Cambridge Assessment International Education

Cambridge Lower Secondary Progression Test

Mathematics mark scheme

Stage 9

MATHS_S9_01_MS_8RP

General guidance on marking

Difference in printing

It is suggested that schools check their printed copies for differences in printing that may affect the answers to the questions, for example in measurement questions.

Brackets in mark scheme

When brackets appear in the mark scheme this indicates extra information that is not required but may be given.

For example:

Question	**1**		
Part	**Mark**	**Answer**	**Further Information**
	1	19.7 or 19.6(58…)	
Total	**1**		

This means that 19.6 is an acceptable truncated answer even though it is not the correct rounded answer.
The … means you can ignore any numbers that follow this; you do not need to check them.

Accept
- any correct rounding of the numbers in the brackets, e.g. 19.66,
- truncations beyond the brackets, e.g. 19.65

Do not accept
- 19.68 (since the numbers in brackets do not have to be present but if they are they should be correct).

These tables give general guidelines on marking learner responses that aren't specifically mentioned in the mark scheme. Any guidance specifically given in the mark scheme supersedes this guidance.

Number and place value

The table shows various general rules in terms of acceptable decimal answers.

Accept
Accept omission of leading zero if answer is clearly shown, e.g. **.675**
Accept tailing zeros, unless the question has asked for a specific number of decimal places or significant figures, e.g. **0.7000**
Accept a comma as a decimal point if that is the convention that you have taught the learners, e.g. **0,638**

Units

For questions involving quantities, e.g. length, mass, money, duration or time, correct units must be given in the answer. Units are provided on the answer line unless finding the units is part of what is being assessed.

The table shows acceptable and unacceptable versions of the answer 1.85 m.

	Accept	**Do not accept**
If the unit is given on the answer line, e.g. ..... m	Correct conversions, provided the unit is stated unambiguously, e.g. .....185 cm..... m (this is unambiguous since the unit cm comes straight after the answer, voiding the m which is now not next to the answer)	.....185..... m .....1850..... m etc.
If the question states the unit that the answer should be given in, e.g. 'Give your answer in metres'	1.85 1 m 85 cm	185; 1850 Any conversions to other units, e.g. 185 cm

Money

In addition to the rules for units, the table below gives guidance for answers involving money.

The table shows acceptable and unacceptable versions of the answer $0.30.

	Accept	**Do not accept**
If the amount is in dollars and cents, the answer should be given to two decimal places.	$0.30 For an integer number of dollars it is acceptable not to give any decimal places, e.g. $9 or $9.00	$0.3 $09 or $09.00
If units are not given on the answer line	Any unambiguous indication of the correct amount, e.g. 30 cents; 30 c $0.30; $0-30; $0=30; $00:30	30 or 0.30 without a unit $30; 0.30 cents Ambiguous answers, e.g. $30 cents; $0.30 c; $0.30 cents (as you do not know which unit applies because there are units either side of the number)
If $ is shown on the answer line	All unambiguous indications, e.g. $.....0.30.....; $.....0-30.....; $.....0=30.....; $.....00:30.....	$.....30..... Ambiguous answers, e.g. $.....30 cents.....; $.....0.30 cents..... **unless** units on the answer line have been deleted, e.g. ~~$~~.....30 cents.....
If cents is shown on the answer line	.....30.....cents	.....0.30.....cents Ambiguous answers, e.g. .....$30 .....cents; .....$0.30 .....cents **unless** units on the answer line have been deleted, e.g. .....$0.30.....~~cents~~

Duration

In addition to the rules for units, the table below gives guidance for answers involving time durations.

The table shows acceptable and unacceptable versions of the answer 2 hours and 30 minutes.

Accept	Do not accept
Any unambiguous indication using any reasonable abbreviations of hours (h, hr, hrs), minutes (m, min, mins) and seconds (s, sec, secs), e.g. 2 hours 30 minutes; 2 h 30 m; 02 h 30 m Any correct conversion with appropriate units, e.g. 2.5 hours; 150 mins **unless** the question specifically asks for time given in hours and minutes	Incorrect or ambiguous formats, e.g. 2.30; 2.3; 2.30 hours; 2.30 min; 2 h 3; 2.3 h (this is because this indicates 0.3 (i.e. 18 minutes) of an hour rather than 30 minutes) 02:30 (as this is a 24-hour clock time, not a time interval) 2.5; 150

Time

The table below gives guidance for answers involving time.

