

JAMAICA_9th Grade Math

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- Example: Find height of tower from top of a building (6 Marks)
- Example: Find height of the tree
- Example: Find distance between 2 ships as seen from an aeroplane (6 Marks)
- Example: Find height of poles on either side of road & distance from point of observation (6 Marks)
- Example: Find height of tower
- Example: Find the distance traveled by the balloon during the interval
- Example: Find the length of the slide
- Example: Find the length of the string
- Practice Test

- Test Your Skill

14. Algebraic Expressions and Identities

14.1 Algebraic Expressions

- Tutorial: Recall
- Example: Identify the coefficient and variable in the given term (1)
- Example: Identify the like terms (3)
- Example: Write the degree, term and coefficient of the given polynomial (2)
- Example: Write the coefficient of variable from the given expression (1)
- Example: Identify given algebraic expression as monomial/binomial/trinomial (1)
- Example: Write the coefficient of given variable (1)
- Example: Identify given algebraic expression as monomial/binomial/trinomial (1)
- Test Your Skill

14.2 Addition and Subtraction of Algebraic Expressions

- Tutorial: Addition and Subtraction of Algebraic Expressions
- Example: Add the polynomials (1)
- Example: Add the polynomials (1)
- Example: Add the polynomials (1)
- Example: Subtract the polynomials (1)
- Example: Subtract the polynomials (2)
- Example: Subtract two algebraic expressions (2)
- Example: Subtract two algebraic expressions (2)
- Example: Subtract the polynomials (2)
- Example: Find perimeter of triangle whose sides are in form of binomial expressions (1)
- Example: Add the algebraic expressions (1)
- Example: What should be added to trinomial expression to make it binomial expression (3)
- Example: Add the 3 algebraic expressions
- Example: Add the algebraic expressions
- Example: Add the algebraic expressions
- Example: Add the algebraic expressions
- Example: Add the algebraic expressions
- Example: Subtract a polynomial from another

- Example: Subtract a polynomial from another
- Practice Test
- Test Your Skill

14.3 Product of a Monomial and a Polynomial

- Tutorial: Product of a Monomial and a Polynomial
- Example: Find the product of a monomial and a polynomial (2)
- Example: Find the product of a monomial and a polynomial (2)
- Example: Find the volume of a rectangular box whose dimensions are given (3)
- Example: Subtract a polynomial from another (1)
- Example: Find the product of monomials
- Example: Find the product of monomials
- Example: Find the area of rectangle whose dimensions are given
- Example: Complete the table of product
- Example: Find the volume of a rectangular box whose dimensions are given
- Example: Find the volume of a rectangular box whose dimensions are given
- Example: Find the volume of a rectangular box whose dimensions are given
- Example: Add the polynomials
- Example: Add the polynomials
- Example: Subtract a polynomial from another
- Example: Find the product of monomial & polynomial
- Example: Complete the table of product
- Example: Simplify algebraic expression
- Example: Find the product of monomials
- Example: Find the value of expression when value of x is given
- Example: Find the value of expression when value of x is given
- Example: Subtract a polynomial from another
- Practice Test1
- Practice Test2
- Test Your Skill

14.4 Evaluate Algebraic Expressions

- Tutorial: Evaluating Algebraic Expressions

- Example: Evaluate an algebraic expression
- Example: Evaluate an algebraic expression
- Example: Evaluate a linear/quadratic expression
- Example: Evaluate a polynomial

15. Factoring

15.1 Factorisation by Grouping

- Tutorial: Factorisation by Grouping
- Example: Find the greatest common factor of the given numbers (1)
- Example: Find the greatest common factor of the given numbers (3)
- Example: Factor out the greatest common factor from the given expression (3)
- Example: Factor out the greatest common factor of given the trinomial (3)
- Example: Factor out the minus sign from given binomial.(2)
- Example: Factorize by grouping (5)
- Example: Factorize by grouping: $y^2 + ay + by + c$ (5)
- Example: Factorize $x^2 + xy + ax + by$ (2)
- Example: Find the common factor of given terms
- Example: Factorise the given expression: $ax - b$
- Example: Factorise the given expression: $pa^2 + qa$
- Example: Factorise the given expression: $ax^2y - bxy^2$
- Example: Factorise the given expression: $pa^2 - qb^2 + tc^2$
- Example: Factorise the given expression: $-pa^2 + qab - tca$
- Example: Factorise the given expression: $apq + b + cq + dp$
- Example: Find the common factor of given terms
- Example: Factorise the given expression: $ax+by-ay-by$
- Practice Test1
- Practice Test2
- Test Your Skill

