Delegate Booklet
Course Title: Welcome to Pearson International GCSE Mathematics 4MA1 and 4MB1 4MA1-23IF2

Name.....
Date.....

Contents

About this event

Course Title: Welcome to Pearson International GCSE Mathematics 4MA1 and 4MB1

Course Code: 4MA1-23IF2

Aims and Objectives of the event

Course description:

This face-to-face event is designed for teachers who are new to delivering the International GCSE Mathematics A and B specifications. This event will give you an understanding of the content of the qualification and how to cover it, an understanding of the mark schemes and practise applying them using exemplar student work, as well as access to the range of Pearson support available to teachers.

In this training, delegates will: -

- identify how the qualifications are devised
- review the content of the qualification
- explore how to plan the course and/or lessons
- understand the assessment of the qualification and how to prepare students
- identify the support available from Pearson
- network and share ideas with other teachers.

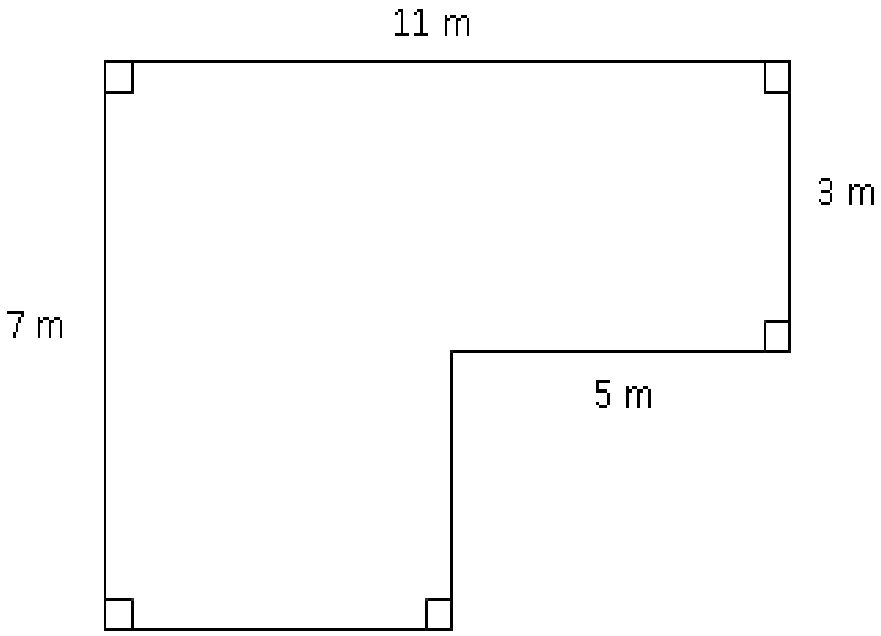
Agenda

Time	Item
9.30 – 10.00	Welcome Tea & Coffee
10.00	Agenda & Introductions
10.15 – 11.30	Session 1 Welcome to Pearson – getting ready for delivery
11.30	Break
11.45 – 12.45	Session 1 continued and begin Session 2 – How is the content assessed?
12.45 – 13.30	Lunch
13.15 – 14.30	Session 2 continued
14.30 – 15.45	Session 3 The support on offer from Pearson
15.45+	Feedback

Activity 1 - Lesson planning

- How do you plan your lessons in mathematics? Do you, for example, have a common lesson structure as a starting point?
- How do you ensure that you have covered the specification?
- What concerns do you have about planning this course?
- Are there ways you might need to adapt your method(s) of lesson planning to deliver this specification?

Activity 2 – A ‘real world’ problem solving question



The diagram shows the floor plan of a room in Kate’s house.
Kate is going to cover the floor with tiles. She is going to buy some packs of tiles.
The tiles in each pack of tiles cover 2 m² of floor and can be purchased in whole packs only. Each pack of tiles costs £24.80
Work out how much it will cost Kate to buy the packs of tiles she needs.

- What steps does a candidate need to take to solve this problem?
- How would you teach your students to tackle this type of question?

