	74

(a) Work out the four-point moving averages for this information.
 The first three have been worked out for you.

.....120.....95.....93.....

(2)

(b) Use the moving averages to describe the trend.

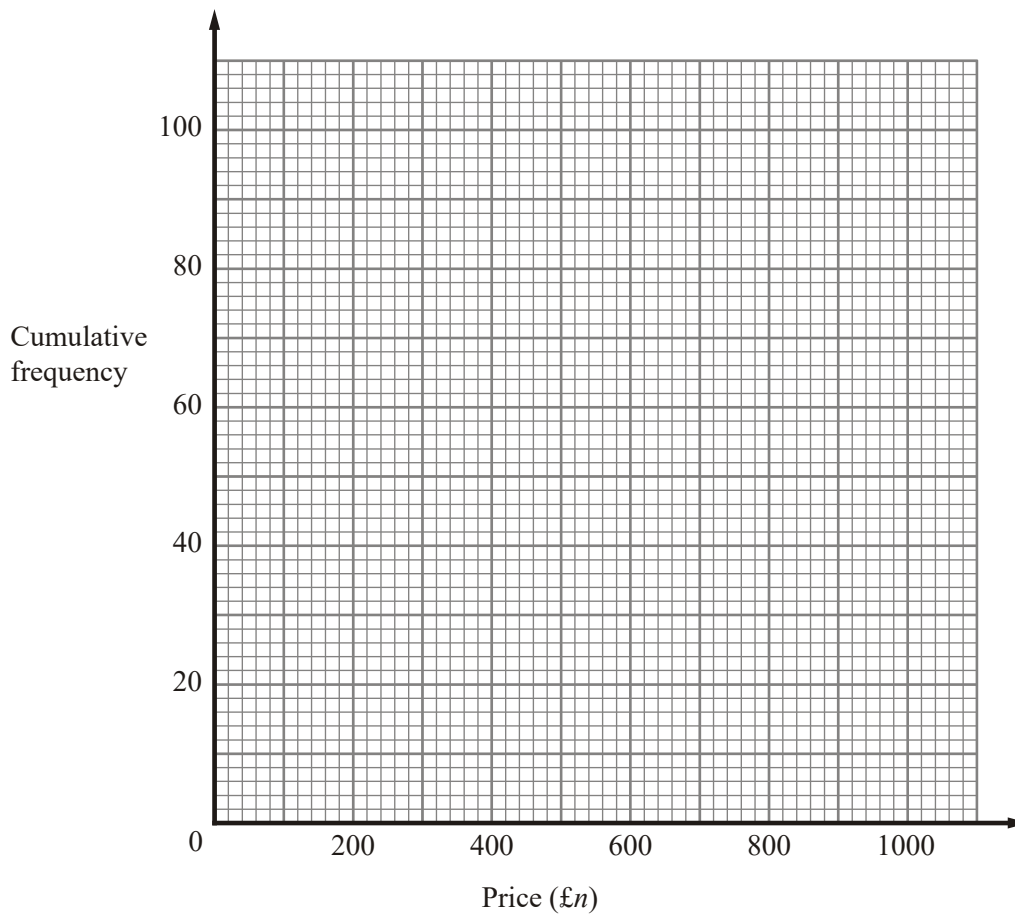
.....

(1)

The **cumulative frequency** table shows information about the prices, in £, of 100 televisions.

Price (£ n)	Cumulative frequency
$0 < n \leq 200$	5
$0 < n \leq 400$	20
$0 < n \leq 600$	40
$0 < n \leq 800$	75
$0 < n \leq 1000$	100

(c) On the grid below, draw a cumulative frequency graph for the table.



(2)

(d) Use your graph to find an estimate for the median price of these televisions.

£

(1)

(Total 6 marks)

15. The table shows the number of births in a hospital from 2000 to 2005

Year	2000	2001	2002	2003	2004	2005
Number of births	608	595	597	623	640	639

(a) Work out the 3-point moving averages for this information.

The first three have been done for you.

600, 605, 620,

(2)

(b) Use these moving averages to describe the trend.

.....