16. Pair of Linear Equation in two variables

16.1 Pair of Equation in two variables

- Tutorial: Pair of equation in two variables
- Example: Identify if given point is solution of given system (1 Mark)

- Example: Represent cost of Items algebraically (1 Mark)
- Example: Identify if given ordered pair is solution of given system (1 Mark)
- Example: Write equations of given axis (1 Mark)
- Example: Find 'a' so that given point lies on the line (1 Mark)
- Example: Check if given values of x, y are solution of given equation (1 Mark)
- Example: Express y in terms of x in the given equation and check if given point is on the line (1 Mark)
- Practice Test

16.2 Graphical method of solving pair of Linear Equation

- Tutorial: Graphical method of solving pair of linear equation
- Example: Find if given pair of linear equations are consistent/inconsistent (2 Marks)
- Example: Find vertices of triangle formed by the given lines (3 Marks)
- Example: Find if given pair of equations are consistent/inconsistent & solve graphically (2 Marks)
- Example: Find 'k' for unique solutions, given perimeter (1 Mark)
- Example: Check if given pair of equations is parallel, coincident or intersect (2 Marks)
- Example: Find a,b if given pair of equations have infinitely many solutions (2 Marks)
- Example: Find dimensions of garden (2 Marks)
- Example: Without drawing graph determine whether lines will be parallel/intersecting (1 mark)
- Example: Find 'p' for the system of equations to represent parallel lines (1 mark)
- Example: Find value of 'k' for system of equations to have infinite solutions (1 Mark)
- Example: Without solving find if the pair of equations is consistent (1 Mark)
- Example: Find whether the system of equations has any solutions (1 Mark)
- Example: Find value of 'k' if system has unique solutions (1 Mark)
- Example: Write condition for equations to be parallel/coincident/intersecting (1 Mark)
- Practice Test
- Test your skill1
- Test your skill2

16.3 Algebraic method of solving pair of linear Equation

- Tutorial: Algebraic method of solving pair of linear equation
- Example: Solve using substitution method (2 Marks)

- Example: Solve for x and y (3 Marks)
- Example: Applications on age problem (3 Marks)
- Example: Applications on two digit no (3 Marks)
- Example: Find 2 numbers from given (2 Marks)
- Example: Application on two digit number (3 Marks)
- Example: Application on salary and annual increment (3 Marks)
- Example: Application on taxi fare (3 Marks)
- Example: Application on income and expenditure (3 Marks)
- Example: Application on finding angles of a triangle (3 Marks)
- Example: Application on questions in a test (3 Marks)
- Example: Application on upstream/downstream (6 Marks)
- Example: Application on monthly expenses (3 Marks)
- Example: Application on finding l and b of rectangle, if area is known (3 Marks)
- Example: The two given equations have a unique solution, find value of k (2 Marks)
- Example: Find value of k for which given values of x & y is solution of given equation (1 Mark)
- Application: Applications on price of item (3 Marks)
- Application: Applications on % in mixture (3 Marks)
- Application: Applications on upstream/downstream (3 Marks)
- Application: Applications on speed (3 Marks)
- Application: Applications on % in solutions (3 Marks)
- Application: Applications of currency (3 Marks)
- Application: Applications of fractions (3 Marks)
- Application: Applications on library charges (3 Marks)
- Application: Applications on age problem (3 Marks)
- Practice Test1
- Practice Test2
- Test your skill

17. Linear Inequalities

17.1 Linear Inequation

- Tutorial: Linear Inequation
- Example: Find the solution set for given inequation (3)

- Example: Find the solution set for given inequation (2)
- Practice Test
- Test Your Skill

17.2 Solutions of Linear Inequalities

- Tutorial: Solutions of Linear Inequalities
- Example: Solve inequality & graph the solution (3)
- Example: Solve inequality & graph the solution (3)
- Practice Test1
- Practice Test2

17.3 Three Part Inequalities

- Tutorial: Three Part Inequalities
- Example: Solve inequality & graph the solution (3)
- Example: Solve inequality & graph the solution (2)
- Practice Test1
- Practice Test2
- Test Your Skill

18. Relations and Functions

18.1 Definition of a Relation

- Tutorial: Definition of a Relation
- Example1: Find the domain and range of a relation defined by a given set of points

18.2 Definition of a Function

- Tutorial: Definition of a Function

18.3 Graph of a Relation

- Tutorial: Graph of a Relation
- Example1: Graph $y = mx + c$
- Example2: Graph $ay^2 = bx$
- Example3: Graph $y = |x + a|$

