Province of the
EASTERN CAPE
EDUCATION

MATHEMATICS PROGRAMME FOR GRADE 12 LEARNERS FROM 4 – 22 MAY 2020

TOPIC: DIFFERENTIAL CALCULUS
MARKS IN EXAMINATION PAPER: 35 +/- 3 MARKS IN PAPER 1
MAIN RESOURCE(S) SUGGESTED: MIND THE GAP STUDY GUIDE AND EC BOOKLETS/ 'YES I CAN' GUIDES
ADDITIONAL RESOURCES: ANY APPROVED TEXTBOOK AND/ OR STUDY GUIDE

MEDIA:

- SELECTED EC COMMUNITY RADIO STATIONS AT 18H00 FROM 30 MARCH.
- UMHLOBO WENENE FM AT 10H30 ON 20 AND 27 MAY 2020.
- VLC EC VIRTUAL LESSONS.
- SABC TV, OVHD AND DSTV CHANNEL 319.
- ECDOE WEBSITE.
- DBE WEBSITE.

USE OF MIND THE GAP STUDY GUIDE AND EC BOOKLETS/ 'YES I CAN' GUIDES

WEEK 1: 4 – 8 MAY 2020

USE MIND THE GAP (PAGE 123 TO 144) AS FOLLOWS:

- Read and follow the explanation about the topic/ concept.
- Follow and practice Examples indicated 'E.G'.
- Then do Activities without looking at the solutions first.
- Then check your solutions against solutions provided.
- Then do corrections.
- Double or triple check if you are able to do Activities on your own without looking at the solutions until you master the concept(s).

DATE	EXAMPLES	ACTIVITY	PAGE(S)
4/05	Read 7.1 on page 123	1	123
5/05	1 and 2 on page 125 and 127	2	127
6/05	3, 4 & 5 on page 128	3	129
7/05	6	4	130
8/05	Revise FIRST PRINCIPLES and Using Rules of Differentiation	Use 'YES I CAN' BOOKLET OR Previous Question Paper.	

WEEK 2: 11 – 15 MAY 2020

- Read and follow the explanation about the topic/concept.
- Follow and practice Examples indicated 'E.G'.
- Then do Activities without looking at the solutions first.
- Then check your solutions against solutions provided.
- Then do corrections if you did not get the correct answers.
- Double or triple check if you are able to do Activities on your own without looking at the solutions until you master the concept(s).

DATE	EXAMPLES	ACTIVITY	PAGE(S)
11/05	7	Follow E.G 8 and do it on your own as an activity	132 – 134
12/05	9	Follow E.G 10 and do it on your own as an activity	135 – 137
13/05	Revise Previous examples	5 number 1	137
14/05	Revise Previous examples	5 number 2	132 – 138
15/05	Revise Sketching Cubic Functions and Using Rules of Differentiation	Use 'YES I CAN' BOOKLET OR Previous Question Paper.	

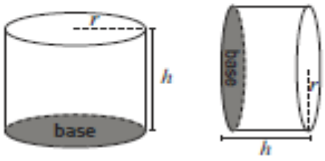
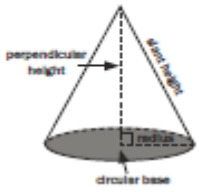
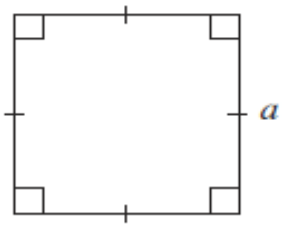
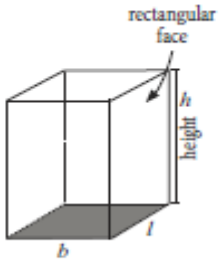
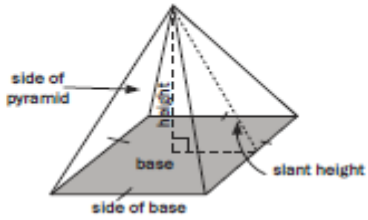
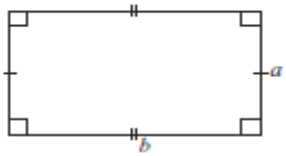
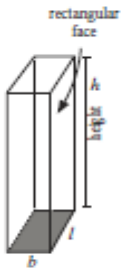
WEEK 3: 18 – 22 MAY 2020

DATE	EXAMPLES	ACTIVITY	PAGE(S)
18/05	Read and follow 'Finding the Maxima and Minima' on page 139 – 141	6 number 1	141
19/05		6 number 2	142
20/05		6 number 3	142
21/05		Revise formulate and Maxima and Minima. See Annexure A on page 3 – 4 of this document	139 – 142
22/05	Write a test	Use 2017 Supp. QP attached as Annexure B on page 5 of this document.	

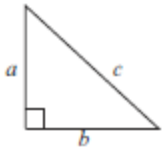
REMEMBER, PRACTICE MAKES PERFECT!

SO, PRACTICE, PRACTICE AND PRACTICE!