(1)

(Total 3 marks)

01. (a) $\frac{91-85}{85} \times 100 = \frac{6}{85} \times 100 = 7.05882..$
7.06%

3

M2 $\frac{91-85}{85} \times 100$

(M1 $\frac{91-85}{85}$ or sight of $\frac{6}{85}$ or 0.0705 – 0.071 or $\frac{91}{85}$ or

1.0705 – 1.071)

AI 7.05 – 7.06

Or

M1 $\frac{91}{85} \times 100 (= 107.05)$

M1 (dep) “107.05” – 100

AI 7.05-7.06

T&I methods must lead to an answer 7.05 – 7.06 for full marks, otherwise 0 marks

(b) $(64 + 73 + 85)/3 = 222/3 = 74$
 $(73 + 85 + 91)/3 = 249/3 = 83$
74, 83

2

M1 for $(64 + 73 + 85)/3$ or $(73 + 85 + 91)/3$ or $222/3$ or $249/3$ or 74 or 83 (condone missing brackets)

AI both answers in the correct order cao

[5]

02. (a) 182, 178, 180, 184

2

M1 mean of any three consecutive months, eg $(147 + 161 + 238) \div 3$ oe

AI cao

(b) Sale price = 80%

Fun Friday price = 70% of 80% = 56% (oe)

2

B1 B1 for a fully correct explanation involving a worked example (oe)

B1 a partially complete explanation

[4]

03. (a) Increase = $708 - 620 (=88)$
 % increase = $\frac{88}{620} \times 100$
 = 14.1935...
 14 or 14.2 or 14.19 4
- MI for $708 - 620 (=88)$*
MI for $\frac{88}{620} \times 100$
 OR
MI for $\frac{708}{620} \times 100$
MI for '114.19(3...)' - 100
A2 for 14 or 14.2 or 14.19
(A1 for unrounded or truncated answer)
(SC if A0 award B1 for an answer rounded or given to 2dp,
1dp, 2sf or nearest whole number)

- (b) $\frac{129.86}{100 - 14} \times 100 = \frac{12986}{86}$ 3
 151
MI for recognizing that (100 - 14)% is equivalent to 129.86
MI (dep.) for $\frac{129.86}{100 - 14} \times 100$ oe
A1 cao

- (c) $\frac{19 + 20 + 15}{3}$ 2
 18
MI for adding three consecutive numbers and dividing by 3
A1 cao

[9]

04. (a) $\frac{1240 + 1270 + 1330}{3}$ 2
 = 1280
MI $\frac{1240 + 1270 + 1330}{3} = \frac{3840}{3}$
accept $1240 + 1270 + 1330 \div 3$ oe
A1 cao

$$(b) \quad \frac{1300 + 1330 + x}{3} = 1350 \quad 2$$

$$= 1420$$

$$\text{or } (1350 \times 3) - (1300 + 1330) = 4050 - 2630$$

$$M1 \quad \frac{1300 + 1330 + x}{3} = 1350$$

or

$$(1350 \times 3) - (1300 + 1330) \text{ or } 4050 - 2630$$

Al cao

[4]

05. 20

$$\frac{23 + 31 + 15 + 11}{4}$$

19

$$\frac{31 + 15 + 11 + 19}{4}$$

3

M1 for finding the mean of any 4 consecutive months

Al for 20

Al for 19

[3]

06. (a) 78

$$(58 + 64 + 86 + 104) \div 4$$

79.75

$$(64 + 86 + 104 + 65) \div 4$$

81.25

$$(86 + 104 + 65 + 70) \div 4$$

2

B2 for all correct or 78, 79 or 80, 81

(B1 for one correct or one correct unevaluated moving average_

or full set of 3 point moving averages (69.3̇, 84.6̇, 85, 79.6̇) or
one of 234, 270.25, 272.5)

(b) increasing

1

B1 ft for more DVDs being sold oe

[3]

07.
$$\frac{9375 + 8907 + 9255}{3}$$

$$\frac{8907 + 9255 + 9420}{3}$$

 9179, 9194

2

*MI for adding 3 consecutive figures and dividing by 3 OR
 adding 2 sets of 3 consecutive figures
 AI cao*

[2]

08. (a)
$$\frac{270 + 324 + 300 + 258}{4}$$

$$\frac{324 + 300 + 258 + 309}{4}$$

$$\frac{300 + 258 + 309 + 335}{4}$$

 288, 297.75, 300.5

2

*MI for adding 4 consecutive numbers and dividing by 4
 AI
 (SC: BI for 3 or 4 of 298, 294, 289, $300\frac{2}{3}$)*

(b) *BI for upwards trend; moving average increasing, sales increasing* 1

[3]

09. $(351 + 435 + 582) \div 3 = 1368 \div 3$
 456
 $(435 + 582 + 372) \div 3 = 1389 \div 3$
 463