18.4 Vertical Line Test Notation

- Tutorial: Vertical Line Test
- Example1: Determine if a graph represents a function

18.5 Functional Notation $f(x)$

- Tutorial: Functional Notation
- Example1: Compute $f(a)$, $f(b)$

18.6 Section Review

- Practice
- Test Your Skill

18.6 Additional Examples with Pop-up Solution

- Example: Identify whether the relation is a function? Also find domain & range in each case (0110)
- Example: Determine whether or not the equation $ax+by=c$ describes a function (1517)
- Example: Determine whether or not the equation $y=a$ describes a function (1824)
- Example: Determine whether or not the equation $ax+by=c$ describes a function (1928)
- Example: Determine whether or not the equation $y^2=ax$ describes a function (2025)
- Example: Determine whether or not the equation $y=1/(ax+b)$ describes a function (2627)
- Example: Determine whether or not the equation $y=ax/(x^2+b)$ describes a function (2930)
- Example: Identify whether or not the relation defined by graph is a function (3143)
- Example: Identify whether or not the relation defined by graph is a function (3444)
- Example: Find the indicated value given $f(x)=ax^2-bx+c$ (4551)
- Example: Find the indicated value given $g(x)=-a^2x^2$ (4756)
- Example: Find the indicated value given $f(x)=a/(x^2+b)$ (5257)
- Example: Find the indicated value given $g(x)=-(x+a)^2$ (5455)
- Example: Find the indicated value given $f(x)=(a/b)x^2+(c/d)x-e$ (5862)
- Example: Find the indicated value given $g(x)=(x^2+a)/-b$ (5961)

19. Graphs of Linear/Non-Linear Functions/Equations

19.1 Plotting Ordered Pairs

- Tutorial: Graph Order Pairs
- Example: Plot (a,b)
- Example: Given the plot of a point, find its coordinates

19.2 Graphing a linear equation using points

- Tutorial: Graphing a linear equation using points
- Example: Graph $px + qy = r$

19.3 Graphing a linear equation Using intercepts

- Tutorial: Using intercepts to Graphing a linear equation
- Example: Plot $px + qy = r$ by plotting its intercepts

19.4 Slope of a Line Through Two Given Points

- Tutorial: Slope of a Line
- Example1: Find the slope of the line through (a,b) , (c,d) and graph it
- Example2: Given m , determine the type of $y = mx + c$
- Example: Identify slope of a line from its graph

19.5 Finding the slope of a line from the equation of the line

- Tutorial: Finding the slope from the equation of the line
- Example: Find the slope of a line
- Example2: Find the slope of $ax + by + c = 0$

19.6 Solutions of Linear Inequalities

- Tutorial: Solutions of linear inequalities
- Example: Graph an inequation on a number line
- Example: Graph $(3 + 4x)$ is less than $(3x + 11)$ on a number
- Example: Graph $4x \leq 16$ on a number
- Example: Graph $((3/4)x - 4)$ is less than $((4/5)x + 1)$ on a number
- Example: Write a statement as an inequality
- Example: Write a statement as an inequality
- Example: Graph the solution (4) is less than $(2x)$ is less than (6) on a number
- Example: Graph $(-3) \leq (1 - 2x) \leq 6$ on a number
- Example: Solve an inequality $(-12) \leq (4 - (3/-5)x)$ is less than (2)
- Example: Solve a word problem on an inequality

19.7 Graphing Linear Inequalities in two Variables

- Tutorial: Graphing linear inequalities in two variables
- Example: Graph the solution of $(2x - y)$ is greater than (3)

19.8 Solving System of Linear Inequalities

- Tutorial: Solving system of linear inequalities
- Example: Graph the solution of the given system of linear system of equations
- Example: Graph the solution of the given system of linear system of equations

20. Statistics and Probability

20.1 Statistics

- Tutorial: Statistics

20.2 Presentation of Data

- Tutorial: Presentation of Data (2)
- Example: Find range of the given data
- Practice Test
- Test Your Skill

20.3 Graphical Representation of Data

- Tutorial: Graphical Representation of Data
- Tutorial: Graphical Representation of Data
- Example: Answer from the histogram (salary) (3)
- Example: Read the circle graph.(1)
- Example: Read the circle graph.(4)
- Example: Construct the circle graph to represent th given data.(5)
- Example: Read the bar graph.(2)
- Example: Read the bar graph.(3)
- Example: Read the bar graph.(3)
- Example: Construct the bar graph using the given data.(4)
- Example: Construct the bar graph using the given data.(4)
- Example: Read the graph.(3)
- Practice Test1
- Practice Test2
- Practice Test3
- Practice Test4
- Practice Test5
- Test Your Skill1
- Test Your Skill2