The table shows acceptable and unacceptable versions of the answer 07:30.

	Accept	Do not accept
If the answer is required in 24-hour format	Any unambiguous indication of correct answer in numbers, words or a combination of the two, e.g. 07:30 with any separator in place of the colon, e.g. 07 30; 07,30; 07-30; 0730	7:30 7:30 am 7 h 30 m 7:3 730 7.30 pm 073 07.3
If the answer is required in 12-hour format	Any unambiguous indication of correct answer in numbers, words or a combination of the two, e.g. 7:30 am with any separator in place of the colon, e.g. 7 30 am; 7.30 am; 7-30 am 7.30 in the morning Half past seven (o'clock) in the morning Accept am or a.m.	Absence of am or pm 1930 am 7 h 30 m 7:3 730 7.30 pm

Algebra

The table shows acceptable and unacceptable versions of the answer $3x - 2$.

Accept	Do not accept
$x3 - 2$; $3 \times x - 2$	$3x + -2$ if it is supposed to be in simplest form
Case change in letters	
Changes in letters as long as there is no ambiguity	

Accept extra brackets when factorising, e.g. $5(x + (3 + y))$.

Inequalities

The table shows acceptable and unacceptable versions of various answers.

For the following	Accept	Do not accept
For $6 \leqslant x < 8$	[6, 8)	$6 < x < 8$
For $x \leqslant -2$	$(-\infty,-2]$	$x < -2$
For $x > 3$	$(3, \infty)$ $3 < x$	Just '3' written on the answer line, even if $x > 3$ appears in the working.

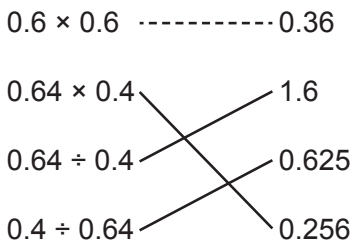
Plotting points

The table shows acceptable and unacceptable ways to plot points.

Accept	Do not accept
Crosses or dots plotted within $\pm\frac{1}{2}$ square of the correct answer The graph line passing through a point implies the point even though there is no cross.	A horizontal line and vertical line from the axes meeting at the required point.

Stage 9 Paper 1 Mark scheme

Question	1		
Part	**Mark**	**Answer**	**Further Information**
	2	9.3 −2.1 −18.9	Award 1 mark for two correct.
Total	**2**		

Question	2		
Part	**Mark**	**Answer**	**Further Information**
	1		All lines correct for the mark.
Total	**1**		

Question	3		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	7.1 14 (7.5) 7.9 28	
(b)	1	2 (3) 5 8	
Total	**2**		

Question	4		
Part	**Mark**	**Answer**	**Further Information**
	1	Triangular prism	
Total	**1**		

[Turn over

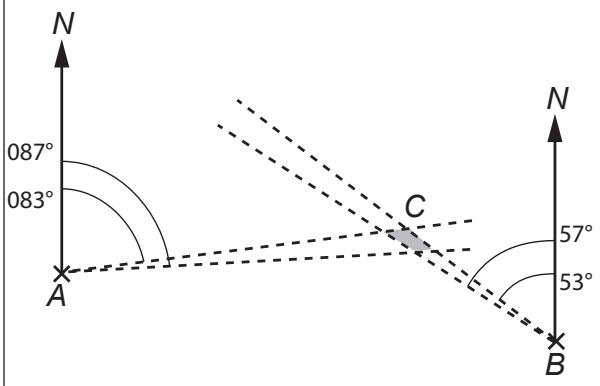
Question	5		
Part	**Mark**	**Answer**	**Further Information**
	1	☐ ☒ ☐ ☐	
Total	**1**		