ANNEXURE A

2-D shapes	3-D shapes Right prisms	3-D shapes Where the base is a polygon and the sides meet at one point, the apex.
Area **&** **Perimeter** (The distance around the outside)	**V =Area of base × ⊥ height** **&** **Surface area = the sum of the areas of the flat shapes**	$V = \frac{1}{3}$ *Area of base* × ⊥ *Height* $= \frac{1}{3} A \times H$ *Where H is the perpendicular height* *&* *Surface area = Area of base* $+ \frac{1}{2} ph$ *where p is the perimeter of the base and h the slant height*
1. Circle  $A = \pi r^2$ *Circumference* $= 2\pi r$ *Circumference* $= 2\pi r$	**1. Right cylinders**  $V = \pi r^2 \times h$ *Surface area* $= 2\pi r^2 + 2\pi rh$	**1.Cones**  $V = \frac{1}{3} \pi r^2 \times H$ *Surface area* $= \pi r^2 + \frac{1}{2}(2\pi r \times h)$ $= \pi r^2 + \pi rh$
2. Square  *A* = length × length = a^2 Perimeter = $4a$	**2. Square prism**  Note: $l = b = h = a$ $V = a \times a \times a = a^3$ Surface area = $6a^2$	**2. Square base pyramid**  $V = \frac{1}{3} a^2 \times H$ Surface area = area of square + 4 × area of triangle $= a^2 + 4\left(\frac{1}{2} \cdot a \cdot h\right)$ $= a^2 + 2ah$
3. Rectangle  Area: A = length × breadth $= ab$ Perimeter = $2a + 2b$	**3. Rectangular prism**  $V = l \times b \times h$ Surface area = $2lb+2lh+2bh$	The **slant height** runs from the middle of the edge of the base to the apex. We calculate the slant heights using the perpendicular height and the dimensions of the base by using the Theorem of Pythagoras.

4a. Right-angled triangle



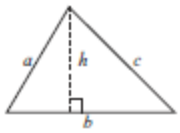
Area:

$A = \frac{1}{2} \times \text{base} \times \text{height}$

$= \frac{1}{2} \times b \times a$

Perimeter = $a + b + c$

4b. Triangle



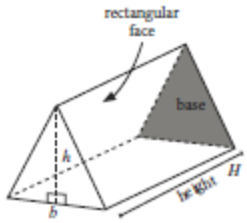
Area:

$V = \frac{1}{2} \times \text{base} \times \perp \text{height}$

$= \frac{1}{2} \times b \times h$

Perimeter = $a + b + c$

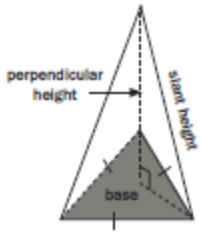
4. Triangular prism



$V = \left(\frac{1}{2} \times b \times h\right) \times H$

Surface area of triangular prism
= 2 × area of triangle
+ (sum of areas of 3 rectangles)

4. Triangular base pyramid

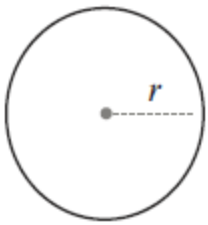


$V = \frac{1}{3}$ area of base triangular × H

Surface area = area of base triangular
+ (sum of areas of 3 triangles)

2-D shapes

1. Circle

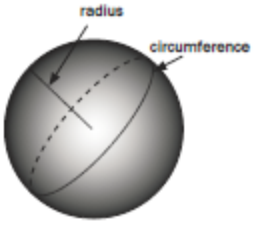


$A = \pi r^2$

Circumference = $2\pi r$

3-D shapes

1. Spheres



$V = \frac{4}{3}\pi r^3$

Surface area = $4\pi r^2$

CONVERSIONS

1 millilitre = 1cm^3

1 m^3 = 1000 litres

ANNEXURE B

2017 SUPP MATH P1 NSC

QUESTION 7

7.1 Determine $f'(x)$ from first principles if $f(x) = x^2 - 5$. (5)

7.2 Determine the derivative of: $g(x) = 5x^2 - \frac{2x}{x^3}$ (3)

7.3 Given: $h(x) = ax^2$, $x > 0$.
Determine the value of a if it is given that $h^{-1}(8) = h'(4)$. (6)
[14]

QUESTION 8

Given: $f(x) = 2x^3 - 5x^2 + 4x$

8.1 Calculate the coordinates of the turning points of the graph of f. (5)

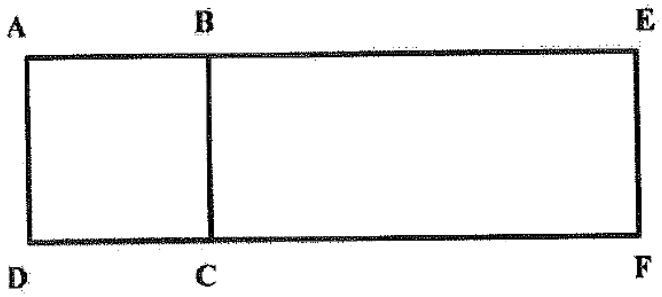
8.2 Prove that the equation $2x^3 - 5x^2 + 4x = 0$ has only one real root. (3)

8.3 Sketch the graph of f, clearly indicating the intercepts with the axes and the turning points. (3)

8.4 For which values of x will the graph of f be concave up? (3)
[14]

QUESTION 9

A piece of wire 6 metres long is cut into two pieces. One piece, x metres long, is bent to form a square ABCD. The other piece is bent into a U-shape so that it forms a rectangle BEFC when placed next to the square, as shown in the diagram below.



Calculate the value of x for which the sum of the areas enclosed by the wire will be a maximum. **[7]**