

Delta 3

Unit 10 Review (Non-Calculator)

Mathematical Reasoning

How well did you do:

Mathematical Reasoning	Score = $\frac{\quad}{50}$	
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<i>Topics/skills which need to be revisited:</i>	<i>Questions from the review</i>	<i>Further practice from Delta 3</i>
• Recognise if a mathematical statement is true or false • Explain /show why a mathematical solution is true • Explain /show why a mathematical solution is always true	• 1a,b • 2 • 3a,b	• P235 Q2 P239 Q1 • P235 Q3, P240 Q13,15 • P236 Q5, P241 Q18,20
• Use a mathematical proof • Identify if a mathematical statement is always, sometimes or never true • Understand and use a mathematical proof	• 4 • 5 • 6	• P237 Q1,2 • P235 Q4,5 • P238 Q6, P240 Q7
• Present a logical argument using algebra	• 7,8	• P239 Q6,9,10,11

1 State whether the following expressions are true or false. Give a reason to support your decision.

a If $a > b$, then $-a > -b$

.....

b A rhombus has exactly 1 line of symmetry.

.....

(2 marks)

2 Explain why every term in the sequence with the n th term $2n + 10$ is even.

.....
.....
.....

(2 marks)

3 a Is $5x$ always a multiple of 5? Explain your reasoning.

.....
.....
.....

b Is $5x$ always a multiple of 10? Explain your reasoning.

.....
.....
.....

(2 marks)

- 4 a** Work through this number puzzle using two numbers as examples.
Show your working in the 'Example' columns.

	Example 1	Example 2	Algebra
Think of a number			n
Multiply it by 2			
Add 9			
Add your original number			
Divide by 3			
Add 4			
Subtract your original number			
What is your result?			

- b** In the third column, use algebra to prove that the result must always be true.

(4 marks)

- 5** Are the equations below ALWAYS TRUE, NEVER TRUE or SOMETIMES TRUE. Give reasons for your answers.

a $5x = 5(x - 1) + 4$

.....

b $(x + 2)^2 = x^2 + 4x + 4$

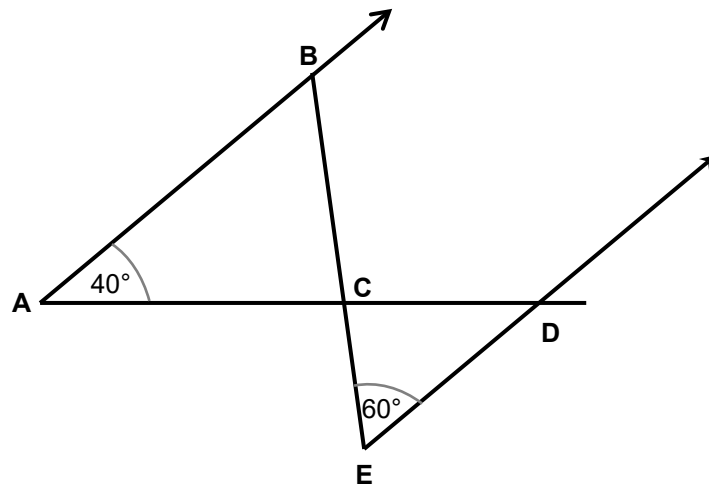
.....

c $6x = 5x + 1$

.....

(6 marks)

- 6 In the diagram, AB is parallel to ED; angle BAC = 40° and angle CED = 60°



Prove that the triangles ABC and CDE are mathematically similar.

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.....

.....

.....

.....

(4 marks)

7 $2k + 1$ is always an odd number for any integer value of k .

a Write down an expression for a consecutive odd number to $2k + 1$

.....

b Prove that the **sum** of these two consecutive odd numbers is always a multiple of 4.

.....

.....

c Prove that their **product** is always 1 less than a multiple of 4.

.....

.....

(6 marks)

8 Prove that

$(2n + 3)^2 - (2n - 3)^2$ is a multiple of 8

for all positive integer values of n .

.....

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(4 marks)

END of TEST