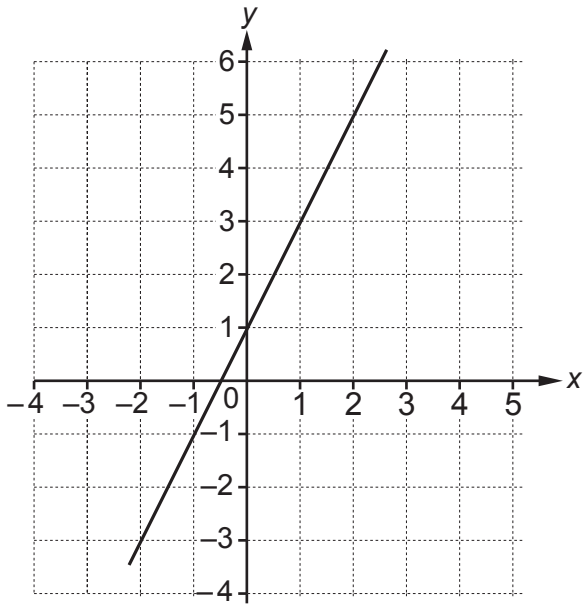
Question	6		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	6	
(b)	1	Any correct description of the relationship, e.g. • Positive correlation. • Heavier cakes take longer to cook. • As the mass increases, the cooking time increases.	Do not accept simply 'positive'.
(c)	1	Any correct explanation, e.g. • 80 minutes is too long for a cake that only has a mass of 800 grams. • 80 minutes would be the cooking time for a heavier cake. • Cakes that have a mass of 800g only take about 40 minutes to cook.	Accept any indication that the cooking time is too long for the size of the cake. Do not accept • Not many cakes take that long to cook.
Total	**3**		

Question	7		
Part	**Mark**	**Answer**	**Further Information**
	2	$29 - 5n$	Accept equivalent expressions, e.g. $24 - 5(n - 1)$ Award 1 mark for $-5n$ seen. Do not award the mark for just $5n$.
Total	**2**		

Question	8		
Part	**Mark**	**Answer**	**Further Information**
	2	164.52	Award 1 mark either for • sight of the digits 16452 in the answer **or** • a correct method leading to an answer with 2 decimal places with no more than one arithmetic error. e.g. 4 5 7 × 3 6 2 ⑥ 4 2 1 3 7 1 0 1 6 3 5 2 so 163.52
Total	**2**		

Question	9		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	1	
(b)	1	$\frac{1}{8}$	Do not accept $\frac{1}{2^3}$
Total	**2**		

Question	10		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	15.2 (km)	Allow a tolerance of ±0.2 km.
(b)	2		Award 2 marks if *C* is within both sets of tram lines (tram lines should allow for a ±2° tolerance). Award 1 mark if *C* is within one set of tram lines.
Total	**3**		

Question	11		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	x | –1 | 0 | 2 y | –1 | 1 | 5	Both required for the mark.
(b)	2	Straight line graph correctly drawn extending at least from $x = -1$ to $x = 2$. 	Award 1 mark for correctly plotting *their* 3 points.
Total	**3**		

Question	12		
Part	**Mark**	**Answer**	**Further Information**
	2	15	Award 1 mark for sight of $\frac{9}{2}$ and $\frac{10}{3}$ or answer of $\frac{90}{6}$ **or** for a correct method allowing one arithmetic error.
Total	**2**		

Question	13		
Part	**Mark**	**Answer**	**Further Information**
	2	$x^2 - 2x - 15$	Award 1 mark for at least three of these four terms seen or implied: x^2, $-5x$, $3x$, -15 **or** for two correct out of x^2, $-2x$ and -15 in final answer.
Total	**2**		

Question	14		
Part	**Mark**	**Answer**	**Further Information**
	2	135 (cm^3)	Award 1 mark for sight of a fully correct method for the area of the trapezium, e.g. • $2 \times 3 + 0.5 \times 2 \times 3$ • $0.5 \times (2 + 4) \times 3$ • $3 \times 4 - 0.5 \times 2 \times 3$ implied by 9×15 seen **or** for sight of *their* area × 15.
Total	**2**		

Question	15		
Part	**Mark**	**Answer**	**Further Information**
	2	True / False $10^{-1} = 0.1$ ✓ ☐ $400 \times 10^4 = 400\,000$ ☐ ✓ $0.3 \div 10^{-2} = 0.003$ ☐ ✓ $0.8 \times 10^3 = 0.8 \div 10^{-3}$ ✓ ☐	Award 1 mark if 3 ticks are correctly placed.
Total	**2**		

Question	16		
Part	**Mark**	**Answer**	**Further Information**
	2	30 (cm^2)	Award 1 mark for $\frac{10}{2}$ or equivalent **or** for an attempt at an algebraic solution, e.g, • $12 + 2x$ or similar, which may be part of an equation • $2y = 2x + 10$.
Total	**2**		

Question	17		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	Any correct explanation, e.g. • The probabilities do not add to make 1. • 0.35 + 0.25 + 0.3 = 0.9, not 1. • The total of the probabilities is 0.1 too small.	0.35 + 0.25 + 0.3 = 0.9 on its own is not sufficient for the mark.
(b)	1	0.05 or equivalent	
Total	**2**		

