

GRADE 12 MATHEMATICS
NOVEMBER EXAMINATION PAPER 1

QUESTION 1

1.1 Solve for x

1.1.1 $x^2 - 9x + 20 = 0$ (3)

1.1.2 $x(x + 3) - 1 = 0$ (correct to 2 decimal points) (3)

1.1.3 $x^2 + 7x < 0$ (3)

1.1.4 $2x^{\frac{2}{3}} = 64$ (4)

1.2 Solve simultaneously for x and y if:

$2x - y = 8$, and
 $x^2 - xy + y^2 = 19$ (7)

1.3 Solve the expression below without the use of a calculator:

$$\frac{\sqrt[3]{4} + \sqrt[3]{16}}{\sqrt[3]{16}}$$

(4)

QUESTION 2

2.1 The terms p , $(2p + 2)$, $(5p + 3)$ form an arithmetic sequence.

Determine:

2.1.1 The value of p . (4)

2.1.2 The rule in the form of $a_n = a + (n - 1)d$. (2)

2.1.3 The 15th term of the sequence. (4)

2.2 x , y , 81 is a geometric sequence.
And $y = 2x - 5$
All terms in the sequences are integers.
Calculate the values of x and y . (10)

[24]

QUESTION 3

Given the sequence 2, 8, 10, 14,

3.1 What type of sequence is this? Justify your answer by calculation. (2)

3.2 Calculate T_{10} . (3)

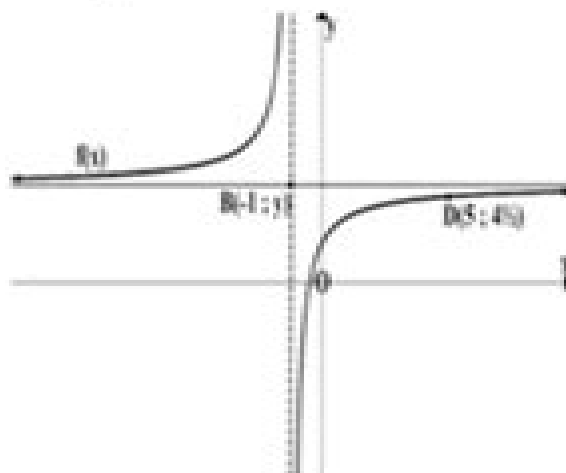
3.3 Which term has a value of 322? (3)

3.4 Determine by calculation if 1204 is a term in the sequence? (4)

[12]

QUESTION 4

The sketch below shows the graph of $f(x) = \frac{-1}{x+5} + q$. The asymptotes of f intersects at $B(-1; y)$. The Point $D(5; 4)$ is a point on the graph.



4.1 Determine the value of p . (1)

4.2 Prove that $q = 5$. (2)

4.3 Calculate the x -intercept of f . (2)

4.4 Determine the equation of the vertical asymptote of h if $h(x) = f(x + 4)$. (2)

4.5 One of the symmetry axes of f is an increasing function. Determine the equation of the symmetry axis. (3)

4.6 Give the values x for $f(x) \geq x + 6$. (2)

4.7 Determine the equation of g , the reflection of f in the x -axis and move two units to the right. (3)

[15]

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M Walker



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Disorder and the Disinformation Society Jonathan Paul Marshall, James Goodman, Didar Zowghi, Francesca da Rimini, 2015-04-17 This book is the first general social analysis that seriously considers the daily experience of information disruption and software failure within contemporary Western society Through an investigation of informationalism defined as a contemporary form of capitalism it describes the social processes producing informational disorder While most social theory sees disorder as secondary pathological or uninteresting this book takes disordering processes as central to social life The book engages with theories of information society which privilege information order offering a strong counterpoint centred on disinformation Disorder and the Disinformation Society offers a practical agenda arguing that difficulties in producing software are both inherent to the process of developing software and in the social dynamics of informationalism It outlines the dynamics of software failure as they impinge on of information workers and on daily life explores why computerized finance has become inherently self disruptive asks how digital enclosure and intellectual property create conflicts over cultural creativity and disrupt informational accuracy and scholarship and reveals how social media can extend but also distort the development of social movements

Mathematics And Its Teaching In The Southern Americas: With An Introduction By Ubiratan D'ambrosio Hector Rosario, Bruce R Vogeli, Patrick Scott, 2014-09-26 This anthology presents a comprehensive review of mathematics and its teaching in the following nations in South America Central America and the Caribbean Argentina Bolivia Brazil Chile Colombia Costa Rica Cuba Guyana Haiti Honduras Mexico Panama Paraguay Peru Puerto Rico Trinidad and Tobago and Venezuela The last summary of mathematics education encompassing countries from the Southern Americas appeared in 1966 Progress in the field during five decades has remained unexamined until now