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Activity 3 – A ‘mathematical’ problem solving question

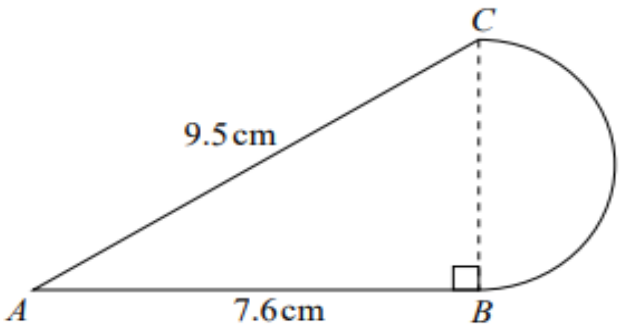

Diagram **NOT** accurately drawn

The diagram shows a shape made from triangle ABC and a semicircle with diameter BC.
Triangle ABC is right-angled at B.

$AB = 7.6$ cm and $AC = 9.5$ cm.

Calculate the area of the shape.
Give your answer correct to 3 significant figures.

- What makes this a problem solving question?

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Activity 4 – Using a mark scheme

26 (a) Use the factor theorem to show that $(2x + 3)$ is a factor of $2x^3 - 3x^2 - 17x - 12$

(b) Hence, factorise completely $2x^3 - 3x^2 - 17x - 12$

- Answer the above question and use the mark scheme to mark your own work.

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Mark scheme

Question	Working	Answer	Mark	AO	Sub-total	Total
25(a)	$90+28t-3t^2$ (2 terms correct)	(cao)	M1 A1	1.4 1.4	2	
25(b)	'$90+28t-3t^2$' = 0 (oe)		M1	1.4		
	$\frac{+28\pm\sqrt{(-28)^2-4\times(3)\times(-90)}}{2\times 3}$ (Solving 3 term quadratic)		M1 DEP	1.3		
	$\sqrt{1864}$, 43.17	awrt 11.9	B1 A1	1.3 1.4	4	**6**
26(a)	$2\times(-1.5)^3-3\times(-1.5)^2-17\times(-1.5)-12$ (substitute)		M1	1.3		
		= 0	A1		2	
26(b)	x^2-3x		M1			
		x^2-3x-4	A1			
	$(x-4)(x+1)$ (solving trinomial quadratic)		M1 INDEP			
		$(2x+3)(x-4)(x+1)$	A1		4	**6**

Activity 5 – The exam paper

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | Candidate Number

Tuesday 21 May 2019

Morning (Time: 2 hours) | Paper Reference **4MA1/1F**

Mathematics A
Level 1/2
Paper 1F
Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – there may be more space than you need.
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

- Discuss the detail on the front cover of the examination paper.
- How much time should be spent on each question?
- Is there any strategy you would use to advise your students on how to go through the paper?
- Start at the beginning?
- Read the whole paper first?
- Approach to 'difficult questions'?

Activity 6 – Marking exercise 1

Question 5 Paper 1F

5 There are 12 481 people at a concert.
8906 of these people are adults.
The rest of the people are children.

$\frac{3}{5}$ of the children are boys.

Work out the number of girls at the concert.

Mark scheme Question 5 Paper 1F

5		$\frac{3}{5}$ × (12481 – 8906) (=2145) **or** $1 - \frac{3}{5}(=\frac{2}{5})$ **and** 12481 – 8906 (=3575)		4	M2 If not M2 then award M1 for either 12481 – 8906 (=3575) **or** $1 - \frac{3}{5}(=\frac{2}{5})$
		3575 – "2145" **or** $\frac{2}{5}$ × "3575"			M1 dep
			1430		A1
					Total 4 marks

Response 1

5 There are 12 481 people at a concert.
8906 of these people are adults.
The rest of the people are children.

$\frac{3}{5}$ of the children are boys.

Work out the number of girls at the concert.

12481 people − 8906 = 3575 = children

$\frac{3}{5}$ of 3575 = 2145

12481 − 2145 = 10336 girls

10336

(Total for Question 5 is 4 marks)

Response 2

5 There are 12 481 people at a concert.
8906 of these people are adults.
The rest of the people are children.

$\frac{3}{5}$ of the children are boys.

Work out the number of girls at the concert.

3575

2145

(Total for Question 5 is 4 marks)

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Question 20 Paper 2H June 2019

20 The equation of the line **L** is $y = 9 - x$
The equation of the curve **C** is $x^2 - 3xy + 2y^2 = 0$

L and **C** intersect at two points.

Find the coordinates of these two points.
Show clear algebraic working.