Question	18		
Part	**Mark**	**Answer**	**Further Information**
	1	$\frac{2a}{5}$ or any equivalent fraction, e.g. $\frac{4a}{10}$, $\frac{10a}{25}$	
Total	**1**		

Question	19		
Part	**Mark**	**Answer**	**Further Information**
	2	39 304	Award 1 mark for an attempt to work out 4913 × 2 × 2 × 2.
Total	**2**		

Question	20		
Part	**Mark**	**Answer**	**Further Information**
	3	Correct algebraic method seen leading to (x =) 2 (y =) −1 Correct methods include: • rearranging one of the equations to make one variable the subject and then substituting into the other equation, • making the coefficients of x or y equal followed by addition/subtraction of the equations.	Do not accept trial and improvement as a method here. Award 2 marks for an algebraic method leading to either x = 2 **or** y = −1. Award 1 mark for 2 and −1 with no/incorrect working **or** for eliminating either x or y, allowing one arithmetic error, e.g. • rearrange one of the equations to make one variable the subject and then substituting into the other equation, • making the coefficients of x or y equal, followed by addition/subtraction of the equations.
Total	**3**		

Question	21		
Part	**Mark**	**Answer**	**Further Information**
	2	($) 9.60	Award 1 mark for 2.40 × 4 **or** 2.40 ÷ 0.25.
Total	**2**		

Question	22		
Part	**Mark**	**Answer**	**Further Information**
	3	(a =) 2	Award 2 marks for $a^2 + 9^2 = 6^2 + 7^2$. This may be implied by $(a^2) = 6^2 + 7^2 - 9^2$ (= 4). Award 1 mark for $6^2 + 7^2$ (= 85) **or** $a^2 + 9^2$ seen.
Total	**3**		

Stage 9 Paper 2 Mark scheme

Question	1		
Part	**Mark**	**Answer**	**Further Information**
	2	($)87.12	Award 1 mark for a valid method, e.g. 48.40 ÷ 20 × 36 **or** 2.42 seen **or** 1.8 seen.
Total	**2**		

Question	2		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	$6(3a - 2)$	
(b)	1	$c(2c + 5)$	
Total	**2**		

Question	3		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	36°	
(b)	1	144°	Accept 180 – *their* (a).
Total	**2**		

Question	4		
Part	**Mark**	**Answer**	**Further Information**
	1	A minimum of four intervals in the range 100–200(cm) without gaps or overlaps	Ignore additional intervals outside of this range. Condone unequal intervals.
Total	**1**		

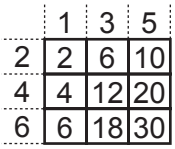
Question	5		
Part	**Mark**	**Answer**	**Further Information**
	1	True ☐ False ☑ True ☑ False ☐	Both correct for 1 mark.
Total	**1**		

[Turn over

Question	6		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	n^3	
(b)	1	n	Accept n^1
Total	**2**		

Question	7		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	(12, 5)	
(b)	1	(5, 1)	
Total	**2**		

Question	8		
Part	**Mark**	**Answer**	**Further Information**
	1	12.4(…) (km / *l*)	
Total	**1**		

Question	9		
Part	**Mark**	**Answer**	**Further Information**
	2		Rows and columns can be transposed. The numbers 1, 3, 5 can be in any order. The numbers 2, 4, 6 can be in any order. Award 1 mark for row and column labels correct.
Total	**2**		

Question	10		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	Sales are expected to increase as the price goes down.	Accept equivalents, e.g. • Less sales as the price goes up. • As one goes down the other goes up.
(b)	2	4 (thousand)	Condone 4000. Award 1 mark for sight of 7 (thousand) **or** 3 (thousand). This can be implied by the correct lines drawn on the graph.
Total	**3**		

Question	11		
Part	**Mark**	**Answer**	**Further Information**
	3	A complete trial and improvement method leading to the answer x = 3.4. This consists of at least one correct trial of 3.4 or lower and a correct 2 decimal place trial to confirm the first decimal place.	Award 1 mark for any trial of a number between 3 and 4 correctly evaluated. Award 1 mark for a trial of x correctly evaluated where $3.35 \leqslant x \leqslant 3.38$. Award 1 mark for 3.4 in the answer space.
Total	**3**		

x	$x^2 + 4x$ (Accept rounded or truncated answers)
3.1	22.01
3.2	23.04
3.3	24.09
3.35	**24.6225**
3.36	24.7296
3.37	24.8369
3.38	24.9444
3.39	25.0521
3.4	**25.16**
3.5	26.25
3.6	27.36
3.7	28.49
3.8	29.64
3.9	30.81

