



MARKSCHEME

May 2012

MATHEMATICAL STUDIES

Standard Level

Paper 1

21 pages

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**Paper 1 Markscheme
Instructions to Examiners**

Notes: If in doubt about these instructions or any other marking issues, contact your team leader for clarification.

The number of marks for each question is 6.

1 Abbreviations

The markscheme may make use of the following abbreviations:

- M** Marks awarded for **Method**
- A** Marks awarded for an **Answer** or for **Accuracy**
- C** Marks awarded for **Correct** answers (irrespective of working shown)
- R** Marks awarded for clear **Reasoning**
- ft** Marks that can be awarded as **follow through** from previous results in the question

2 Method of Marking

- (a) All marking must be done in scoris using the mathematical studies annotations and in accordance with the current document for guidance in e-marking Mathematical Studies SL. It is essential that you read this document before you start marking.
- (b) If the candidate has full marks on a question use the **C6** annotation, if the candidate has made an attempt but scores zero marks use **C0**. If there is no attempt use the No response button. If a candidate does not score full or zero marks then full annotations **MUST** be shown.
- (c) In this paper, if the **correct answer is seen on the answer line the** maximum mark is awarded. **There is no need to check the working!** Award **C** marks and move on.
- (d) If the answer does not appear on the answer line, but the correct answer is seen in the working box with no subsequent working, award the maximum mark.
- (e) If the **answer is wrong**, marks should be awarded for the working according to the markscheme.
- (f) Working crossed out by the candidate should not be awarded any marks. Where candidates have written two solutions to a question, only the first solution should be marked.
- (g) A correct answer in the working box transcribed inaccurately to the answer line can receive full marks.
- (h) If correct working results in a correct answer **in the working box** but then further working is developed, full marks should **not** be awarded. In most such cases it will be a single final answer mark that is lost, however, a statement on the answer line should always be taken as the candidate's final decision on the answer **as long as it is unambiguous**. Accuracy of numerical answers is an exception to this rule- see Section 5.

Example: Factorise $x^2 - 5x - 6$

Markscheme	Candidates' Scripts	Marking
$(x-6)(x+1)$ (AI)(AI)	(i) Answer line: $(x+6)(x+1)$	(A0)(AI)
	(ii) Working box: $(x-6)(x+1)$ followed by $x=6$ and -1 , or just $6, -1$ in either working box or on answer line.	(AI) (A0)

3 Follow through (ft) Marks

Errors made at any step of a solution affect all working that follows. To limit the severity of the penalty, **follow through (ft)** marks can be awarded. Markschemes will indicate where it is appropriate to apply follow through in a question with '(ft)'.

- (a) Follow through applies only from one part of a question to a subsequent part of the question. Follow through does not apply within the same part.
- (b) If an answer resulting from follow through is extremely unrealistic (e.g. negative distances or incorrect by large order of magnitude) then the final A mark should not be awarded.
- (c) If a question is transformed by an error into a **different, much simpler question** then follow through may not apply.
- (d) To award follow through marks for a question part, **there must be working present for that part**. An isolated follow through answer, without working is regarded as incorrect and receives no marks **even if it is approximately correct**.
- (e) The exception to the above would be in a question which is testing the candidate's use of the GDC, where working will not be expected. **The markscheme will clearly indicate where this applies**.
- (f) Inadvertent use of radians will be penalised the first time it occurs. The markscheme will give clear instructions to ensure that only one mark per part can be lost for the use of radians.

Example: Finding angles and lengths using trigonometry

Markscheme	Candidates' Scripts	Marking
(a) $\frac{\sin A}{3} = \frac{\sin 30}{4}$ (MI)(AI) $A = 22.0^\circ$ (22.0243...) (AI)	(a) $\frac{\sin A}{4} = \frac{\sin 30}{3}$	(MI)(A0) (use of sine rule but with wrong values)
	$A = 41.8^\circ$	(A0) (Note: the 2 nd (AI) here was not marked (ft) and cannot be awarded because there was an earlier error in the same question part.)
(b) $x = 7 \tan(22.0243\dots^\circ)$ (MI) $= 2.83$ (2.83163...) (AI)(ft)	(b) case (i) $x = 7 \tan 41.8^\circ$	(MI)
	$= 6.26$ <i>but</i> case (ii) 6.26	(AI)(ft) (C0) since no working shown