20.4 Measure of Central Tendency

- Tutorial: Measure of Central Tendency
- Example: Find mean of primes less than given number (2)

- Example: Find mode of given data (basketball team) (1)
- Example: Find median of given data (2)
- Example: Find x if mode is given (1)
- Example: Find x if median is given (2)
- Example: Find x if mean is given (2)
- Example: Find median after finding mean (3)
- Example: If mean of values in x is known, find mean of first three values (3)
- Example: Find excluded number if mean is known (2)
- Example: Find value of p if mean of data is known (4)
- Example: Find nth observation if mean is known (2)
- Example: Find mean weight (2)
- Practice Test
- Test Your Skill

20.5 Mean of Grouped Data

- Tutorial: Mean of Grouped Data
- Example: Find mean of increased values (2)
- Example: Find n if sum of deviations is known (3)
- Example: Find mean using step deviation method (3)
- Example: Find missing frequency (4)
- Example: Find missing frequencies if mean & total frequency are known (5)
- Example: Find frequency of given class interval (1)
- Example: Find sum of deviations from mean (1)
- Practice Test
- Test Your Skill

20.6 Mode of Grouped Data

- Tutorial: Mode of Grouped Data
- Example: Find mode of given data (3)
- Example: Find missing frequencies if mode & total frequency are known (5)
- Example: Find mode of given data (3)
- Example: Find mode of given data (1)
- Example: Find lower limit of modal class (1)

- Example: Find modal life of components (4)
- Practice Test
- Test Your Skill

20.7 Median of Grouped Data

- Tutorial: Median of Grouped Data
- Example: Find median of given data (4)
- Example: Find missing frequencies, if median is known (5)
- Example: Calculate median (less than) (4)
- Example: Find the median of the given data (1)
- Example: Find mean if mode & median are known (2)
- Example: Find mode if mean & median are known (3)
- Practice Test
- Test Your Skill

20.8 Probability

- Tutorial: Probability
- Example: Probability when die is thrown (1 Mark)
- Example: Find probability of drawing a particular ball (1 Mark)
- Example: Find probability of selecting boy/girl (1 Mark)
- Example: Find x , if probability of drawing a ball is given (2 Marks)
- Example: Find probability of a specific day in non leap year (2 Marks)
- Example: Find probability of getting prize winning ticket (1 Mark)
- Example: Find probability of choosing a consonant/vowel (1 Mark)
- Example: Find probability of getting a specific day in a leap year (2 Marks)
- Example: Probability of birthday problem (1 Mark)
- Example: Find probability of drawing 2 digit number from a box (1 Mark)
- Example: Probability of game of spinning arrow (1 Mark)
- Example: Probability of tossing 3 unbiased coins (1 Mark)
- Example: Probability of die landing in a circle (1 Mark)
- Example: Probability of ball in roulette wheel (1 Mark)
- Example: Probability of raining on a day (1 Mark)
- Example: Probability if coin is tossed three time (1 Mark)

- Example: Probability of atleast 2 boys (2 Marks)
- Example: Problem of coloured balls (2 Marks)
- Example: Probability of drawing a card (1 Mark)
- Example: Probability of drawing non defective nut (1 Mark)
- Example: Find $(1 - P(\bar{E}))$ (1 Mark)
- Example: Probability on throwing a die (1 Mark)
- Example: Probability of drawing a ball (1 Mark)
- Example: Write sample space for balls (1 Mark)
- Example: Check for probability (1 Mark)
- Example: Probability of drawing a card (1 Mark)
- Example: Find the probability of that the coin will be a 50p coin/ will not be a Rs 5 coin
- Example: What is the probability that the fish taken out is a male fish?
- Example: Find the probability that the bulb is not defective
- Example: Find the probability of getting a card of heart, king, club etc.
- Example: Find the probability of getting exactly two heads
- Example: What is the probability that the sum of two numbers appearing on the top of dice is n
- Example: What is the probability that the two friends visit the shop on same day?
- Example: What is the probability that the total score on die is even
- Example: Find the number of blue marbles in the jar
- Example: A dice is thrown. What is the probability that a given no. will come up atleast once
- Practice Test
- Test Your Skill