Question	12		
Part	**Mark**	**Answer**	**Further Information**
	3	7.5 (%)	Award 2 marks for a correct method for finding the fractional or percentage increase, i.e. $\frac{0.08\times1300+(961-900)}{2200}$ (= 0.075) **or** $\frac{1.08\times1300+961}{2200}$ (= 1.075) **or** $\frac{2365}{2200}$ Award 1 mark for sight of any of these: • 0.08 × 1300 (=$104) oe • 1.08 × 1300 (=$1404) oe • ($)165 (increase over year) • ($)2365 (total for this year).
Total	**3**		

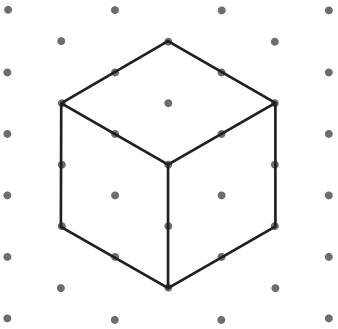
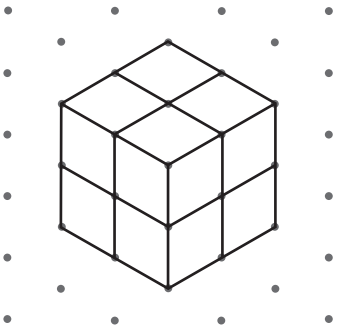
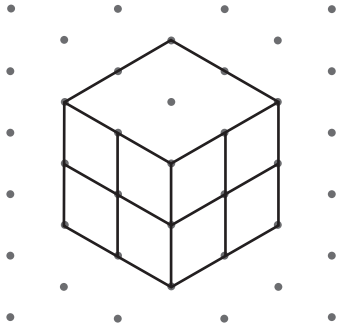
Question	13		
Part	**Mark**	**Answer**	**Further Information**
	2	(c =) −20	Award 1 mark for $5c + 160 = 60$ **or** $c + 32 = 12$.
Total	**2**		

Question	14		
Part	**Mark**	**Answer**	**Further Information**
	3	3840 (bottles)	Method 1 (Calculating the total number of litres produced). Award 2 marks for sight of 2880 (litres) **or** $\frac{180 \times 40}{2.5}$ **or** $\frac{7200}{2.5}$ Award 1 mark for sight of 180 × 40 (= 7200) **or** $\frac{40}{2.5}(=16)$ Method 2 (Calculating the number of bottles produced per tree). Award 2 marks for sight of 21.33… (bottles per tree) **or** $\frac{40}{2.5} \div 0.75$ (= 21.33 ...) Award 1 mark for $\frac{40}{2.5}$ (= 16)
Total	**3**		

Question	15		
Part	**Mark**	**Answer**	**Further Information**
(a)	1	4.384615.....	Award the mark if these digits are seen.
(b)	1	4.4	Allow follow through from an incorrect answer in **(a)** as long as *their* **(a)** has 3 or more digits.
Total	**2**		

Question	16		
Part	**Mark**	**Answer**	**Further Information**
	2	3.6 (litres)	Award 1 mark for 3600 **or** for correct conversion to litres of an incorrect volume in cm^3.
Total	**2**		

Question	17		
Part	**Mark**	**Answer**	**Further Information**
	1	Journey A: 180 km in 3 hours Journey B: 140 km in 2.5 hours Journey C: 30 km in 0.5 hours Journey D: 10 km in 10 minutes	
Total	**1**		