4 Using the Markscheme

(a) **A** marks are **dependent** on the preceding **M** mark being awarded, it is **not** possible to award **(M0)(A1)**. Once an **(M0)** has been awarded, all subsequent **A** marks are lost in that part of the question, even if calculations are performed correctly, until the next **M** mark.
The only exception will be for an answer where the accuracy is specified in the question – see section 5.

(b) **A** marks are **dependent** on the **R** mark being awarded, it is **not** possible to award **(A1)(R0)**. Hence the **(A1)** is not awarded for a correct answer if no reason or the wrong reason is given.

(c) **Alternative methods** may not always be included. Thus, if an answer is wrong then the working must be carefully analysed in order that marks are awarded for a different method consistent with the markscheme.
Where alternative methods for complete questions are included in the markscheme, they are indicated by ‘**OR**’ *etc.*

(d) Unless the question specifies otherwise, accept **equivalent forms**. For example: $\frac{\sin \theta}{\cos \theta}$ for $\tan \theta$.

On the markscheme, these equivalent numerical or algebraic forms will sometimes be written in brackets after the required answer.

Where numerical answers are required as the final answer to a part of a question in the markscheme, the scheme will show, in order:

the 3 significant figure answer worked through from full calculator display;

the exact value (for example $\sqrt{3}$ if applicable);

the full calculator display in the form 2.83163... as in the example above.

Where answers are given to 3 significant figures and are then used in subsequent parts of the question leading to a **different** 3 significant figure answer, these solutions will also be given.

(e) As this is an international examination, all valid **alternative forms of notation** should be accepted. Some examples of these are:

Decimal points: 1.7; 1’7; 1·7; 1,7 .

Different descriptions of an interval: $3 < x < 5$; (3, 5);] 3, 5 [.

Different forms of notation for set properties (*e.g.* complement): A' ; \bar{A} ; A^c ; $U - A$; $(A; U \setminus A$.

Different forms of logic notation: $\neg p$; p' ; \bar{p} ; \bar{p} ; $\sim p$.

$p \Rightarrow q$; $p \rightarrow q$; $q \Leftarrow p$.

(f) **Discretionary marks**: There will be very rare occasions where the markscheme does not cover the work seen. In such cases the annotation DM should be used to indicate where an examiner has used discretion. Discretion should be used sparingly and if there is doubt an exception should be raised through scoris to the team leader.

As from Nov 11 the AP, FP and UP penalties will no longer apply. Accuracy and units will be assessed in particular questions and the marks applied according to the rules given in sections 5, 6 and 7 below.

5 Accuracy of Answers

Incorrect accuracy should be penalized once only in each question according to the rules below.

Unless otherwise stated in the question, all numerical answers should be given exactly or correct to 3 significant figures.

1. If the candidate’s unrounded answer is seen and would round to the required 3 sf answer, then award *(AI)* and ignore subsequent rounding.

Note: The unrounded answer may appear in either the working box or on the final answer line.

2. If the candidate’s unrounded answer is **not** seen then award *(AI)* if the answer given is **correctly** rounded to 2 or more significant figures, otherwise *(A0)*.

Note: If the candidate’s unrounded answer is **not** seen and the answer is given correct to 1 sf (correct or not), the answer will be considered wrong and will not count as incorrect accuracy. If this answer is used in subsequent parts, then working must be shown for further marks to be awarded.

3. If a correct 2 sf answer is used in subsequent parts, then working **must** be shown for further marks to be awarded. (This treatment is the same as for following through from an incorrect answer.)

These 3 points (see numbers in superscript) have been summarised in the table below and illustrated in the examples which follow.