Mark scheme Question 20 Paper 2H June 2019

20		$x^2 - 3x(9 - x) + 2(9 - x)^2$ (= 0)	$(9 - y)^2 - 3y(9 - y) + 2y^2$ (= 0)			M1 substitution of linear equation into quadratic
		e.g. $6x^2 - 63x + 162$ (= 0) **or** $2x^2 - 21x + 54$ (= 0) allow $2x^2 - 21x = -54$ oe	e.g. $6y^2 - 45y + 81$ (= 0) **or** $2y^2 - 15y + 27$ (= 0) allow $2y^2 - 15y = -27$ oe			A1 (dep on M1) writing the correct quadratic expression in form $ax^2 + bx + c$ (= 0) allow $ax^2 + bx = c$
		e.g. $(2x - 9)(x - 6)$ (= 0) $x = \frac{-(-21) \pm \sqrt{(-21)^2 - 4\times2\times54}}{2\times2}$ e.g. $2\left(\left(x - \frac{21}{4}\right)^2 - \left(\frac{21}{4}\right)^2\right) = -54$	e.g. $(2y - 9)(y - 3)$ (= 0) $y = \frac{-(-15) \pm \sqrt{(-15)^2 - 4\times2\times27}}{2\times2}$ e.g. $2\left(\left(x - \frac{15}{4}\right)^2 - \left(\frac{15}{4}\right)^2\right) = -27$			M1 (dep on M1) for a complete method to solve their 3-term quadratic equation (allow one sign error and some simplification – allow as far as $\frac{21 \pm \sqrt{441 - 432}}{4}$)
		$x = 4.5$ and $x = 6$	$y = 4.5$ and $y = 3$			A1 (dep on M1) both x-values **or** both y-values
				(4.5, 4.5) and (6, 3)	5	A1 (dep on M1) oe Must be paired correctly
						Total 5 marks

20 Alt		$(x - y)(x - 2y)$ (= 0)				M1 for a method to factorise **C**
		$(x - (9 - x))(x - 2(9 - x))$ (= 0)	$(9 - y - y)(9 - y - 2y)$ (= 0)			A1 (dep M1) substitution of **L** into their factorised **C**
		$(2x - 9)(3x - 18)$ (= 0) oe	$(9 - 2y)(9 - 3y)$ (= 0) oe			M1 (dep on M1)
		$x = 4.5$ and $x = 6$	$y = 4.5$ and $y = 3$			A1 (dep on M1) both x-values **or** both y-values
				(4.5, 4.5) and (6, 3)	5	A1 (dep on M1) oe Must be paired correctly
						Total 5 marks

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Response 1

20 The equation of the line **L** is $y = 9 - x$
The equation of the curve **C** is $x^2 - 3xy + 2y^2 = 0$

L and **C** intersect at two points.

Find the coordinates of these two points.
Show clear algebraic working.

$(9-x)(9-x)$

$81 - 9x - 9x + x$

$81 - 17x$

$y = 9 - x$

$x^2 - 3xy + 2y^2 = 0$

$x^2 - 3x(9-x) + 2(9-x)(9-x) = 0$

$x^2 - 27x + 3x^2 + 2(81 - 17x) = 0$

$x^2 - 27x + 3x^2 + 162 - 34x = 0$

$4x^2 - 61x + 162 = 0$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\frac{61 \pm \sqrt{61^2 - 4 \times 4 \times 162}}{2 \times 4}$

27 v6

2x 9

2x 18

36

54

9 - 11.8

= -2.8

$x_1 = 11.8$

$y_1 = -2.8$

$x_2 = 3.4$

$y_2 = 5.6$

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Response 2

20 The equation of the line **L** is $y = 9 - x$
The equation of the curve **C** is $x^2 - 3xy + 2y^2 = 0$

L and **C** intersect at two points.

Find the coordinates of these two points.
Show clear algebraic working.