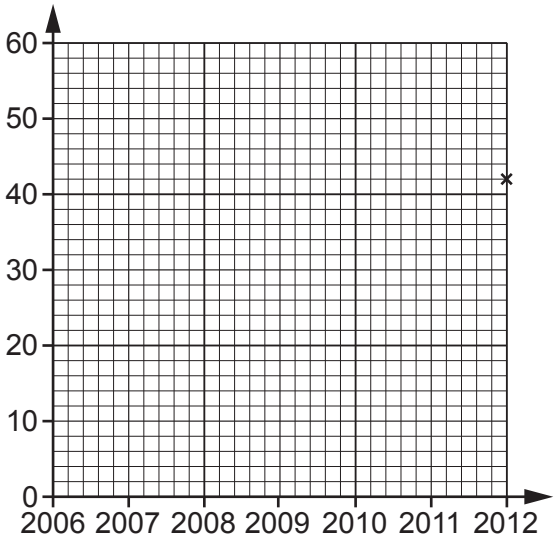
Question	18		
Part	**Mark**	**Answer**	**Further Information**
	1	A correct representation, i.e.  **or** 	Accept a drawing with some visible edges of the individual cubes shown, e.g.  Accept a drawing with hidden edges shown if hidden edges are dashed.
Total	**1**		

Question	19		
Part	**Mark**	**Answer**	**Further Information**
	2	$(t =)\frac{r}{7} - 3$ or $(t =)\frac{r-21}{7}$	Accept equivalent expressions, e.g. $r \div 7 - 3$ $(r - 21) \div 7$ Do not accept $r - 21 \div 7$ Award 1 mark for a correct first step, i.e. • $\frac{r}{7} = t + 3$ • $r = 7t + 21$
Total	**2**		

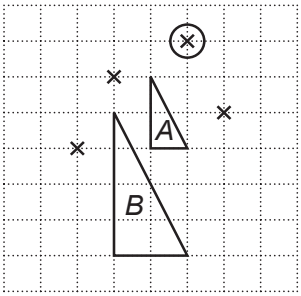
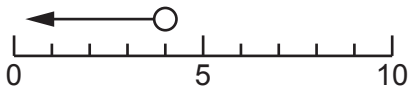
Question	20		
Part	**Mark**	**Answer**	**Further Information**
(a)	2	History | Geography 8 6 5 2 | 4 | 3 1 0 | 5 | 0 0 5 | 6 | 4 8 1 1 | 7 | 2 4 7 8	Award 1 mark if there is one omission in the 9 leaves **or** if there are 9 unordered, but otherwise correct, leaves.
(b)	1	A correct comparison, e.g. • There are more higher geography marks than history marks. • History has more marks in the 40s than geography. • Geography has more marks in the 70s than history.	Do not accept just a description of one subject, e.g. history had lots of marks in the 40s. Do not accept references to averages alone.
Total	**3**		

Question	21		
Part	**Mark**	**Answer**	**Further Information**
	2	(Manjit's number =) 6 (Gabriella's number =) 39	Award 1 mark for one number correct **or** if a factor of 24 (other than 24) **and** a multiple of 13 (other than 13) are seen.
Total	**2**		

Question	22		
Part	**Mark**	**Answer**	**Further Information**
	1	Any correct explanation that indicates that the original price of the trainers needs to be taken into account, e.g. • There is a higher percentage/fractional discount on bargain trainers. • There is a 12% discount on the Alpha trainers compared to a 20% discount on the Bargain trainers. • $\frac{6}{50}$ is less than $\frac{6}{30}$ (or equivalent).	Do **not** accept, e.g. • Bargain trainers are cheaper. • Alpha trainers are more expensive.
Total	**1**		

Question	23		
Part	**Mark**	**Answer**	**Further Information**
	2	The point should be plotted at (2012, 42).  	Award 1 mark if the value 42 is seen (28 + 14) or implied by the graph. **or** Award 1 mark for correct method. $x + \frac{x}{2}$ with x misread from the graph.
Total	**2**		

Stage 9 Paper 3 Mark scheme

Question	Mark	Answer	Further information
1	1	9	
2	1	Square Triangle Hexagon (Pentagon)	
3	1	$x \rightarrow x - 3$	
4	1	Negative	Ignore comments about strength.
5	1	22	
6	1	18	Answer may be written next to 13.
7	1		
8	1	$\frac{122}{200}$ or $\frac{61}{100}$ or 61% or 0.61	
9	1	20 (km)	
10	1	$\frac{3}{2}$ or $1\frac{1}{2}$ or 1.5	Accept any equivalent fractions.
11	1	18	
12	1	2	
13	1	3.2	
14	1		Do not accept solid circle.
15	1	0.4 (m^3)	
16	1	150(°)	
17	1	72(°)	
18	1	360 cm^3 (1800 cm^3) 180 cm^3 3600 cm^3	
19	1	64	Do not accept 4^3.
20	1	1 250 000 (cm^3)	