

Assessment for learning Using Moodle quizzes in mathematics

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HESTEM eAssessment Workshop, 22 February 2011

The Open University





- Europe's leading distance learning organisation
- Part-time students
 - High quality notes
 - (Local) tutors
- 250,000 active students
- 15,000 maths students

MU123:Discovering Mathematics

- 30 point introductory module
- Launched February 2010
- Two presentations a year
- \sim 1800 students per presentation



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Aims

- Increase retention over previous incarnation
- Better prepare students for subsequent modules



Print based





- Print based
- Study guided by VLE (Moodle) calendar





- Print based
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 - screen-casts

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 - quizzes (iCMAs)

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Quizzes

Practice Quizzes (PQ)

- Formative
- Immediate feedback
- Three tries per question
- Worked solutions
- Can repeat
- \approx 12 questions per unit

iCMAs

- Summative
- Delayed feedback
- Single attempt
- 6 questions per unit
- 12% of module grade
- Gradebook

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Unit 1	PQ 1	iCMA 41
Unit 2	PQ 2	
Unit 3	PQ 3	iCMA 42
Unit 4	PQ 4	
Unit 5	PQ 5	
Unit 6	PQ 6	iCMA 43
Unit 7	PQ 7	
Unit 8	PQ 8	
Unit 9	PQ 9	iCMA 44
Unit 10	PQ 10	
Unit 11	PQ 11	
Unit 12	PQ 12	iCMA 45
Unit 13	PQ 13	
Unit 14	PQ 14	
Are vou	ready for	MST121?

(Also 5 Tutor Marked Assignments.)

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Questions

- All questions randomised
 - Generated offline, uploaded as Moodle XML
 - Moodle selects random question from "bucket"
 - At least 5 versions of iCMA questions
 - Typically 10 versions of PQ questions
 - Approx 2400 question-variants
- Question types:
 - Numerical
 - Multiple choice (single correct option)
 - OU Multiple response (several correct options)
 - Matching (choose from drop-down menu)
 - Drag and drop
 - OpenMark
 - Short answer



Que	Questions 💡							
i	1	2	3	4	Mark			
5	6	7	8	9	/1			
10					3 trie allow			

End test...

. 🖻	Which one of the following points lies on the line $y = -4x - 3$?						
tarks: 0 -/1 tries llowed	Choose one answer.	○ (-2, 8)					
		○ (1/3, -5/3)					
		○ (3, -9)					
		○ (-1/2, -1)					
	Check						



Quest	ions _애	1 🖻	Which one of the following points lies on the line $y = -4x - 3$?						
i [1 2 3 4	Maulas Chance and O (-2 R)							
5	Questions 🌍	1 🖻	s on the line $y = -4x - 3$?						
11 Enc	i 1 2 3 5 6 7 8 10 End test	4 9		Choose one answer. See Unit 6, Su Try again	 (-2, 8) (1/3, -5/3) (3, -9) (-1/2, -1) ubsection 1.2. 	Your answer is incorrect.			



Ques	tions	0	1 🖻	Which on	Which one of the following points lies on the line $y = -4x - 3$?							
i	1	2 3 4	6.8	Choose or	Chance one O (-2 S)							
5	Que	stions 🌍	1 5	Whi	ch one of the fo	ollowing points lies or	n the line $y = -4x - 3?$					
11	i	1 2 3	4	Cho	ose one 🛛 💿 (-2,8)	Your answer is incorrect.					
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	Ŀ	i 1 2	3 4		Choose one	○ (-2,8)						
	E	567	89		answer.	(1/3, -5/3)	Your answer is incorrect.					
		10				○ (3, -9)						
		End test				○ (-1/2,-1)						
					Check to see if the coordinates of each point satisfy the equation of the line. See Unit 6, Subsection 1.2. Try again							