2

*MI for $(351+435+582) \div 3$ oe
 or $(435+582+372) \div 3$ oe
 or 456 seen or 463 seen
 AI for 456 and 463 cao*

[2]

10. (a) $(255 + 235 + 260) \div 3$
 $(235 + 260 + 261) \div 3$
 $(260 + 261 + 298) \div 3$
 $= 250, 252, 273$ 2
*MI for either $(255 + 235 + 260) \div 3$ or $(235 + 260 + 261) \div 3$
or $(260 + 261 + 298) \div 3$ or 250 or 252 or 273 in any order;
condone missing brackets.
AI cao*
- (b) Sales increased 1
*BI for acceptable explanation
eg rising, increasing, sell the most at the end of the year*
- [3]**
11. $(352 + 336 + 272 + 256) \div 4$ 2
 $(336 + 272 + 256 + 264) \div 4$
 $= (325), 304, 282$
*MI for valid method for one moving average or one correct
AI for 2 correct and in correct order
SC BI for 282, 304*
- [2]**
12. (a) $(3940 + 3810 + 4230 + 4560) \div 4$ 2
 $= 16540 \div 4$
 $= 4135$
*MI for $(3940 + 3810 + 4230 + 4560) \div 4$
AI cao*
- (b) Plot (6.5, "4135") 1
BI ft for plotting (6.5, 4135) or (6.5, "4135") ± 1 square
- (c) Trend line 1
*BI for a correct straight trend line between (2.5, 3600) and
(2.5, 3700) to (6.5, 4100) and (6.5, 4200) with at least 1 point
on either side of the line or at least 2 points on the line.*
- [4]**
13. (a) $(25 + 30 + 29) \div 3$ 2
28
*MI for $(25+30+29) \div 3$ or $84 \div 3$ (condone missing brackets)
AI cao*

- (b) *B1 for plotting 3 points (6, 26), (7, 27), (8, 26)* 1
- (c) *B1 for trend line between (2, 24) and (2, 26.5) and between (8, 25) and (8, 27.5)* 1
- (d) trend is upwards *B1 for trend is upwards oe* 1
- [5]**
14. (a) 82 *M1 for $(99 + 63 + 92 + 74) \div 4$ or $328 \div 4$
A1 cao* 2
- (b) Decreasing *B1 for decreasing oe* 1
- (c) Heights = 5, 20, 40, 75, 100
Correct cumulative frequency graph 2
*B2 for fully correct cumulative frequency graph
(Ignore any part of graph outside range of points)
(B1 for 4 or 5 points plotted correctly ± 1 full (2mm) square at the end of interval
or for 4 or 5 points plotted not at end but consistent within each interval and joined)*
- (d) 640 – 680 *B1 for 640 – 680 or ft (dep on graph being cf)
for reading from graph at 50 ± 1 full (2mm) square* 1
- [6]**
15. (a) $(623 + 640 + 639) \div 3$
634 *M1 for either $(623 + 640 + 639) \div 3$ or $(608 + 595 + 597) \div 3$
or $(595 + 597 + 623) \div 3$ or $(597 + 623 + 640) \div 3$ seen with
no other inconsistent approach
A1 cao* 2

(b) Increase (upwards)

1

*B1 for increase or upwards trend or 'number of births went up'
or 'it goes up' oe*

[3]

01. Part (a) was a percentage change question made a little more challenging by the relevant numbers being in a table. It was extremely rare for anything other than the 85 and 91 to be chosen. However, apart from that the remaining working was not good. Many candidates had little idea how to proceed and wrote 6% presumably from $91 - 85$. Others knew they had to convert a fraction to a percentage, but used a denominator of 91. Another common error was to calculate either $\frac{91}{85}$ or $\frac{91}{85} \times 100$ and then omit the subtraction of either unity or 100. Some candidates adopted a trial and improvement approach but rarely got to within the demanded level of accuracy.

Part (b) was a standard moving average question. There were many correct answers, but also many candidates did not know where to start and left a blank or worked out the average of all the figures.

02. Mathematics A

Paper 4

Very few candidates gave the impression of ever having studied this topic; many failed to attempt it. Some worked out the mean of all 6 months, whilst a common error failed to use their calculators correctly and pressed \div before totalling. In part (b) many candidates failed to give an answer that was little more than a re-statement of the question. There were, however, some good attempts at explaining the situation. The most successful candidates were those who included a numerical example of the difference.

Paper 6

Success was very much centre specific for part (a) with many candidates opting to find the mean of all six values or the means of the first 3 and the last 3.