Formality of the Little $\mathbb{N}$ -disks Operad Pascal Lambrechts, Ismar Volić, 2014-06-05 The little disks operad along with its variants is an important tool in homotopy theory It is defined in terms of configurations of disjoint dimensional disks inside the standard unit disk in $\mathbb{R}^n$ and it was initially conceived for detecting and understanding fold loop spaces Its many uses now stretch across a variety of disciplines including topology algebra and mathematical physics In this paper the authors develop the details of Kontsevich's proof of the formality of little disks operad over the field of real numbers More precisely one can consider the singular chains on as well as the singular homology of These two objects are operads in the category of chain complexes The formality then states that there is a zig zag of quasi isomorphisms connecting these two operads The formality also in some sense holds in the category of commutative differential graded algebras The authors additionally prove a relative version of the formality for the inclusion of the little disks operad in the little disks operad when $n \geq 2$ *A Vector Field Method on the Distorted Fourier Side and Decay for Wave Equations with Potentials* Roland Donniger, Joachim Krieger, 2016-04-26 The authors study the Cauchy problem for the one dimensional wave equation $\partial_t^2 u + \partial_x^2 u + V(x)u = 0$ The potential V is assumed to be smooth with asymptotic behavior $V(x) \sim |x|^{-2}$ as $|x| \rightarrow \infty$ They derive dispersive estimates energy

estimates and estimates involving the scaling vector field $t \otimes x$ where the latter are obtained by employing a vector field method on the distorted Fourier side In addition they prove local energy decay estimates Their results have immediate applications in the context of geometric evolution problems The theory developed in this paper is fundamental for the proof of the co dimension 1 stability of the catenoid under the vanishing mean curvature flow in Minkowski space see Donninger Krieger Szeftel and Wong Codimension one stability of the catenoid under the vanishing mean curvature flow in Minkowski space preprint arXiv 1310.5606 2013

On Sudakov's Type Decomposition of Transference Plans with Norm Costs Stefano Bianchini, Sara Daneri, 2018-02-23 The authors consider the original strategy proposed by Sudakov for solving the Monge transportation problem with norm cost with probability measures in and absolutely continuous w r t The key idea in this approach is to decompose via disintegration of measures the Kantorovich optimal transportation problem into a family of transportation problems in where are disjoint regions such that the construction of an optimal map is simpler than in the original problem and then to obtain by piecing together the maps When the norm is strictly convex the sets are a family of dimensional segments determined by the Kantorovich potential called optimal rays while the existence of the map is straightforward provided one can show that the disintegration of and thus of on such segments is absolutely continuous w r t the dimensional Hausdorff measure When the norm is not strictly convex the main problems in this kind of approach are two first to identify a suitable family of regions on which the transport problem decomposes into simpler ones and then to prove the existence of optimal maps In this paper the authors show how these difficulties can be overcome and that the original idea of Sudakov can be successfully implemented The results yield a complete characterization of the Kantorovich optimal transportation problem whose straightforward corollary is the solution of the Monge problem in each set and then in The strategy is sufficiently powerful to be applied to other optimal transportation problems

Irreducible Geometric Subgroups of Classical Algebraic Groups Timothy C. Burness,, Soumaïa Ghandour, Donna M. Testerman, 2016-01-25 Let G be a simple classical algebraic group over an algebraically closed field of characteristic p with natural module V Let H be a closed subgroup of G and let ρ be a non trivial irreducible tensor indecomposable restricted rational module such that the restriction of ρ to H is irreducible In this paper the authors classify the triples of this form where H is a disconnected maximal positive dimensional closed subgroup of G preserving a natural geometric structure on V

Exotic Cluster Structures on SL_n : The Cremmer-Gervais Case M. Gekhtman, M. Shapiro, A. Vainshtein, 2017-02-20 This is the second paper in the series of papers dedicated to the study of natural cluster structures in the rings of regular functions on simple complex Lie groups and Poisson Lie structures compatible with these cluster structures According to our main conjecture each class in the Belavin Drinfeld classification of Poisson Lie structures on SL_n corresponds to a cluster structure in The authors have shown before that this conjecture holds for any in the case of the standard Poisson Lie structure and for all Belavin Drinfeld classes in In this paper the authors establish it for the Cremmer Gervais Poisson Lie structure on SL_n which is the least similar to the standard one

Descent Construction for GSpin Groups Joseph Hundley, Eitan Sayag, 2016-09-06 In this paper the authors provide an extension of the theory of descent of Ginzburg Rallis Soudry to the context of essentially self dual representations that is representations which are isomorphic to the twist of their own contragredient by some Hecke character The authors theory supplements the recent work of Asgari Shahidi on the functorial lift from split and quasisplit forms of GSpin_{2n} to GL_{2n}

Curvature: A Variational Approach A. Agrachev, D. Barilari, L. Rizzi, 2019-01-08 The curvature discussed in this paper is a far reaching generalization of the Riemannian sectional curvature The authors give a unified definition of curvature which applies to a wide class of geometric structures whose geodesics arise from optimal control problems including Riemannian sub Riemannian Finsler and sub Finsler spaces Special attention is paid to the sub Riemannian or Carnot Carathodory metric spaces The authors construction of curvature is direct and naive and similar to the original approach of Riemann In particular they extract geometric invariants from the asymptotics of the cost of optimal control problems Surprisingly it works in a very general setting and in particular for all sub Riemannian spaces *Studies in Intelligence*, 2016

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