Ques	stions _?	1 💌 👌	Which one of the following points lies on the line $y = -4x - 3?$					
i	1 2 3 4	salution ('honce one 🛛 🔿	(-2.8)				
5	Questions 🌍	1 🖻	Which one of the following points lies on the line $y = -4x - 3$?					
10	i 1 2 3	4	Choose one		Your answer is incorrect.			
Enc	Questions @) 1	which	one of the following p	points lies on the line $y = -4x - 3?$			
	Questions 🌍	1 🖻	Which one of	the following points	lies on the line $y = -4x - 3$?			
	i 1 2 3	4 Marks:	Choose one	○ (-2, 8)				
	5 6 7 8 9		answer.	0 (1/3, -5/3)				
	10	Comple	ted	○ (3, −9)				
	End test			⊙ (−1/2,−1)	Your answer is correct.			
			A point lies o	A point lies on a line if its coordinates satisfy the equation.				
			To check if a the resulting different, the	To check if a point lies on a line, substitute its x-coordinate into the equation of the line. If the resulting value for y is the same as the y-coordinate, the point lies on the line. If it is different, the point does not lie on the line.				
			In this case, equation of t	the point which lines he line gives	on the line is $(-1/2, -1)$ since, substituting $-1/2$ for x in the			
			$y = -4 \times (-1/2)$	$y = -4 \times (-1/2) - 3$				
			=2-3					
			= -1					
			which is the :	same as the y-coordi	nate of the point.			
			See Unit 6, Subsection 1.2.					



Numeric (PQ6, Q2)



What is the gradient of the line joining the points $(-1, -3)$ and $(2, 4)$.						
Give your answer correct to 2 significant figures.						
2.333						
Your answer is incorrect. Remember to round your answer to 2 significant figures.						
The gradient of the line joining the points $(x_1,y_1) \text{ and } (x_2,y_2) \text{is } \frac{y_2-y_1}{x_2-x_1} \;.$						
See Unit 6, Subsections 2.1 and 2.2.						
Try again						

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Matching (PQ6, Q3)





OU Multiple response (PQ6, Q5)

Questions 🌍	5 🖻	Which \mathbf{two} of the following lines have an x-intercept of -5?						
i <u>1</u> 2 3 4	Marks:	Choose at least one answer.	✓ x=-5	Your answer is correct.				
5 6 7 8 9 10 End test	Completed		y = -5x y = 0.2x + 1					
			y = -5 y = -5x + 25					
		Your answer has one correct choice. The two lines with an x-intercept of -5 are:						
		 x = -5 This is a y = 0.2x - 	=-5 his is a vertical line that passes through the point (-5,0), so its x-intercept is -5. = 0.9x+1					
		The <i>x</i> -in	The x-intercept can be found by solving the equation $y = 0$.					
			For this option, when $y = 0$	0, 0.2x + 1 = 0.				
		Subtrac	ting 1 from both sides give:	5: 0.2x = -1				
		Multi	plying both sides by 5 gives	s: x=−5.				
		So this e	equation does indeed have	an x-intercept of —5.				
		See Unit 6, Su	bsection 3.3.					



OpenMark (PQ6, Q10)

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10 C Drag the two points at the end of the line segment below, so that the segment lies on the line

y = -2x + 3

You can manipulate the points with the mouse by dragging the circular markers. To manipulate the points with the keyboard, tab to each marker and then use the arrow keys.



Your answer is still incorrect.

You have been asked to draw a straight line with a gradient of -2 which crosses the y-axis at 3 but your line segment has a gradient of -0.36 and the line crosses the y-axis at 2.44.

See Unit 6, Subsection 1.1.

Try again



Drag and drop (PQ10, Q8)



Drag the options below into the spaces to complete the following which puts the quadratic expression $x^2 + 18x + 5$ in completed square form.



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Marks: --/1

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Grades (MU123 2010B)





Usage (MU123 2010B)



Practice Quiz repeats





Number of attempts at a PO





iCMA usage relative to cut-off





PQ usage relative to study unit



Times taken





Problems



"Give your answer as a number without units"

Problems



- "Give your answer as a number without units"
 - ▶ £26
 - 12 children had different favourite treats
 - ► -1.25

Problems



- "Give your answer as a number without units"
 £26
 - 12 children had different favourite treats
 - ► -1.25
- Missing (Unicode) characters
- Students not "Finalising" attempts
- Offender learners

End of Module Survey: 2010B



• The computer-based individual learning activities for this course supported my learning.

92.2% agree, 0.5% disagree

• Overall, I am satisfied with my study experience.

99.0% agree, 0.5% disagree

Student Quotes



- The practice quizzes are a great way to build up knowledge.
- It's a great way to consolidate.
- I already submitted my iCMA 41,I found that the practice quiz helped a lot.
- I like the practice quizzes, you can do lots of them until (hopefully) the lights come on.
- When I've finished a Unit I do the Practice Quiz over and over again until I get a really high score.

Student Quotes



- The practise quizzes are great just wish I could do them when I'm sat under a tree in the forest waiting for my little girl to finish school.
- I don't enjoy the icma's at all and always do much better on the tma's. ... I just think that they account for such a small percentage of your final mark that they really aren't worth worrying about



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