

## GRADE 11 MATHEMATICS

### NOVEMBER EXAMINATION PAPER 2

#### QUESTION 1

1.1 Calculate the following with the use of a calculator:

1.1.1  $\sin 43^\circ + \cos 47^\circ$  (1)

1.1.2  $\tan^2 50^\circ$  (1)

1.1.3  $\cos 30^\circ \times \csc 15^\circ$  (1)

1.2 If  $A = 24.3^\circ$  and  $B = 22.2^\circ$ , calculate the following to two decimal places:

1.2.1  $\sin(A + B)$  (2)

1.2.2  $\sin\left(\frac{A}{2}\right)$  (2)

1.3 Calculate the following without the use of a calculator:

1.3.1  $\sin 30^\circ + \cos 60^\circ$  (2)

1.3.2  $\tan 45^\circ + \cos 45^\circ$  (2)

1.3.3  $\cos 90^\circ + \sin 90^\circ$  (2)

#### QUESTION 2

Without the use of a calculator, answer the following questions:

2.1 Given  $\cos \theta = -\frac{1}{2}$  and  $180^\circ \leq \theta \leq 180^\circ$

Use a diagram to determine the values of:

2.1.1  $\tan(180^\circ + \theta)$  (2)

2.1.2  $\sin(\theta - 90^\circ)$  (2)

2.2 Simplify the following expression  $\frac{\sin(-180^\circ)}{\cos(360^\circ)} + \frac{\cos(0^\circ)}{\sin(360^\circ)}$  (2)

2.3 Prove that  $\tan^2 \theta - 1 = \frac{1}{\cos^2 \theta} - 1 = \frac{1}{1 + \tan^2 \theta}$  (4)

2.4 Determine the general solution for:  $\tan^2 \theta + 1 = \sin \theta$  (6)

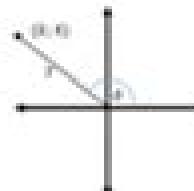
#### QUESTION 3

3.1 Sketch on the same set of axes the graphs for:

$f(x) = -2\cos x$  and  $g(x) = \sin 2x$ , for the interval  $-180^\circ \leq x \leq 180^\circ$ .

Show the coordinates of the turning points and all axis intercepts.

3.2 Study the following sketch and determine the value of  $\cot \theta - \cot \alpha$ , without the use of a calculator.



(2)

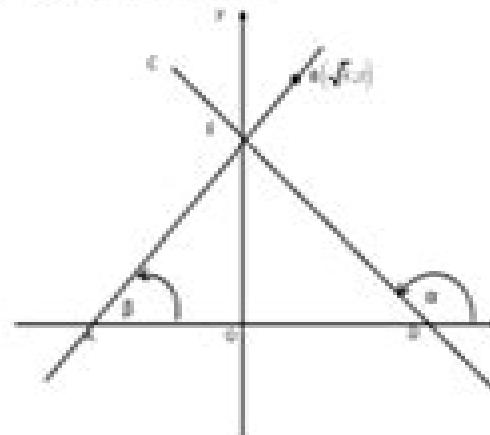
(2)  
[14]

#### QUESTION 4

In the diagram below, the angle between line AB and the x-axis is  $\beta$ . The angle between line CD and the x-axis is  $\beta$ . A and C are the x-axis intercept points for lines AB and CD respectively. The coordinates of point B are  $(\sqrt{3}, 1)$ .

The intercept point E of lines AB and CD lies on the y-axis.  $\angle C = 60.69^\circ$

The equation of the line CD is given as:  $3x + 2y = 6$



(2)

(2)

(2)

4.1 Determine the coordinates of E.

4.2 Calculate the numerical value of  $\alpha$ .

4.3 Calculate the numerical value of  $\beta$ .

(2)

# Question Paper 2 Mathematics Grade 11 Nov December

**A Loxley**

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1. Understanding the eBook Question Paper 2 Mathematics Grade 11 Nov December
  - The Rise of Digital Reading Question Paper 2 Mathematics Grade 11 Nov December
  - Advantages of eBooks Over Traditional Books
2. Identifying Question Paper 2 Mathematics Grade 11 Nov December
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Question Paper 2 Mathematics Grade 11 Nov December
  - User-Friendly Interface
4. Exploring eBook Recommendations from Question Paper 2 Mathematics Grade 11 Nov December
  - Personalized Recommendations
  - Question Paper 2 Mathematics Grade 11 Nov December User Reviews and Ratings
  - Question Paper 2 Mathematics Grade 11 Nov December and Bestseller Lists
5. Accessing Question Paper 2 Mathematics Grade 11 Nov December Free and Paid eBooks
  - Question Paper 2 Mathematics Grade 11 Nov December Public Domain eBooks
  - Question Paper 2 Mathematics Grade 11 Nov December eBook Subscription Services
  - Question Paper 2 Mathematics Grade 11 Nov December Budget-Friendly Options
6. Navigating Question Paper 2 Mathematics Grade 11 Nov December eBook Formats
  - ePUB, PDF, MOBI, and More
  - Question Paper 2 Mathematics Grade 11 Nov December Compatibility with Devices
  - Question Paper 2 Mathematics Grade 11 Nov December Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Question Paper 2 Mathematics Grade 11 Nov December
  - Highlighting and Note-Taking Question Paper 2 Mathematics Grade 11 Nov December
  - Interactive Elements Question Paper 2 Mathematics Grade 11 Nov December

8. Staying Engaged with Question Paper 2 Mathematics Grade 11 Nov December
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Question Paper 2 Mathematics Grade 11 Nov December
9. Balancing eBooks and Physical Books Question Paper 2 Mathematics Grade 11 Nov December
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Question Paper 2 Mathematics Grade 11 Nov December
10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
11. Cultivating a Reading Routine Question Paper 2 Mathematics Grade 11 Nov December
  - Setting Reading Goals Question Paper 2 Mathematics Grade 11 Nov December
  - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Question Paper 2 Mathematics Grade 11 Nov December
  - Fact-Checking eBook Content of Question Paper 2 Mathematics Grade 11 Nov December
  - Distinguishing Credible Sources
13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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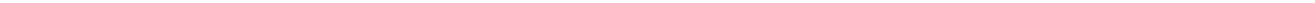
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an object to perform optimization is created by calling solverfactory with an argument giving the name of the solver the argument would be gurobi if e g gurobi was desired instead of glpk create a solver opt pyo solverfactory glpk the next lines after a comment create a model

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