

UNIVERSITY OF SWAZILAND**FACULTY OF EDUCATION****SUPPLEMENTARY EXAMINATION PAPER 2011**

TITLE OF PAPER: CURRICULUM STUDIES IN MATHEMATICS

COURSE CODE: EDC 281

PROGRAMME: B.ED 2 & PGCE

TIME ALLOWED: THREE (3) HOURS

TOTAL MARKS: 100

INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS. EACH QUESTION IS WORTH 25 MARKS.

This paper contains 4 pages including this one

Question 1

- (a) State **five** of the criteria for scoring a C grade in SGCSE mathematics [5]
- (b) Choose **one** learning method from the learning methods studied in this course and explain why you would support its use in the teaching and learning of school mathematics [15].
- (c) State **five** reasons for scheming [5]

Question 2

- (a) How does a problem differ from an exercise? [2]
- (b) Critically analyze a learner's solution to the mathematics problem at the beginning of appendix 1 [8]
- (c) Write in detail on any **one** learning theory (studied in this course) that supports problem solving or investigations [15]

Question 3

Create a learning task on the topic "Rotations" for senior secondary learners [10],
Identifying the following for the task:

- i) Material(s) needed to do the task [2].
- ii) Prerequisite knowledge [5].
- iii) The expected learning outcomes at the end of the task [8].

Question 4

For mathematics to be meaningful to learners it should be taught in contexts that are realistic to them. Using the syllabus subtopics 'surface area' explain how it could be treated using realistic contexts [25].

Question 5

Appendix 1

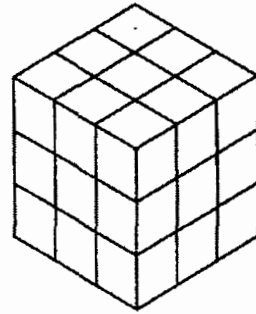
Write an essay on the importance of motivation in school mathematics. [25]

9 Painting cubes

The large cube on the right consists of 27 unit cubes.

All six faces of the large cube are painted green.

- How many unit cubes have 3 green faces?
- How many unit cubes have 2 green faces?
- How many unit cubes have 1 green face?
- How many unit cubes have 0 green faces?



Answer the four questions for the cube which is $n \times n \times n$.

Solution

How many unit cubes have 3 green faces?
- The corner cubes have 3 green faces.
 \therefore 8 unit cubes have 3 green faces

How many unit cubes have 2 green faces?
- The cubes with 2 green faces are in the centre layers at the edges. Each layer has 4 and there are 3 layers \therefore 12 unit cubes have 2 green faces

How many unit cubes have 1 green face?
- The one at the centre of each face has 1 green face, \therefore there are only 6 unit cubes with 1 green face

How many unit cubes have 0 green faces?
 - only one cube has 0 green faces, that
 is the cube at the centre of the middle
 layer.

Size of big cube	3 green faces	2 green faces	1 green face	0 green faces
$3 \times 3 \times 3$	8	12	6	1
$4 \times 4 \times 4$	8	$4 \times 2 \times 3$	$4 \times 6 = 24$	$4 \times 2 = 8$
⋮				
$n \times n \times n$	8	$4(n-2) \times 3$	$(n-2)^2 \times 6$	$(n-2)^2 \times (n-2)$

$n-2$ is the number of middle layers
 $(n-2)^2$ is the number of middle cubes on each layer
 To work out the problem I drew rough sketches
 of $4 \times 4 \times 4$ & $5 \times 5 \times 5$ big cubes