



# higher education & training

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

## **GENERAL EDUCATION AND TRAINING CERTIFICATE**

### **NQF LEVEL 1**

### **AET LEVEL 4 SITE-BASED ASSESSMENT**

**LEARNING AREA : MATHEMATICS AND  
MATHEMATICAL SCIENCES**

**CODE : MMSC4**

**TASK : INVESTIGATION**

**TIME : 3 HOURS**

**MARKS : 50**

**This assessment task consists of 5 pages.**

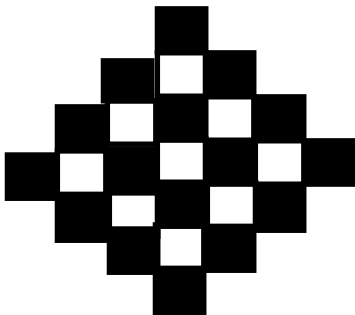
## INSTRUCTIONS AND INFORMATION

1. This investigation should be done in pairs. Each member should however write his/her own work and submit.
2. ACTIVITY 1 will be marked using a rubric and ACTIVITY 2 will be marked using a memorandum.
3. For preparation, you need to have the following: a ruler, pencil and a calculator.

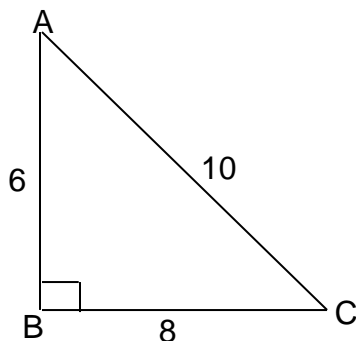
### Activity 1

It is not easy to guess the relationship between the sides of a right-angled triangle. However, many historians think that the ancient Egyptians used a triangle with sides in a ratio 3 : 4 : 5. They used triangles with this ratio to get angles of  $90^\circ$  when they built the pyramids in about 3 000–2 900 BCE. Pythagoras was the first person to write a formal proof of the theorem. In Activity 1 will investigate what this mathematician discovered.

Look at toothed square alongside. In total 9 white squares and 16 black squares make up the area of toothed squares. In other words  $(3)^2 + (4)^2 = (5)^2$



1.1 Given below is  $\triangle ABC$ :



1.1.1 Determine the values of the following:

$$(AC)^2 =$$

$$(AB)^2 =$$

$$(BC)^2 =$$

1.1.2 Calculate the following:

$$(AB)^2 + (AC)^2 =$$

$$(AB)^2 + (BC)^2 =$$

$$(BC)^2 + (AC)^2 =$$

1.1.3 Substitute the following equations using the values you got in QUESTION 1.1.1 and 1.1.2 and state whether the statements are TRUE or FALSE by checking if the left side of an equation is equal to the right side of an equation.

$$1^{\text{st}}: (AB)^2 + (AC)^2 = (BC)^2$$

$$2^{\text{nd}}: (AB)^2 + (BC)^2 = (AC)^2$$

$$3^{\text{rd}}: (BC)^2 + (AC)^2 = (AB)^2$$

1.1.4 Draw a right angled triangle with the dimensions 5 cm, 12 cm and 13 cm using a ruler where 1 unit will be 1 *cm*.

Square the dimensions. Compare the longest dimension squared and the sum of the other two dimensions.

1.1.5 Based on your findings in QUESTION 1.1.1–1.1.4 what can you conclude regarding the sides of the triangle if they are squared?

1.1.6 Draw any triangle but NOT a right angled triangle with different dimensions like 9 cm, 10 cm and 13 cm or any other dimensions of your choice using a ruler. Square the dimensions and compare their squares.

1.1.7 Based on your conclusion in QUESTION 1.1.5 does the conclusion hold for any triangle? State the theorem of Pythagoras in words.

[35]

Name of Learner: \_\_\_\_\_

Name of Centre: \_\_\_\_\_

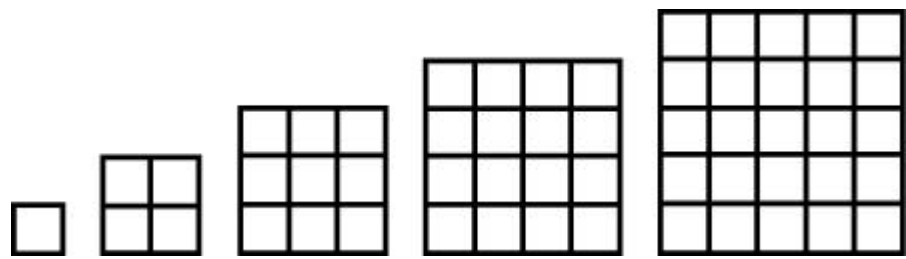
Marking rubric for **ACTIVITY 1.1.1–1.1.7**

CRITERIA	LEVEL				MARKS
	MARKS 0	MARKS 1–2	MARKS 3–4	MARKS 5	
Correctness of calculations in QUESTION 1.1.1–1.1.3	NO calculations made for QUESTION 1.1.1–1.1.3	Made major mistakes in calculations	Made minor mistakes in calculations	Made NO errors accurately and completely	× 2
Question 1.1.4: Drawing a <b>right angled tri-angle</b> with a dimension of 5:12:13	Make no attempt to draw a right-angled triangle	Drawing a right angled triangle with wrong dimensions	Draw a right angled triangle with minor wrong dimensions	Accurate drawing and exactly the same dimension	× 1
Question 1.1.4: Showing calculations following procedure from QUESTION 1.1.1–1.1.3 Using the values 5:12:13	NO calculations are made	Made errors in calculation (not squaring the values)	Made minor (squaring the values but not getting accurate answers) mistakes in calculations	Calculations are clearly and completed	× 1
Question 1.1.6: Drawing <b>any triangle</b> with the dimensions 9 : 10 : 13	Made no attempt to draw a triangle	Drawing a triangle with wrong dimensions	Draw a triangle accurately with minor wrong dimension (other dimensions right and others wrong)	Accurate drawing and exactly the same dimension	× 1
Question 1.1.6: Showing calculations following procedure from QUESTION 1.1.1–1.1.3 using the values 9 : 10 : 13	NO calculations are made	Made errors in calculation (not squaring the values)	Made minor (squaring the values but not getting accurate answers) mistakes in calculations	calculations are clearly and completed	× 1
Question 1.1.7: Identification/understanding of a theorem, and mathematical reasoning in conclusion	NO theorem and no logical reasoning	Identifying the theorem but did not reason	Identifying and describing theorem and able to reach a consistent conclusion	Identifying and describing the theorem correctly and offer and proper logical reasoning	× 1

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ACTIVITY 2

2.1 The side length of each small square is 1 cm across the sequence of squares. Study the sequence of squares below and answer the questions.



2.1.1 Complete the table: by filling in the second row and the third row. (5)

Side length of square (cm)	1	2	3	4	5	6
Number of small squares	1					
Perimeter of large square (cm)	4					

2.1.2 Describe, in words the relationship between the length of a side of a square and the number of small squares used to form the squares. (2)

2.1.3 Let the length of a side of a small square be  $n$  units.

- (a) Determine a general rule to calculate the number of small squares in any other bigger square.
- (b) Determine a general rule to calculate the perimeter of any bigger square.

(2 x 1) (2)

2.1.4 How many small squares are needed to make a square with side length of 50? (2)

2.1.5 Determine the perimeter of a larger square with side length of 90 cm. (2)

2.1.6 How many small squares are needed to make up a large square with a perimeter of 600 cm? (2)

(2)  
[15]

[50]