	If candidates final answer is given...				
	Exact or correct to 3 or more sf	Incorrect to 3sf	Correct to 2sf ³	Incorrect to 2sf	Correct or incorrect to 1sf
Unrounded answer seen ¹	Award the final <i>(AI)</i> irrespective of correct or incorrect rounding				
Unrounded answer not seen ²	<i>(AI)</i>	<i>(A0)</i>	<i>(AI)</i>	<i>(A0)</i>	<i>(A0)</i>
Treatment of subsequent parts	As per MS	Treat as follow through, only if working is seen. ³			

Examples:

Markscheme	Candidates' Scripts	Marking
9.43 (9.43398...) (AI)	(i) 9.43398... is seen in the working box followed by 9; 9.4; 9.43; 9.434 etc (correctly rounded)	(AI)
	(ii) 9.43398... is seen in the working box followed by 9.433; 9.44 etc (incorrectly rounded)	(AI)
	(iii) 9.4	(AI)
	(iv) 9	(A0) (correct to 1sf)
	(v) 9.3	(A0) (incorrectly rounded to 2sf)
	(vi) 9.44	(A0) (incorrectly rounded to 3sf)

Markscheme	Candidates' Scripts	Marking
7.44 (7.43798...) (AI)	(i) 7.43798... is seen in the working box followed by 7; 7.4; 7.44; 7.438 etc (correctly rounded)	(AI)
	(ii) 7.43798... is seen in the working box followed by 7.437; 7.43 etc (incorrectly rounded)	(AI)
	(iii) 7.4	(AI)
	(iv) 7	(A0) (correct to 1sf)
	(v) 7.5	(A0) (incorrectly rounded to 2sf)
	(vi) 7.43	(A0) (incorrectly rounded to 3sf)

Example: ABC is a right angled triangle with angle $ABC = 90^\circ$, $AC = 32$ cm and $AB = 30$ cm. Find (a) the length of BC, (b) The area of triangle ABC.

Markscheme	Candidates' Scripts	Marking
(a) $BC = \sqrt{32^2 - 30^2}$ (MI) Award (MI) for correct substitution in Pythagorus' formula $= 11.1 (\sqrt{124}, 11.1355\dots)$ (cm) (AI)	(a) $BC = \sqrt{32^2 - 30^2}$ 11 (cm) (2 sf answer only seen, but correct)	(MI) (AI)
(b) $\text{Area} = \frac{1}{2} \times 30 \times 11.1355\dots$ (MI) Award (MI) for correct substitution in area of triangle formula $= 167(167.032\dots)$ (cm ²) (AI)(ft)	(b) case (i) $\text{Area} = \frac{1}{2} \times 30 \times 11$ $= 165$ (cm ²) case (ii) $= 165$ (cm ²) (No working shown, the answer 11 is treated as a ft, so no marks awarded here)	(MI) (AI)(ft) (M0)(A0)(ft)

Rounding of an exact answer to 3 significant figures **should be accepted if performed correctly**.

Exact answers such as $\frac{1}{4}$ can be written as decimals to fewer than three significant figures if the result is still exact. Reduction of a fraction to its lowest terms is **not** essential, however where an answer simplifies to an integer this is expected.

Ratios of π and answers taking the form of square roots of integers or any rational power of an integer (e.g. $\sqrt{13}, 2^{2/3}, \sqrt[4]{5}$,) may be accepted as exact answers. All other powers (e.g. of non-integers) and values of transcendental functions such as sine and cosine must be evaluated.

If the level of accuracy is specified in the question, a mark will be allocated for giving the answer to the required accuracy. In all such cases the final mark is not awarded if the rounding does not follow the instructions given in the question. A mark for specified accuracy can be regarded as a (ft) mark regardless of an immediately preceding (M0).