Most candidates could give a partial answer for part (b) by essentially repeating the stem of the question. The more successful candidates used a combination of multipliers ($0.8 \times 0.7 = 0.56$) or gave a specific example (usually based on a multiple of £10)

Mathematics B Paper 17

Understanding of moving averages was centre dependant; many candidates finding the mean of all 6 months in an effort to salvage something from the lack of coverage of this topic.

$147 + 161 + 238/3 = 387$ etc was a common error, showing knowledge of the topic but misuse of the calculator.

In part (b) many candidates clearly understood the problem but found difficulty in verbalising their explanation; those who chose to illustrate their reasoning with an example usually succeeded.

A number of candidates merely tried to re-write the question and those misunderstanding the problem usually based their argument on Fun Friday having an extra 10% reduction only.

03. Intermediate Tier

It was surprising that part (a) caused as many problems as it did. Most candidates worked out the increase as 88 but the majority could not then calculate the percentage increase. Some calculated 88 as a percentage of 708 or 1328 while others calculated 620 as a percentage of 708. Many simply wrote 88% as the answer.

Candidates always tend to struggle with reverse percentage questions and this one, in part (b), was no exception. Only candidates who realised that £129.86 was 86% of the normal price were successful. Most worked out 14% of £129.86 and added it on.

In part (c) more than 60% of candidates calculated an average of three consecutive numbers but only one quarter of these worked out the second three-month moving average. The most common answer was 27, from using the last three months

Higher Tier

In (a), about equal numbers of candidates chose to calculate either $\frac{88}{620} \times 100$ or

$\frac{708}{620} \times 100 - 100$ and virtually all of these were able to give their answer to an appropriate

degree of accuracy. Some of the weaker candidates knew that they needed to calculate 88, but were then unsure as to how proceed, 88% or 0.88% were common answers. There were a worrying number of candidates who attempted to do this question by trial and improvement.

In part (b), candidates either knew how to do the calculation or they didn't. Calculating a 14% reduction (or increase) in the cost was a common misunderstanding. Again there were many attempts to do this by trial and improvement.

Part (c) was done quite well by the majority of the candidates, but there were many, including some of the most able, who thought the second 3-point moving average was derived from the values 15, 27 and 39, thus demonstrating a lack of understanding in the way these averages overlap.

04. Higher Tier

Answers to these questions have gradually improved. Many candidates were able to write down and complete a correct calculation. A few decided to work out all 3 moving averages and were awarded the marks providing they were correct and were clearly indicated. There were an alarming number of arithmetic errors which suggested calculators were not being used correctly.

On part (b) some candidates adopted an algebraic approach and considered the equation

$$\frac{1300 + 1330 + x}{3} = 1350$$
 whilst others wrote down and worked out 1350×3 and then

subtracted the 1300 and 1330 values.

Intermediate Tier

It remains the case that many candidates have little or no understanding of moving averages. In part (a) those who showed some knowledge often added the three values to give 3840 but then failed to divide by 3. Many used the number of televisions as a sequence of numbers and tried to find the June value by looking at differences. Part (b) was not well answered, and many did not attempt it. It was common to see frequencies treated as a series.

- 05.** The concept of moving averages has clearly not been taught in many centres. More able candidates were able to score quite well, however, by finding the mean of the first four entries. This was usually followed by the mean of the last four monthly entries and thus answers of 20 and 17 were seen regularly. Weaker candidates tended to merely pull numbers out of the table or quote months as their answers. A few candidates wrote the 8 numbers in the table in order and found the middle numbers; again care had to be taken to ensure that “correct” answers were not found this way.
- 06.** From comments written in the answer space for this question it was clear that some candidates felt that they had not met this topic prior to the examination. Indeed, “four point moving average” did not appear to be a familiar phrase to many candidates with just under half of the candidates failing to score any marks in part (a). The mean of all six values was frequently found. Three point moving averages were a common occurrence. A number of candidates failed to evaluate the sum before dividing by four, suggesting the incorrect use of a calculator. Of those who found the correct moving averages it was quite common for them to continue to find the mean of these or to find $(104 + 65 + 70 + 58)/4$. In part (b) many candidates failed to appreciate the concept of a trend. A very common incorrect answer was to state that more DVDs were sold at the end of the year because it was Christmas.
- 07.** The success of candidates with this question did appear to be very centre dependent with only about half of all candidates able to gain some credit. Many correct answers were seen but, equally, candidates simply found the average of all four given numbers. There was clear evidence of incorrect use of calculators whereby the sum was not evaluated (or brackets not used) before the division was attempted.