21. Vectors

21.1 The Position Vector

- Tutorial: The Position Vector

21.2 The Representations of a Position Vector

- Tutorial: The Representations of a Position Vector

21.3 The Magnitude (Norm) of a Vector

- Tutorial: The Magnitude (Norm) of a Vector
- Example1: Find the magnitude of the given vector in component form
- Example2: Find the magnitude of the given vector in vector form

21.4 Vectors with Magnitude and Inclination

- Tutorial: Vectors with Magnitude and Inclination
- Example1: Given the magnitude and inclination of a vector, find the vector

21.5 Addition of Vectors

- Tutorial: Addition of Vectors
- Example1: Find the sum vector of two given vectors

21.6 Multiplication by a Scalar

- Tutorial: Multiplication by a Scalar
- Example1: Given vectors u, v find $au + bv$

21.7 Vectors with Initial Points not at the Origin

- Tutorial: Vectors with Initial Points not at the Origin
- Example: Given points P, Q ; write the vector PQ in numeric form

21.8 The Unit Vector

- Tutorial: The Unit Vector
- Example: Find the unit vector in the same direction as a given vector
- Example: Find a unit vector parallel to a given vector
- Example: Find the resultant force acting on the object

22. Matrices

22.1 Matrices

- Tutorial: Matrices
- Example: Find dimension of given matrix (1)
- Example: Construct a 2×3 matrix whose elements are given by $a_{ij} = (i + r)(j + t)$, $i = 1, 2$; $j = 1, 2, 3$ (2)
- Example: Construct a 2×3 matrix whose elements are given by $a_{ij} = ci - dj$, $i = 1, 2$; $j = 1, 2, 3$ (2)
- Example: Construct a 2×2 matrix whose elements are given by $a_{ij} = (i + j)^2 / t$, $i = 1, 2$; $j = 1, 2$ (2)
- Example: Construct a 3×2 matrix whose elements are given by $a_{ij} = |i - 3j| / t$, $i = 1, 2, 3$; $j = 1, 2$ (2)
- Example: Construct a 3×2 matrix whose elements are given by $a_{ij} = (i + 2j)^2 / t$, $i = 1, 2, 3$; $j = 1, 2$ (2)
- Practice Test

- Test Your Skill

22.2 Equality of Matrices

- Tutorial: Equality of Matrices
- Example: Find x, y, a and b from two given matrices (2)
- Example: Find the values of x and y from two equal matrices (3)
- Example: For what real values of x and y the given matrices A & B are equal (3)
- Example: Find the values of x, y and z from two equal matrices (2)
- Example: Find the values of x, y and z from two equal matrices (3)
- Example: Find the values of a, b, c and d from two equal matrices (4)
- Practice Test
- Test Your Skill

22.3 Addition of Matrices

- Tutorial: Addition of Matrices
- Example: Find sum of two matrices (2×2) (2)
- Example: Find sum of two matrices (2×3) (2)
- Example: Find sum of two matrices (2×2) (2)
- Example: Given matrices A and B , find the matrix C if $A + B - C = 0$ (2)
- Practice Test
- Test Your Skill

22.4 Subtraction of Matrices

- Tutorial: Subtraction of Matrices
- Example: Find difference of two matrices (3×3) (2)
- Example: Given matrices A, B, C , find value of $A - B + C$ (2)
- Example: Given matrices A and B , find matrix C s.t. $A - B + C = 0$ (2)
- Example: Find matrix x if sum of two matrices is given (2)
- Practice Test
- Test Your Skill

22.5 Matrix Multiplication

- Tutorial: Matrix Multiplication
- Example: Multiply (1×3) & (3×1) matrices (2)
- Example: Multiply (1×3) & (3×1) matrices (2)

- Example: Find (x,y) entry of AB , given A, B (2)
- Example: Multiply two 2×2 matrices (2)
- Example: Find product of (3×2) and (2×3) matrices (3)
- Example: Application on unit price of TV set (2)
- Example: Find AI & IA where A is 3×3 matrix (2)
- Example: Given matrices A and I , find values of x and y s.t $(xI + yA)^2 = A$ (4)
- Example: Given matrices A and I , find value of k so that $A^2 = kA - nI$ (3)
- Example: Write as a single matrix by simplifying the matrices (2)
- Example: Given matrix $F(x)$, examine whether $F(x)F(y) = F(x + y)$ or not (3)
- Example: Given matrices A & B , find value(s) of α for which $A^2 = B$ (if it exists) (2)
- Practice Test
- Test Your Skill