Certain answers obtained from the GDC are worth 2 marks and working will not be seen. In these cases only one mark should be lost for accuracy.

e.g. Chi-squared, correlation coefficient, mean

Markscheme	Candidates' Scripts	Marking
Chi-squared 7.68 (7.67543...) (A2)	(a) 7.7	(A2)
	(b) 7.67	(A1)
	(c) 7.6	(A1)
	(d) 8	(A0)
	(e) 7	(A0)
	(e) 7.66	(A0)

Regression line

Markscheme	Candidates' Scripts	Marking
$y = 0.888x + 13.5$ (A2) ($y = 0.887686\dots x + 13.4895\dots$) If an answer is not in the form of an equation award at most (A1)(A0).	(a) $y = 0.89x + 13$	(A2) (both accepted)
	(b) $y = 0.88x + 13$	(A1) (one rounding error)
	(c) $y = 0.88x + 14$	(A1) (rounding error repeated)
	(d) (i) $y = 0.9x + 13$	(A1) (1sf not accepted)
	(ii) $y = 0.8x + 13$	
	(e) $0.88x + 14$	(A0) (two rounding errors and not an equation)

maximum/minimum/points of intersection

Markscheme	Candidates' Scripts	Marking
(2.06, 4.49) (AI)(AI) (2.06020..., 4.49253...)	(a) (2.1, 4.5)	(AI)(AI) <i>(both accepted)</i>
	(b) (2.0, 4.4)	(AI) <i>(same rounding error twice)</i>
	(c) (2.06, 4.4)	(AI) <i>(one rounding error)</i>
	(d) (2, 4.4)	(A0) <i>(1sf not accepted, one rounding error)</i>

6 Level of accuracy in finance questions

The accuracy level required for answers will be specified in all questions involving money. This will usually be either whole units or two decimal places. The first answer not given to the specified level of accuracy will not be awarded the final **A** mark. The markscheme will give clear instructions to ensure that only one mark per paper can be lost for incorrect accuracy in a financial question.

Example: A financial question demands accuracy correct to 2dp.

Markscheme	Candidates' Scripts	Marking
\$231.62 (231.6189) (A1)	(i) 231.6	(A0)
	(ii) 232	(A0) <i>(Correct rounding to incorrect level)</i>
	(iii) 231.61	(A0)
	(iv) 232.00	(A0) <i>(Parts (iii) and (iv) are both incorrect rounding to correct level)</i>

7 Units in answers

There will be specific questions for which the units are required and this will be indicated clearly in the markscheme. The first correct answer with no units or incorrect units will not be awarded the final **A** mark. The markscheme will give clear instructions to ensure that only one mark per paper can be lost for lack of units or incorrect units.

The units are considered only when the numerical answer is awarded **(A1)** under the accuracy rules given in Section 5.

Markscheme	Candidates' Scripts	Marking
(a) 37000 m ² (A1)	(a) 36000 m ²	(A0) <i>(Incorrect answer so units not considered)</i>
(b) 3200 m ³ (A1)	(b) 3200 m ²	(A0) <i>(Incorrect units)</i>

If no method is shown and the answer is correct but with incorrect or missing units award the **C** marks with a one mark penalty.

8 Graphic Display Calculators

Candidates will often obtain solutions directly from their calculators. They must use mathematical notation, not calculator notation. No method marks can be awarded for incorrect answers supported only by calculator notation. The comment 'I used my GDC' cannot receive a method mark.

QUESTION 1

(a) $x = 1$ (AI) (C1)

(b) $\frac{3+y}{2} = 5$ (MI)

Note: Award (MI) for setting the correct equation or equivalent.

$y = 7$ (AI) (C2)

(c) $1+1+3+7+14+z = 6 \times 7$ (MI)(MI)

Note: Award (MI) for the sum of their 5 numbers and z , and (MI) for 6×7 .

$z = 16$ (AI)(ft) (C3)

Note: Follow through from their x and y found in part (b) provided y is a positive integer less than 14.

QUESTION 2

(a) (i) $\frac{-4+2}{2} = q$ (MI)

Note: Award (MI) for correct substitution in the correct formula.

$q = -1$ (AI)

(ii) $\frac{p+(-3)}{2} = 1$ (MI)

Note: Award (MI) for correct substitution into the correct formula or consistent with their equation in (i).

$p = 5$ (AI) (C4)

Notes: Award A marks for integer values. Penalise if answers left as a fraction the first time a fraction is seen.

(b) $AB = \sqrt{(2+4)^2 + (-3-5)^2}$ (MI)

Note: Award (MI) for the correct substitution of their coordinates for A and B in the correct formula.