- 08.** It was encouraging to see more candidates being able to provide a fully correct solution to part (a) than has been the case in recent examination sessions. A few candidates used their calculator incorrectly, forgetting to obtain the answer to the additions before dividing by 4. Some candidates omitted the division completely. A small minority of candidates misread the question and gave the set of 3-point rather than the required 4-point moving averages. In part (b) most candidates were able to identify that the trend was an increase in sales although some candidates did describe the pattern of sales from 3 month to 3month period or give the period when most CDs were sold.
- 09.** It is clear that many candidates did not understand the concept of moving averages. Many used the first two moving averages given as the first two terms of a linear sequence, found the difference of 9, and then gave 452 ($443 + 9$) and 461 ($452 + 9$) as their answer. Some candidates found the mean of all the whole data. Often working out was not shown.
- 10.** Far more candidates than is usually the case were able to give the correct moving averages, without resorting to producing a number series. Little working out was shown, yet the correct answers were given in the right order. Nearly all candidates were able to interpret their figures correctly in part (b).
- 11.** It was disappointing to see some candidates not attempting this question. However, the success rate for those who did was high. Some candidates showed that they were using the right method, but their incorrect use of the calculator caused problems. A failure to press the equals key after adding led to the answers 1024 and 930 seen. Other incorrect answers came from dividing by the wrong number, 3 being the most common.
- 12.** The calculation of the fifth four-point moving average using the information given in the table of values produced a significant number of correct responses. However, many used the previously calculated averages and treated them as a sequence of numbers. As there wasn't a common difference between the values this gave rise to some unrealistic results. There was a follow through from part (a) to part (b) in which the value for the fifth moving average was to be plotted on the graph; this allowed many to gain the mark for the plotting.
- In part (c) the trend line was to be drawn in on the graph. With four moving average points already plotted it gave a hint as to where it should be located, especially as the points lay in almost a straight line. The success at indicating the trend line, however, seemed to be decided by where they had positioned the fifth point as there was a strong desire to 'join up' all the points, straight line or otherwise.

13. It appears that many candidates are not familiar with the context of moving averages. Part (a) was answered correctly by over 70% of candidates but a surprising number used the 3-point moving averages already given to calculate the moving average required. A few candidates treated the problem as a sequence and attempted to find a pattern in the moving averages given. Answers to parts (b), (c) and (d) were disappointing. Most candidates plotted the moving averages though a significant minority failed to understand the vertical scale and plotted the points incorrectly. Many candidates did not understand the need to draw a straight line in part (c) despite a similar question appearing on a recent examination paper. Often candidates mistakenly thought that joining the points would suffice.

In part (d) the meaning of the word “trend” was missed by many candidates who merely described the fluctuation in the moving averages rather than the overall trend. Any answer indicating an “increase” or “upward trend” was acceptable here. A description of correlation was often given. This, on its own, was not acceptable.

14. Many candidates were not aware of how to find the last moving average in (a). By far the most common error was to find a three-point moving average, with some candidates even finding the average of the moving averages given.

In part (b) many candidates did not understand what was required and commented on the number of televisions sold each month. All that was required was to say that the trend was decreasing yet many went into great detail about every number in the table. In parts (a) and (b) 29% of the candidates scored all 3 marks with a further 44% scoring 2 marks. 20% of the candidates scored no marks at all.

Many candidates were successful in parts (c) and (d) with 38% scoring all 3 marks and a further 20% scoring two marks. Quite a few candidates plotted the cumulative frequency values at 100, 200, 300, 400 and 500 thinking that the points needed to be plotted at the midpoints of the price intervals, clearly not understanding the question.

Some of these candidates did, however, go on and earn the mark in (d) for correctly reading from their graph. Some plotted the points in the correct position but then failed to join the points whilst others plotted the points correctly but then proceeded to draw a line of best fit. Nearly 20% of the candidates scored no marks at all on the final two parts of the question.

15. Working out a moving average is becoming a regular visitor to the calculator section of this paper but only 54% of candidates obtained the correct answer of 634. It was very common to see candidates trying to make a number sequence out of the 3 given moving averages and writing 645 for their answer. Other candidates wrote down 3 numbers, obviously thinking that a 3 point moving average needed 3 numbers. In part (b) candidates did not seem to realise that the trend should be based upon the moving averages rather than on the original data. Only 27% of candidates scored the mark in this part as candidates often wrote it went down in 2001 and then back up until 2004 and then dropped again. Another common error in this part was to comment on correlation rather than trend.