$x^2 - 3x(9-x) + 2(9-x)(9-x) = 0$

$x^2 - 27x + 3x^2 + 2(81 - 9x - 9x + x^2) = 0$

$x^2 - 27x + 3x^2 + 162 - 36x + 2x^2 = 0$

$6x^2 - 63x + 162 = 0$

$6x^2 - 36x - 27x + 162 = 0$

$6x(x-6) - 27(x-6) = 0$

$(6x-27)(x-6) = 0$

$x = -4.5$ or 6

$9 - -4.5 = 13.5$

$(-4.5, 13.5)$

$9 - 6 = 3$

$(6, 3)$

Activity 7 - Marking task 2

Question 9 June 2019 4MB1 Paper 2

9

$$\mathbf{p} = \begin{pmatrix} 2x - 1 \\ y \end{pmatrix} \qquad \mathbf{q} = \begin{pmatrix} y + 3 \\ -y \end{pmatrix}$$

The vectors **p** and **q** are such that $|\mathbf{p}| = \sqrt{98}$ and $\mathbf{p} + \mathbf{q} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$

(a) Show that $x^2 - 3x - 9 = 0$

(5)

Given that $x > 0$

(b) (i) find the exact value of x,

(2)

(ii) show that $y = 2 - 3\sqrt{5}$

(2)

(c) Find the exact value of $|\mathbf{q}|^2$
Show your working clearly.

(3)

Mark Scheme – Marking task 2

Question		Working	Answer	Mark	Notes
9	(a)	$\sqrt{(2x-1)^2+y^2}=\sqrt{98}$		5	M1 Correct use of modulus to form any correct equation
		$(2x-1)+(y+3)=7$			M1 oe e.g. $2x+y=5$
		$(2x-1)^2+(5-2x)^2=98$ oe			M1 dep. on both previous M marks. Remove square-roots and substitute to gain an equation in terms of x only. May be seen in expanded form. Eg. $-4x^2+4x+97=25+4x^2-20x$ For this and next M mark allow a maximum of 1 sign or numerical error.
		$8x^2-24x-72=0$			M1 dep. previous mark. Expand and attempt to form 3 term quadratic For this and previous M mark allow a maximum of 1 sign or numerical error.
			$x^2-3x-9=0$		A1 As answer given sufficient working must be shown. No incorrect work can be seen.
	(b)(i)	$x=\frac{-(-3)\pm\sqrt{(-3)^2-4(1)(-9)}}{2(1)}$ or $\left(x-\frac{3}{2}\right)^2-\frac{9}{4}-9=0$		2	M1 Solving quadratic using formula or completing square
			$x=\frac{3+3\sqrt{5}}{2}$		A1 Accept other equivalent exact forms eg $\frac{3+\sqrt{45}}{2}$ Do not accept ± for the final answer, they must indicate positive solution. Do not isw answer given as a decimal.

	(b)(ii)	$y=5-2\left(\frac{3+3\sqrt{5}}{2}\right)$		2	M1 Substitute their x which must be an expression involving surds into linear equation to find y If using equation for y^2 must obtain $y^2=98-49-12\sqrt{5}$ or simpler to gain this mark.
			$y=2-3\sqrt{5}$		A1 As answer given sufficient working must be shown Allow $y^2=49-12\sqrt{5}$ from modulus equation and expansion of $(2-3\sqrt{5})^2=49-12\sqrt{5}$ along with an appropriate comment. Do not isw answer given as a decimal.
	(c)	$(\lvert\mathbf{q}\rvert^2=)$ $(2-3\sqrt{5}+3)^2+\left(-(2-3\sqrt{5})\right)^2$		3	M1 Attempt $\lvert\mathbf{q}\rvert^2=q_1^2+q_2^2$ - allow in terms of y or x Eg. $(y+3)^2+y^2$ or $(8-2x)^2+(5-2x)^2$ Allow an expression for $\lvert\mathbf{q}\rvert$
		$=25-30\sqrt{5}+45+45-12\sqrt{5}+4$			M1 dep expand brackets must involve surds. Allow square root of this.
			$119-42\sqrt{5}$ or $7(17-6\sqrt{5})$		A1 cao Do not isw answer given as a decimal.
					Total 12 marks

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Response 1

(c) Find the exact value of $|\mathbf{q}|^2$
Show your working clearly.