$AB = 10$ (AI)(ft) (C2)

Note: Follow through from their answer to part (a)(ii).

QUESTION 3

(a) $\frac{82414080000000}{48000}$ (MI)

Note: Award (MI) for correct substitution in correct formula.

1716960000 (hours) (AI) (C2)

(b) $\frac{\text{their (a)}}{24 \times 365}$ (MI)

196000 (years) (AI)(ft) (C2)

Note: Award (AI)(ft) from their part (a).

(c) 1.96×10^5 (AI)(ft)(AI)(ft) (C2)

Note: Award (AI)(ft) for 1.96 (accept 1.96000), (AI)(ft) for 10^5 .
Follow through from their answer to part (b).

QUESTION 4

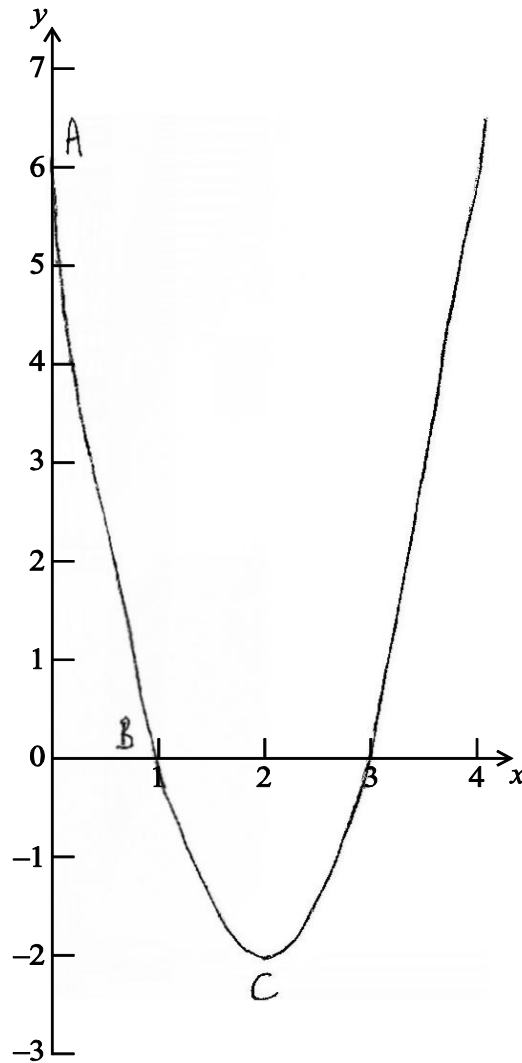
(a) $x = 2$

(A1)(A1)

(C2)

Notes: Award (A1)(A0) for “ $x = \text{constant}$ ” (other than 2).
 Award (A0)(A1) for $y = 2$.
 Award (A0)(A0) for only seeing 2.
 Award (A0)(A0) for $2 = -b / 2a$.

(b)



(A1) for correctly plotting and labelling A, B and C

(A1) for a smooth curve passing through the three given points

(A1) for completing the symmetry of the curve over the **domain given**.

(A3)

(C3)

Notes:
 For A marks to be awarded for the curve, each segment must be a reasonable attempt at a continuous curve.
 If straight line segments are used, penalise once only in the last two marks.

(c) 3

(A1)(ft)

(C1)

Notes: (A0) for coordinates.
 Accept $x = 3$ or $D = 3$.

QUESTION 5

- (a) (i) 6 (mm) (AI)
- (ii) 20 (mm) (AI) (C2)

- (b) Median (AI) (C1)

Note: Award (AI) for Q_2 or 50th percentile.

- (c) 14–9 (AI)

Note: Award (AI) for 9 and 14 seen.

- 5 (mm) (AI) (C2)

- (d) 75 (%) (AI) (C1)

QUESTION 6

- (a) If (both) the numbers x and y are even (then) the sum of x and y is an even number. (AI)(AI) (C2)

Note: Award (AI) for If...(then), (AI) for the correct statements in the correct order.

- (b) If (both) the numbers x and y are not even (then) the sum of x and y is not an even number. (AI)(AI) (C2)

Notes: Award (AI) for If...(then), (AI) for the correct not p , and not q in the correct order.
Accept the word odd for the phrase “not even”.

- (c) The inverse of a statement is not (necessarily) true, because two odd (not even) numbers, always have an even sum. (AI)(RI)(ft) (C2)

Notes: Award (AI)(RI) if a specific counter example given instead of a reason stated in general terms, *e.g.* the inverse is not true because, 5 and 7 have an even sum.

Do not award (AI)(R0). Follow through from their statement in part (b).

QUESTION 7

(a) 12:00 (12 noon, 12 midday, 12pm) (AI) (CI)

Note: Do not accept 12 or 12 hours.

(b) 20 (°C) (AI) (CI)

(c) 6:00 < t < 18:00 (AI)(AI) (C2)

Notes: Award (AI) for 6:00 and 18:00 seen, (AI) for correct strict inequalities used and with the variable *t*.
Accept (6:00, 18:00) or]6:00, 18:00[for the equivalent interval.

(d) $\frac{360}{24}$ (MI)

15 (AI) (C2)

QUESTION 8

(a) 650 × 12.50 (MI)

8125 (MXN) (AI) (C2)

Note: Accept 8130.

(b) 23 (MXN) (AI) (CI)

(c) $\frac{2300 - \text{their } 23}{12.50}$ (MI)

Note: Award (MI) for setting up the expression.

182.16 (USD) (AI)(ft)

Note: Follow through from their answer to part (b).

182 (USD) (AI)(ft) (C3)

Notes: Award final (AI) for their answer correct to the nearest USD.

QUESTION 9

(a) $3 \times (-5) + 2 \times 6 \neq 9$

(AI) (C1)

Note: Also accept $3 \times (-5) + 2x = 9$ gives $x = 12 \neq 6$ or $3y + 2 \times (6) = 9$ gives $y = -1 \neq -5$.

(b) $3y = -2x + 9$

(M1)

Note: Award (M1) for $3y = -2x + 9$ or $y = \frac{-2}{3}x + 3$ or $y = \frac{(-2x+9)}{3}$.

gradient = $-\frac{2}{3}(-0.667)(-0.666666\dots)$

(AI) (C2)

(c) (i) gradient of perpendicular line = $\frac{3}{2}(1.5)$

(AI)(ft)

Note: Follow through from their answer to part (b).

(ii) $y = \frac{3}{2}x + c$

$-5 = \frac{3}{2} \times 6 + c$

(M1)

Note: Award (M1) for substitution of their perpendicular gradient and the point $(6, -5)$ into the equation of their line.

$y = \frac{3}{2}x - 14$

(AI)(ft)

Note: Follow through from their perpendicular gradient. Accept equivalent forms.

OR

$y + 5 = \frac{3}{2}(x - 6)$

(M1)(AI)(ft) (C3)

Notes: Award (M1) for substitution of their perpendicular gradient and the point $(6, -5)$ into the equation of their line. Follow through from their perpendicular gradient.

QUESTION 10

(a) $AC^2 = 6^2 + 10^2 - 2 \times 10 \times 6 \times \cos 120^\circ$ (MI)(AI)

Note: Award (MI) for substitution in cosine formula, (AI) for correct substitutions.

$AC = 14$ (m) (AI) (C3)

(b) $\frac{14}{\sin 40} = \frac{13}{\sin ACB}$ (MI)(AI)(ft)

Note: Award (MI) for substitution in sine formula, (AI) for correct substitutions.

Angle ACB = 36.6° (36.6463...) (AI)(ft) (C3)

Note:
Follow through from their (a).

QUESTION 11

(a) $y = 14.9x - 80$ (AI)(AI) (C2)

Notes: Award (AI) for 14.9x and (AI) for -80. Award at most (A0)(AI) if not given in the form of an equation.

(b) $14.9 \times 17 - 80$ (MI)

Note: Award (MI) for substitution in their equation from part (a).