(3

b i)

$x^2 - 3x - 9 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{3 \pm \sqrt{(-3)^2 - 4 \times 1 \times -9}}{2 \times 1}$

$x = \frac{3 \pm \sqrt{45}}{2}$

$x = 4.85$ or -1.85

$= 4.9$

b ii)

$\begin{pmatrix} 2x-1 \\ y \end{pmatrix} + \begin{pmatrix} y+3 \\ -y \end{pmatrix} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$

$2x - 1 + y + 3 = 7$

$2x + y = 5$

$y = 5 - 2x$

$y + -y = 0$

$y - y = 0$

$0 = 0$

$= y =$

$(q)^2 = (2 - 3\sqrt{5})^2$

c) $q^2 = (2 - 3\sqrt{5})^2$

$q^2 = (2 - 3\sqrt{5})(2 + 3\sqrt{5})$

$2(2 - 3\sqrt{5}) - 3\sqrt{5}(2 - 3\sqrt{5})$

$4 - 6\sqrt{5} - 6\sqrt{5} + 45$

$= 49 - 12\sqrt{5}$

$q^2 = 49 - 12\sqrt{5}$

Response 2

a. $\begin{pmatrix} 2x-1 \\ y \end{pmatrix} + \begin{pmatrix} y+3 \\ -y \end{pmatrix} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$

$2x - 1 + y + 3 = 7$

$2x + y + 2 = 7$

$2x + y + 2 - 7 = 0$

$2x + y - 5 = 0$

$y = 5 - 2x$

$|p| = \sqrt{(2x-1)^2 + (y)^2}$

$\sqrt{98} = \sqrt{(2x-1)^2 + y^2}$

$\sqrt{98} = \sqrt{(2x-1)^2 + (5-2x)^2}$

$\sqrt{98} = \sqrt{4x^2 - 4x + 1 + 25 - 20x + 4x^2}$

$\sqrt{98} = \sqrt{8x^2 - 24x + 26}$

$8x^2 - 24x + 26 = (\sqrt{98})^2$

$8x^2 - 24x + 26 = 98$

$8x^2 - 24x + 26 - 98 = 0$

$8x^2 - 24x - 72 = 0$

$8(x^2 - 3x - 9) = 0$

$x^2 - 3x - 9 = 0$

b. (i) $x^2 - 3x - 9 = 0$

~~$(x-3)(x+3)$~~

~~$P = -9 \quad S = -3$~~

~~$-3 \times +3 \quad -3 + 3$~~

~~$x =$~~ $a = 1 \quad b = -3 \quad c = -9$

$$x = \frac{3 \sqrt{(-3)^2 - (4 \times 1 \times -9)}}{2 \times 1}$$

$$x = \frac{3 + \sqrt{45}}{2} \quad \text{or} \quad x = \frac{3 - \sqrt{45}}{2}$$