173.3 calories (AI)(ft) (C2)

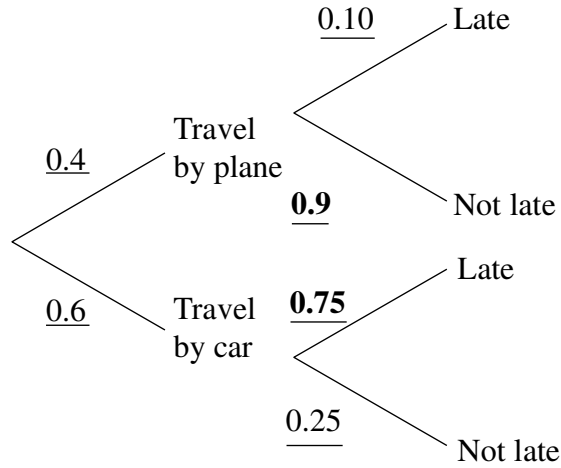
Note: Accept 173 and 170 even if no working is seen.

(c) Reliable. 17 min is in the range of given values for x
or correlation coefficient (r) is 0.989... (AI)(RI) (C2)

Notes: Do not award (AI)(R0).
Alternative acceptable reasons using correlation:
Correlation coefficient close to 1
Strong positive correlation
Strong linear correlation
Strong positive association between the variables
Strong relationship between the variables.

QUESTION 12

(a)



(AI) (CI)

Note: Award (AI) for 0.9 and 0.75.

(b) $0.4 \times 0.9 + 0.6 \times 0.25$

(MI)(MI)

Note: Award (MI) for their two relevant products, (MI) for adding their two products.

$0.51 \left(\frac{51}{100}, 51\% \right)$

(AI)(ft) (C3)

Note: Follow through from their answers to part (a).

(c) $\frac{0.6 \times 0.25}{0.51}$

(MI)

Note: Award (MI) for correctly substituted conditional probability formula.

$0.294 \left(\frac{5}{17}, 0.294117... \right)$

(AI)(ft) (C2)

Note: Follow through from their tree diagram and their part (b).

QUESTION 13

(a) $\frac{AC}{\sin 30^\circ} = \frac{8}{\sin 40^\circ}$ (MI)(AI)

Note: Award (MI) for substitution in the sine rule formula, (AI) for correct substitutions.

$AC = 6.22 \text{ (m) (6.22289...)}$ (AI) (C3)

(b) Area of triangle ABC = $\frac{1}{2} \times 8 \times 6.22289... \times \sin 110^\circ$ (MI)(AI)(ft)

Note: Award (MI) for substitution in the correct formula, (AI)(ft) for their correct substitutions. Follow through from their part (a).

Area triangle ABC = $23.4 \text{ m}^2 \text{ (23.3904...m}^2\text{)}$ (AI)(ft) (C3)

Note: Follow through from a positive answer to their part (a). The answer is 23.4 m^2 , units are required.

QUESTION 14

(a) (i) $2p + q = 11$ and $4p + q = 17$ (MI)

Note: Award (MI) for either two correct equations or a correct equation in one unknown equivalent to $2p = 6$.

$p = 3$ (AI)

(ii) $q = 5$ (AI) (C3)

Notes: If only one value of p and q is correct and no working shown, award (M0)(AI)(A0).

(b) $r = 8$ (AI)(ft) (C1)

Note: Follow through from their answers for p and q irrespective of whether working is seen.

(c) $3 \times 2^s + 5 = 197$ (MI)

Note: Award (MI) for setting the correct equation.

$s = 6$ (AI)(ft) (C2)

Note: Follow through from their values of p and q .

QUESTION 15

(a) $\frac{12500 \times 5 \times 18}{100} + 12500$ (MI)(MI)

Note: Award (MI) for correct substitution in simple interest formula,
(MI) for adding 12500

Total amount = 23750 (EUR) (AI) (C3)

(b) $C \times \left(1 + \frac{0.04}{12}\right)^{12 \times 18} = 25000$ (MI)(AI)

Note: Award (MI) for substitution into a compound interest formula.
Award (AI) for correct substitution and equation.

$C = 12183.39$ (EUR) (AI) (C3)

Note: The final (AI) can only be given for seeing the correct figures.