Ans: $x = \frac{3 + \sqrt{45}}{2}$

(ii) $y = 5 - 2x$

$$y = 5 - 2\left(\frac{3 + \sqrt{45}}{2}\right)$$

$y = 5 - 3 \mp \sqrt{45}$

$y = 2 \mp \sqrt{5 \times 3 \times 3}$

$y = 2 \mp 3\sqrt{5}$

c. $|q|^2 = (y+3)^2 + (y)^2$

$|q|^2 = y^2 + 6y + 9 + y^2$

$|q|^2 = 2y^2 + 6y + 9$

$|q|^2 = 2((2-3\sqrt{5})(2-3\sqrt{5})) + 6(2-3\sqrt{5}) + 9$

$|q|^2 = 2(4 - 6\sqrt{5} - 6\sqrt{5} + 45) + 12 - 18\sqrt{5} + 9$

$|q|^2 = 8 - 24\sqrt{5} + 90 + 12 - 18\sqrt{5} + 9$

$|q|^2 = 119 - 24\sqrt{5} - 18\sqrt{5}$

$|q|^2 = 119 - 42\sqrt{5}$

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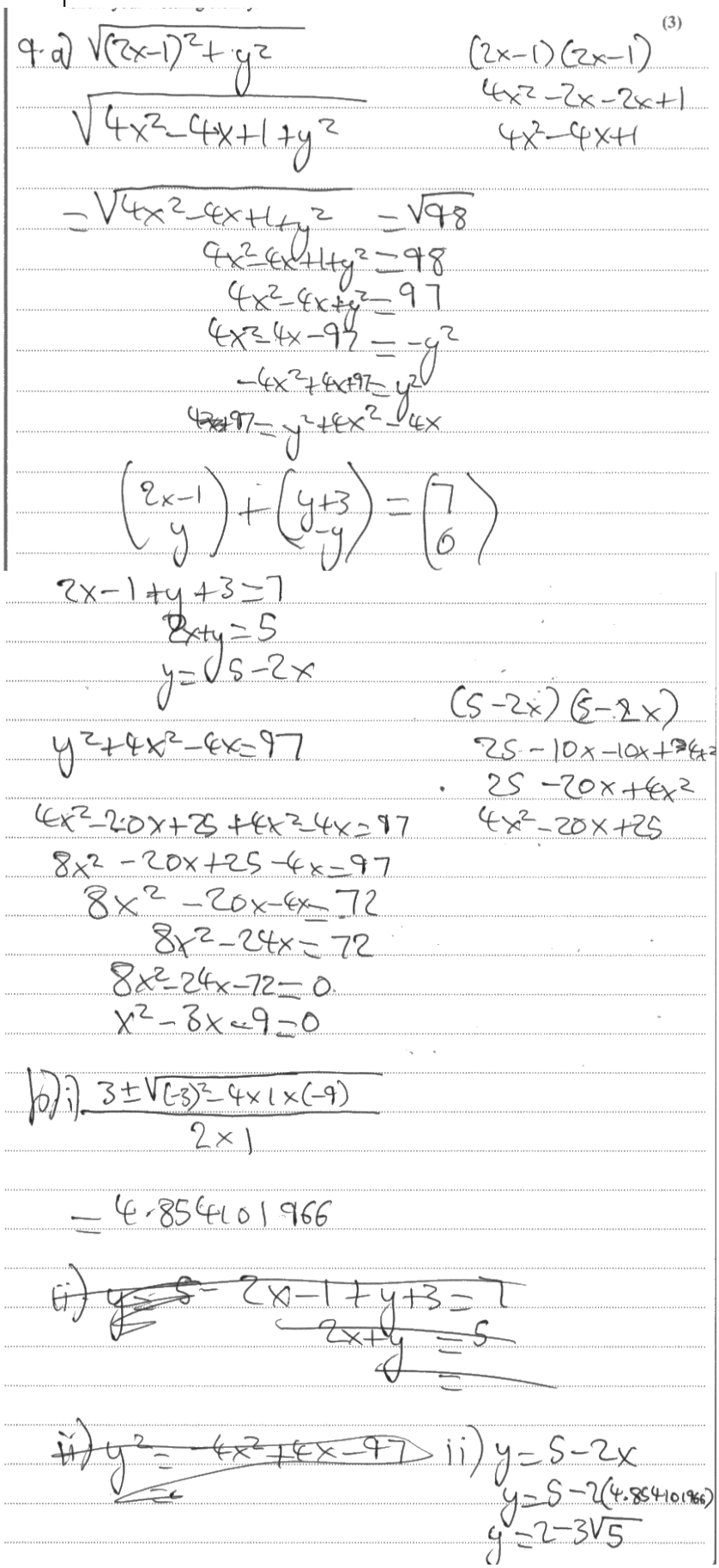
Response 3



c) $q = \begin{pmatrix} y+3 \\ -y \end{pmatrix}$

$= \begin{pmatrix} (2-3\sqrt{5})+3 \\ -(2-3\sqrt{5}) \end{pmatrix}$

$= \begin{pmatrix} 5-3\sqrt{5} \\ -2+3\sqrt{5} \end{pmatrix}$

$= \sqrt{(5-3\sqrt{5})^2 + (-2+3\sqrt{5})^2}$

$= (5.008507257)^2$

$= 25.08514495$

Activity 8 – How can I teach good exam technique?

- Ensuring that students practise using a whole paper and understand how it is laid out.
- Understand the importance of looking at the mark allocation.
- Read the whole question first, before any attempt is made to answer it.
- Always showing complete methods – an examiner can only assess what a student is thinking by seeing their written work in the examination paper.
- Encouraging students to write neatly and work in an orderly manner.
- Understanding that we always provide more than enough paper – you don't need to fill the whole booklet!

Discuss. Does anyone have any other tips?

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Activity 9 – Walking talking mocks

- Students sit in the same exam room where they will do their exam, preferably in the same seats.
- Students are given as exam paper which is as close to being like the real thing as possible (i.e. exam writing booklet if relevant)
- Students are literally walked through every question on the paper – the person leading the session talks them through the smallest steps, such as underlining key words, how to plan, things to remember.
- Students then write in their responses in timed conditions.

Discuss.

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PERSONAL LEARNING

Things to do:

Things to avoid:

Your ideas: