**CRITIRCAL AND CREATIVE THINKING ITEMS**

**CLASS IX : CHAPTER 2 : POLYNOMIALS**

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class:IX**  **Expected time: I5 MIN.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  **Forming expressions using the given conditions.** | |   **1.1Beautiful Birds**    There are two groups of birds sitting on a tree. In the first group there are x numbers of birds and in the second y. The leader of the first group said to the leader of the second that if one bird from your group come to my side then the number of birds in my group is 4 more than 2 times number of birds in your group. The leader of the second group replied that if one bird from your group come to my side then the number of birds in my group is 3 less than five times the number of birds present in your group.  Given below are two statements. Are the statement correct?   |  |  | | --- | --- | | Statement | Is the statement correct | | For the first group leader statement, the number of birds is 2(y-1) +4 | Yes/no | | For the second group leader statement, the number of birds is 5(x+1) - 3. | Yes/no |   **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Strategic competence | | Overarching Idea | Relationships between variables | | Context | Expressions | | Item Format | **Yes/no.** | | Cognitive process | Interpreting | | Proficiency Level | 2 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  Explain expected answer and the respective credits  Yes for first and no for second.  F.C: 02  P.C: 01 [if anyone answer is correct]  Name of the Teacher/Item Writer:S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |
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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time: 05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Finding the value of the polynomial.** | |   If the number of birds in the second group is 16 in the beginning, find the number of birds in the first group if one bird come to this group from the second.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Procedural fluency | | Overarching Idea | Relationships between variables | | Context | Value of the polynomial | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 2 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  F.C: 34.  P.C: Proper substitution only  N.C: Any other response  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

**Item 2**

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials**  Car Maintenance | **Class: IX**  **Expected time: 10 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Forming expressions using the given conditions.** | |     A pronto lube garage charges £25 to lube any vehicle. Other work adds about €6000 per month to the  revenue. It costs pronto lube £6 in materials to service cars. Monthly operating expenses are €23,500.  Write an expression for net profit for C cars.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Strategic competence | | Overarching Idea | Relationships between variables | | Context | Profit and loss | | Item Format | **Yes/no.** | | Cognitive process | Interpreting | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  F.C: 19 C – 17,500  P.C: If Revenue or Costs is correct  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time: 05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Finding the value of the polynomial.** | |   If the number of cars serviced in a particular month is 3000, find the profit  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Procedural fluency | | Overaching Idea | Relationships between variables | | Context | Value of a polynomial | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 2 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  € 39, 500 F.C: 02  Proper substitution P.C: 01.  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time: 05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Finding the value of the polynomial.** | |   If the number of car serviced in a particular month is 900, then the garage got a profit.  True / false.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Procedural fluency | | Overaching Idea | Mathematical understanding. | | Context | Quantity. | | Item Format | True/false. | | Cognitive process | Interpreting. | | Proficiency Level | 2 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  False F.C: 02  True N.C.  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

**Item (3)**

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials**  Gymnastics | **Class: IX**  **Expected time: 05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Finding the value of the polynomial.** | |     A gymnast dismounts the uneven parallel bars. Her height, h(feet), depends on the time, t(sec), that she is in the air as follows.h = - 16 t2+ 8t + 8.  Where she will be after 1 second.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Strategic competency. | | Overarching Idea | Change and relationship. | | Context | Quantity. | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 2 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  h = 0 (or) in the ground F.C: 02  Proper substitution: P.C: 01  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time: 05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Finding the value of the polynomial.** | |   State the reason why when t = 0 and t = sec., she will be on the same height from the ground.  **Mathematical Literacy**   |  |  |  | | --- | --- | --- | | **FRAMEWORK** | | **CHARACTERISTICS** | | Competency cluster | | Procedural fluency | | Overarching Idea | | Change and relationship | | Context | | Scientific | | Item Format | | **Short response item** | | Cognitive process | | Problem solving. | | Proficiency Level | | 2 | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  She will be at a height of 8 feet from the ground when t= 0 and t= we get h= 8 . When t= she will go up and come up the same position.  F.C: 02  Any one substitution is correct i.e. t=0 (or) t =  P.C: 01.  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai  **Item (4)**  (4.1) |  |  |  |  |  |  |  |
| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials**  House Garden | **Class: IX**  **Expected time:20 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Factorising the polynomials.** | |     Mr. Ramkumar has a beautiful rectangular garden and a swimming pool (in the form of a cuboid) in his laxurious bungalow. The area of the garden is x2 +2x-15 .What are the dimensions of the garden .  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Adaptive reasoning. | | Overarching Idea | Change and relationship | | Context | Area | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  Dimensions of the garden (x+5) and (x-3)  F.C: 02  Any one dimension is correct  P.C: 01.  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time: 20 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Factorising the polynomials.** | |   The water capacity of the swimming pool upto the rim is x3-23x2+142x-120. What are the dimensions the swimming pool.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Adaptive reasoning. | | Overarching Idea | Change and relationship | | Context | Volume | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  Dimensions of the swimming pool (x-1), (x-10) and (x-12)  F.C: 02  Any one dimension is correct  P.C: 01.  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai  **(4.3)** |  |  |  |  |  |  |  |
| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time:05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Addition of polynomials.** | |   Find the perimeter of the garden.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Procedural fluency | | Overarching Idea | Change and relationship | | Context | Perimeter | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 2 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  Perimeter of the garden = 4x + 4  F.C: 02.  Perimeter = 2(l + b).  P.C: 01.  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai  **(4.4)** |  |  |  |  |  |  |  |
| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time: 15 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Find the surface area without top as per the given dimensions and finding the value of polynomial** | |   The cost of painting the pool , if the cost of painting is Rs. 5/- per square unit.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Procedural fluency | | Overarching Idea | Change and relationship | | Context | Surface area | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  F.C: 02 {if the cost is correct as per his/her assumed dimensions}  P.C: 01 [if A = lb + 2h (l + b).]  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |
| **Item 5**  **(5.1)** |
| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials**  Pencil Box | **Class: IX**  **Expected time: 10 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Form the polynomial and find its degree.** | |     Rekha wants to make a pencil box using a cardboard. When searching she got a cardboard with sides 12inches by 12 inches. She cuts out four squares of equal size at corners and folding up the sides to make an open box. She paints it beautifully and puts all her pencils in that.  Suppose the side of the square cut-out is x inch. Give the polynomial to find the volume of the cuboid formed. And identify the degree of the polynomial.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Strategic competence | | Overarching Idea | Mathematical relationship | | Context | Volume | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**   1. Full credit: 02   Volume= (12-2x) (12-2x) (x) = 4x3 ─ 48x2 + 144x  Degree = 3  Partial credit: 01  If the expression is correct.  N.C: Any other response  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time:05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Finding the value of polynomial .** | |   If the side of the square is 1 inch then what is the volume of the box?  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Procedural fluency | | Overarching Idea | Change and relationship | | Context | Volume | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**   1. Full credit: 02   X=1 inch, volume=10×10×1=100sq.inch  Partial credit: 01  If the substitution is correct  No credit:  Any other response  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time:05 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Basic conditions to make a cuboid/cube.** | |   Can she make a box if the size of the square cut off is 6 inch? Why?  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Conceptual understanding | | Overarching Idea | Change and relationship | | Context | Volume | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  F.C: 02.  No. Since if x=6, then the length and breadth become zero.  P.C: 01  Substituting x=6.  X=1cm, volume=10×10×1=100sq.inch  Partial credit: 01  If the substitution is correct  No credit:  Any other response  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

(5.4)

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| |  |  |  | | --- | --- | --- | | **Domain: Mathematics literacy** | **Theme: Polynomials** | **Class: IX**  **Expected time: 15 Min.**  **Total credit: 02** | | **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT).**  **Total surface area of a cuboid.** | |   She closed the box and cover it with a cloth, find the area covered by the cloth.  **Mathematical Literacy**   |  |  | | --- | --- | | **FRAMEWORK** | **CHARACTERISTICS** | | Competency cluster | Conceptual understanding | | Overarching Idea | Change and relationship | | Context | Surface area | | Item Format | **Short response item** | | Cognitive process | Problem solving. | | Proficiency Level | 3 |  |  | | --- | | **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:00** |   **Description of Answer Key and Credits**  F.C: 02  Area covered by the cloth = (288 – 48x) sq.inch  P.C: 01. [A = 2(lb + bh + hl).]  X=1cm, volume=10×10×1=100sq.inch  Partial credit: 01  If the substitution is correct  No credit:  Any other response  Name of the Teacher/Item Writer: S.JAYARAMAN  Designation: PGT(MATHS)  Email: gayathri7797@yahoo.co.in  Phone No: 9427523022  Name of the vidyalaya: no1, OE, Trichy  KVS Region: Chennai |  |  |  |  |  |  |  |

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 15**  Daily Wages | **Class: IX**  **Expected time: 5 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |



15.Rama’s daily wages is Rs x. On his promotionafter 10 years the wage was enhanced with 5% of initial salary.

15.1. Represent Rama’s salary after 10 years as a polynomial.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 1 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: Partial credit:

No credit: For any other response

Name of the Teacher/Item Writer: K THANERAJ

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KVS Region: Chennai

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 15** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |



15.2. Rama’s daily wages is Rs x. On his promotionafter 10 years the wage was fixed as Rs 5x. His expected wage at the time of promotion is 5x2.The expected wage of Rama is Rs.50000.

15.2. Find his daily wage.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit:5x2 = 50000, x = 100

Partial credit:5x2 = 50000

No credit: For any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 16**  Investment | **Class: IX**  **Expected time: 6 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |

16. Ramaniand her three friends invested Rs 10x2(equal investment) for their export business. After 5 years the capital was enhanced to Rs 20000 including the profit. Their investment was increased 5% per annum.

16.1 Find the individual investment at the beginning of the business.



**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 4 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: Rs. 4000 Partial credit:Any other relevant answer

No credit: For any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 16**  Profit | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |

Ramani and her four friends invested Rs 10x2 for their export business. Their profit of investment was 5% per annum.

16.2. Express the profit after 5 years as a polynomial.



**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: Partial credit:Any other relevant answer

No credit: For any other response

Name of the Teacher/Item Writer: M MANIVANNAN

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Name of the vidyalaya: KV Anna Nagar

KVS Region: Chennai

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| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 17**  ancestral property | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |

. On partition of ancestral property, Kumar gave a rectangular plot to his son Gopu. The width of the plot was *x* units and length was five less than 7 times of its breath.

17.1 . Express the length as a polynomial.



**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 7x - 5 Partial credit: 7x

No credit: For any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 17** | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |

On partition of ancestral property, Kumar gave a rectangular plot to his son Gopu. The width of the plot was *x* units and length was five less than 7 times of its breath.

17.2. Represent the perimeter as a polynomial.



**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 16x - 10 Partial credit: 8x - 5

No credit: For any other response

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KVS Region: Chennai

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 17** | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |

On partition of ancestral property, Kumar gave a rectangular plot to his son Gopu. The width of the plot was *x* units and length was five less than 7 times of its breath.

17.3. Form the polynomial to represent the area of the plot



**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 7x2 – 5x Partial credit: x (7x -5)

No credit: For any other response

Name of the Teacher/Item Writer: K THANERAJ

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 17** | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for a situation. | |

On partition of ancestral property, Kumar gave a rectangular plot to his son Gopu. The width of the plot was *x* units and length was five less than 7 times of its breath.

17.4 Express the perimeter if the length is increased by 2 units.



**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 16x - 6 Partial credit: Any considerable partial answer

No credit: For any other response

Name of the Teacher/Item Writer: M MANIVANNAN

Designation:TGT (Mathematics)

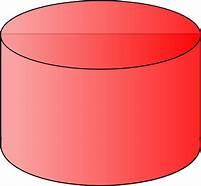
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Name of the vidyalaya: KV Anna Nagar

KVS Region: Chennai

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 18**  Gas Cylinders | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for the situation and learning the multiplication of polynomials | |



As a safety measure a fuel gas organization recommended gas cylinder (assuming perfect cylinder) with the height 2x-1 units and radius 2x + 1 units.

18.1. Express the volume of the gas in the cylinder as a polynomial.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 3 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: (8x3 +4x2 – 2x – 1) Partial credit:(2x - 1) (2x +1)2

No credit: For any other response

Name of the Teacher/Item Writer: K THANERAJ

Designation:PGT (Mathematics)

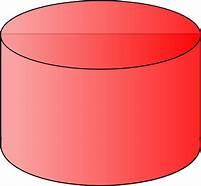
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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 18** | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for the situation and learning the multiplication of polynomials | |



As a safety measure a fuel gas organization recommended gas cylinder (assuming perfect cylinder) with the height 2x-1 units and radius 2x + 1 units.

18.2. Express the surface area of the cylinder as a polynomial

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 3 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 8(2x2 +x) Partial credit: Any other relevant answer

No credit: For any other response

Name of the Teacher/Item Writer: M MANIVANNAN

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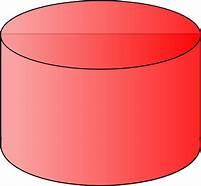
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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 18** | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to frame a polynomial for the situation and learning the multiplication of polynomials | |



As a safety measure a fuel gas organization recommended gas cylinder (assuming perfect cylinder) with the height 2x-1 units and radius 2x + 1 units.

18.3. Express the cost of painting the cylinder @ Rs 10 per Sq. units as a polynomial.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 3 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 80(2x2 +x) Partial credit: Any other relevant answer

No credit: For any other response

Name of the Teacher/Item Writer: K THANERAJ

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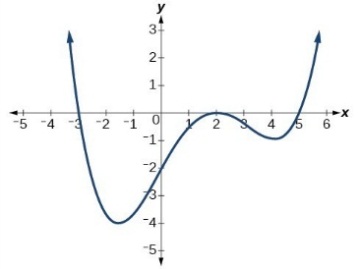
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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 19**  Graph of Polynomial | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | | **🗸** | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to identify the nature of a polynomial function and find the degree and zero of the polynomial function from the graphical representation. | |



The graph represents a polynomial expression.

19.1 What is the degree of the polynomial?

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 4Partial credit: No

No credit: For any other response

Name of the Teacher/Item Writer: M MANIVANNAN

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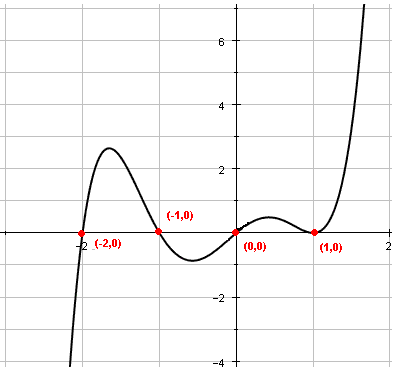
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Name of the vidyalaya: KV Anna Nagar

KVS Region: Chennai

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 19** | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | |  | **Image** | |  | **Table** | | **🗸** | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to identify the nature of a polynomial function and find the degree and zero of the polynomial function from the graphical representation. | |



The above graph represents a polynomial expression.

19.2. Write the number of zeroes and also the zeroes of the polynmoial.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Very Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 4 , Zeroes -2, -1, 0 , 1 Partial credit: portion of the answer

No credit: For any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 20**  Donation | **Class: IX**  **Expected time: 5 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are expected to identify the nature of a polynomial function and find the zero of the polynomial function | |



Raveena donated Rupees to buy books for the mission. Her friends wanted to know the amount donated by Raveena. She did not disclose the amount but gave a hint that

20.1 Find the amount donated by Raveena.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 5 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: = = 3330

Partial credit : Finding = 223

No credit : Any other response

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| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 21**  Mobile Showroom | **Class: IX**  **Expected time: 5 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are able to identify the correct polynomial and find the value of the polynomial at specific value of the variable. | |



Keshavowns a Mobile showroom of a popular brand . The number of mobiles sold by the shop can be modelled by the expression N(t) = 7t+25 and the Selling price per mobile is modelled by an expression

S(t)= 2t2+25t + 12 where t is the number of months in a year.

21.1 Find the number of mobiles sold in one and half years

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 4 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: N(18) = 7(18) +25 = 151

Partial credit: N(18) = 7(18) +25

No credit: Any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 9-2** | **Class: IX**  **Expected time: 5 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to factorise the polynomial and finding the product of the polynomials. | |



Keshavowns a Mobile showroom of a popular brand . The number of mobiles sold by the shop can be modelled by the expression N(t) = 7t+25 and the Selling price per mobile is modelled by an expression

S(t)= 2t2+25t + 12 where t is the number of months in a year.

21.2 Choose the expression which show the amount of revenue generated by the showroom

a)(2t + 1)(t-12)(7t +25)

b)( 2t + 1)(t+12)(7t +25)

c)(7t+25)(2t-1)(t+12)

d)none of these

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Short Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 5 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: 1 Option B ( 2t + 1)(t+12)(7t +25) ---[N(t) X S(t)]

Partial credit: Writing N(t) or S(t)

No credit: Any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 21** | **Class: IX**  **Expected time: 5 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to find the value of the polynomial at particular value of the variable. | |



Keshav owns a Mobile showroom of a popular brand. The number of mobiles sold by the shop can be modelled by the expression N(t) = 7t+25 and the Selling price per mobile is modelled by an expression

S(t)= 2t2+25t + 12 where t is the number of months in a year.

21.3 What is the total amount of revenue generated by the showroom at the end of the year?

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 6 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full credit: N(12) X S(12) = 109 X 600 = 65400

Partial credit: Finding N(12) and S(12) alone

No credit: Any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 21** | **Class: IX**  **Expected time: 2 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to find the value of the polynomial at particular value of the variable. | |



Keshav owns a Mobile showroom of a popular brand. The number of mobiles sold by the shop can be modelled by the expression N(t) = 7t+25 and the Selling price per mobile is modelled by an expression

S(t)= 2t2+25t + 12 where t is the number of months in a year.

21.4 If the cost of production per mobile is modelled by an expression C(t) = t2 + 5t + 6, find the expression that gives the profit earned per mobile

a) t2 -20t + 3

b) t2+20t + 6

c) 2t2 + 30t + 18

d) t2 -10t + 6

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: 2 Option B (t2+20t + 6)

S(t) – C(t) = (2t2+25t + 12) –(t2 + 5t + 6) = (t2+20t + 6)

Partial credit: (2t2+25t + 12) –(t2 + 5t + 6)

No credit: Any other response

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|  |  |  |
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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 21** | **Class: IX**  **Expected time: 5 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to understand the concept of profit and loss applying in polynomials. | |



Keshav owns a Mobile showroom of a popular brand. The number of mobiles sold by the shop can be modelled by the expression N(t) = 7t+25 and the Selling price per mobile is modelled by an expression

S(t)= 2t2+25t + 12 where t is the number of months in a year.

21.5 Find the profit earned by the showroom at the end of the year.

**Mathematical Literacy**

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| --- | --- | --- |
| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 4 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: Profit per mobile =t2+20t + 6 = 122 + 20(12) + 6 = 144 + 240 + 6 =390

No of mobiles sold per year N(12) = 109

Total profit earned = 390 x 109 = 42510

Partial credit: Finding 109 or 390

No credit: Any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 22**  Taxi fare | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to write the polynomial expression for the taxi Fare for a particular distance travelled. | |

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| The taxi fare in Coimbatore city for **Taxi Green Cab** is as follows: For the first kilometre, the fare is Rs*x.* and for the subsequent distance in km it is Rs 3 less than the fare of first kilometre.  C:\Users\Andrew\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\40C21091.tmp  C:\Users\Andrew\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\7F02066D.tmpBut for the **Speed Track**, the taxi fare is as follows: For the first kilometre, the fare is Rs45 and for the subsequent distances it is Rs30/km. |

22.1 Writ the expression for the taxi fare to travel 10 kilometres in Coimbatore city by **Taxi Green Cab**

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
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| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: Taxi fare = 10x - 27

Partial credit: No partial credit.

No credit: Any other response

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| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 22** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to compare the taxi fare. | |

|  |
| --- |
| The taxi fare in Coimbatore city for **Taxi Green Cab** is as follows: For the first kilometre, the fare is Rsxand for the subsequent distance, it is Rs 10 less than the fare of first kilometre.  C:\Users\Andrew\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\7F02066D.tmp  C:\Users\Andrew\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\40C21091.tmp  But for the **Speed Track**, the taxi fare is as follows: For the first kilometre, the fare is Rs45 and for the subsequent distances it is Rs30/km. |

22.2 Which taxi is economical when we plan a trip of 200km travel and how much when minimum fare for first kilometre by Taxi Green cab is Rs30

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: Taxi Green cab is more economical by Rs 2005

Partial credit: Taxi fare for both the cabs as Rs4010 and Rs6015

No credit: Any other response

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|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 23** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to form the polynomial for the concept given. | |

**Visit to Tulip Garden, Srinagar**



**Indira Gandhi Memorial Tulip garden** is a [tulip](https://en.wikipedia.org/wiki/Tulip) garden in [Srinagar](https://en.wikipedia.org/wiki/Srinagar), [Kashmir](https://en.wikipedia.org/wiki/Kashmir). It is the largest [tulip](https://en.wikipedia.org/wiki/Tulip) garden in [Asia](https://en.wikipedia.org/wiki/Asia) spread over an area of about 30 hectares. It is situated on the foothills of [Zabarwan Range](https://en.wikipedia.org/wiki/Zabarwan_Range) with an overview of [Dal Lake](https://en.wikipedia.org/wiki/Dal_Lake). The garden was opened in 2007. The garden is built on a sloping ground in a terraced fashion consisting of seven terraces. Apart from tulips, many other species of flowers - [hyacinths](https://en.wikipedia.org/wiki/Hyacinth_(plant)), [daffodils](https://en.wikipedia.org/wiki/Narcissus_(plant)) and [ranunculus](https://en.wikipedia.org/wiki/Ranunculus) have been added as well.

Lakshmi and her friends visited Srinagar, the summer capital of Jammu and Kashmir. They visited the famous tulip garden and were fascinated by a particular way the tulips were arranged in an area. The area of a part of the garden which is in the shape of a rectangle is 10 more than the sum of 7 times the number of plants in one row and the square of the number of plants in the same row.

23.1 Frame the polynomial function for the area of that part of the garden

**Mathematical Literacy**

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| --- | --- | --- |
| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: X2 + 7x +10

Partial credit: No partial credit

No credit: Any other response

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| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 23** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are able to find one dimension of the rectangular garden compare with other dimension | |

**Visit to Tulip Garden, Srinagar**



**Indira Gandhi Memorial Tulip garden** is a [tulip](https://en.wikipedia.org/wiki/Tulip) garden in [Srinagar](https://en.wikipedia.org/wiki/Srinagar), [Kashmir](https://en.wikipedia.org/wiki/Kashmir). It is the largest [tulip](https://en.wikipedia.org/wiki/Tulip) garden in [Asia](https://en.wikipedia.org/wiki/Asia) spread over an area of about 30 hectares. It is situated on the foothills of [Zabarwan Range](https://en.wikipedia.org/wiki/Zabarwan_Range) with an overview of [Dal Lake](https://en.wikipedia.org/wiki/Dal_Lake). The garden was opened in 2007. The garden is built on a sloping ground in a terraced fashion consisting of seven terraces. Apart from tulips, many other species of flowers - [hyacinths](https://en.wikipedia.org/wiki/Hyacinth_(plant)), [daffodils](https://en.wikipedia.org/wiki/Narcissus_(plant)) and [ranunculus](https://en.wikipedia.org/wiki/Ranunculus) have been added as well.

Lakshmi and her friends visited Srinagar, the summer capital of Jammu and Kashmir. They visited the famous tulip garden and were fascinated by a particular way the tulips were arranged in an area. The area of a part of the garden which is in the shape of a rectangle is 10 more than the sum of 7 times the number of plants in one row and the square of the number of plants in the same row.

23.2 If the length of the rectangle is 5 more than the number of plants in one row, find the breadth.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: x +2

Partial credit: No partial credit

No credit: Any other response

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|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 23** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Students are able to represent the perimeter of a garden as a polynomial | |

**Visit to Tulip Garden, Srinagar**



**Indira Gandhi Memorial Tulip garden** is a [tulip](https://en.wikipedia.org/wiki/Tulip) garden in [Srinagar](https://en.wikipedia.org/wiki/Srinagar), [Kashmir](https://en.wikipedia.org/wiki/Kashmir). It is the largest [tulip](https://en.wikipedia.org/wiki/Tulip) garden in [Asia](https://en.wikipedia.org/wiki/Asia) spread over an area of about 30 hectares. It is situated on the foothills of [Zabarwan Range](https://en.wikipedia.org/wiki/Zabarwan_Range) with an overview of [Dal Lake](https://en.wikipedia.org/wiki/Dal_Lake). The garden was opened in 2007. The garden is built on a sloping ground in a terraced fashion consisting of seven terraces. Apart from tulips, many other species of flowers - [hyacinths](https://en.wikipedia.org/wiki/Hyacinth_(plant)), [daffodils](https://en.wikipedia.org/wiki/Narcissus_(plant)) and [ranunculus](https://en.wikipedia.org/wiki/Ranunculus) have been added as well.

Lakshmi and her friends visited Srinagar, the summer capital of Jammu and Kashmir. They visited the famous tulip garden and were fascinated by a particular way the tulips were arranged in an area. The area of a part of the garden which is in the shape of a rectangle is 10 more than the sum of 7 times the number of plants in one row and the square of the number of plants in the same row.

23.3 Find the perimeter of the garden

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: 4x +14

Partial credit: No partial credit

No credit: Any other response

Name of the Teacher/Item Writer: M MANIVANNAN

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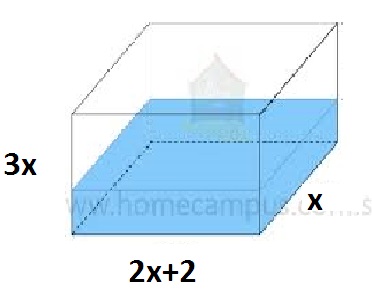
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|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 24**  Water tank | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to find the area of the floor as a polynomial expression. | |



Raju constructs an open cuboidal water tank for his house. He wants to cement the floor of the tank and white wash the walls of the tank. If the length of the tank is 2 more than twice the breadth of the tank and the height is three times the breadth of the tank.

24.1 Represent the area of the floor as a polynomial expression.

**Mathematical Literacy**

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| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern :**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: 2x2+2x

Partial credit: No partial credit

No credit: Any other response

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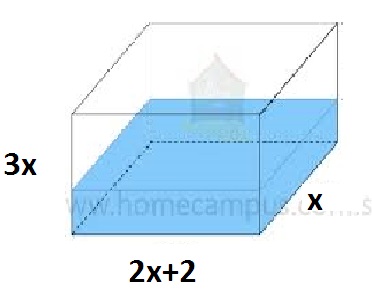
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|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 24** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to express a polynomial expression for the four walls to be white washed | |



Raju constructs an open cuboidal water tank for his house. He wants to cement the floor of the tank and white wash the walls of the tank. If the length of the tank is 2 more than twice the breadth of the tank and the height is three times the breadth of the tank.

24.2 Find a polynomial expression for finding area of the four walls to be white washed

**Mathematical Literacy**

|  |  |  |
| --- | --- | --- |
| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern:**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: 18x2+12x

Partial credit: No partial credit

No credit: Any other response

Name of the Teacher/Item Writer: M MANIVANNAN

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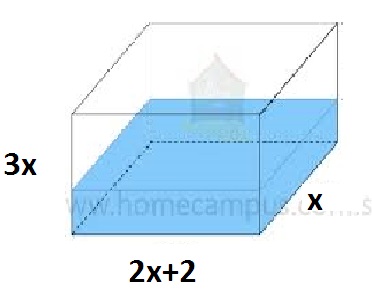
Phone No:9445368909

Name of the vidyalaya: KV Anna Nagar

KVS Region: Chennai

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 24** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to express a polynomial expression forthe volume of the tank. | |

Raju constructs an open cuboidal water tank for his house. He wants to cement the floor of the tank and white wash the walls of the tank. If the length of the tank is 2 more than twice the breadth of the tank and the height is three times the breadth of the tank.



24.3 Find a polynomial expression for the volume of the tank.

**Mathematical Literacy**

|  |  |  |
| --- | --- | --- |
| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern:**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: 6x3+6x2

Partial credit: No partial credit

No credit: Any other response

Name of the Teacher/Item Writer: K THANERAJ

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KVS Region: Chennai

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 25**  Milkman | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to find the volume of the container. | |



A milkman is having one milk container. The number of litres in the container is given by the expression x4 + x3 – 2x2+ x +1 (where x>0). He sells the equal litres of milk to each people daily in DAE Township, Kalpak am.

25.1 The number of peoples that he sells in the first avenue is given by the expression (x-1). What will be the quantity of milk remaining in the container (in litres)?

**Mathematical Literacy**

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| --- | --- | --- |
| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competency cluster | | Conceptual understanding |
| Overarching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern:**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: 2

Partial credit: No partial credit

No credit: Any other response

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KVS Region: Chennai

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 25** | **Class: IX**  **Expected time: 3 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to find the volume of the container. | |



A milkman is having one milk container. The number of litres in the container is given by the expression x4 + x3 – 2x2+ x + 1 (where x>0). He sells the equal litres of milk to each people daily in DAE Township, Kalpakkam.

25.2 The number of peoples that he sells in the second avenue is given by the expression x-2. How many litres of milk is left out in the container?

**Mathematical Literacy**

|  |  |  |
| --- | --- | --- |
| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 2 |
|  | |  |
| **Credit pattern:**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: 19

Partial credit: No partial credit

No credit: Any other response

Name of the Teacher/Item Writer: K THANERAJ

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KVS Region: Chennai

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **CONTEXT : 26**  **Cake** | **Class: IX**  **Expected time: 5 minutes**  **Total credit:02** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  Children are able to find the height from the volume of the container. | |



A new bakery offers decorated cakes for children’s birthday parties and other special occasions. The volume of a small cake is given by the expression 3x4-3x3-33x2+54x.

26.1 The length of a cake is given by 3x and the width is given by x-2. Find the height of the cake.

**Mathematical Literacy**

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| --- | --- | --- |
| **FRAMEWORK** | | **CHARACTERISTICS** |
| Competancy cluster | | Conceptual understanding |
| Overaching Idea | | Changes and relations |
| Context | | Societal |
| Item Format | | Long Answer type |
| Cognitive process | | Interpreting |
| Proficiency Level | | Level 4 |
|  | |  |
| **Credit pattern:**  **Full credit:02**  **Partial credit:01**  **No credit:0** |

**Description of Answer Key and Credits**

Full Credit: x2+x-9

Partial credit: No partial credit

No credit: Any other response

Name of the Teacher/Item Writer: M MANIVANNAN

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KVS Region: Chennai

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 3 minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |

31.2 Write a quadratic polynomial for the revenue R.

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | employing mathematical concepts |
| Overarching Idea | Change and relationships |
| Context | Occupational |
| Item Format | Short Answer |
| Cognitive process | Skill |
| Proficiency Level | 1 |

**Full credit: 02 R=** 4480-633m-m2

**Partial credit: 01** No partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time:2 minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |

32.2 If the volume of box is 48 cubic feet , then find the height

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | employing mathematical concepts |
| Overarching Idea | Space and Shape |
| Context | Scientific |
| Item Format | Short Answer |
| Cognitive process | Skill |
| Proficiency Level | 2 |

**Mathematical Literacy**

**Full credit: 02**  x3+6x2+8x=48 solving we get x=2

**Partial credit: 01** x3+6x2+8x=48

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |

[](https://www.google.com/imgres?imgurl=https://is2-ssl.mzstatic.com/image/thumb/Purple49/v4/0d/6f/dc/0d6fdc2d-fe3d-8957-6e66-5ffc8c16357f/source/512x512bb.jpg&imgrefurl=https://appadvice.com/app/airplane-washington-dc/1080893032&docid=BeVUQRbrX_IZvM&tbnid=Vg8HtHIficarYM:&vet=12ahUKEwjD4rjIxKbnAhVqxDgGHc8hCGU4ZBAzKBswG3oECAEQNw..i&w=512&h=512&itg=1&bih=523&biw=1138&q=aeroplane%20washington%20dc&ved=2ahUKEwjD4rjIxKbnAhVqxDgGHc8hCGU4ZBAzKBswG3oECAEQNw&iact=mrc&uact=8)

Item : (33) Fly away

33.1 The distance between Washington, D.C., and San Francisco is 2800 miles. An airplane flies at a speed of 400 miles per hour in still air. Suppose a wind of w miles per hour blows from west to east across the country. Write a rational expression for the time for a flight from San Francisco to Washington,D.C. Then write a second rational expression for the time for a flight from Washington D.C., to San Francisco

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Space and Shape |
| Context | Scientific |
| Item Format | Short Answer |
| Cognitive process | Skill |
| Proficiency Level | 3 |

**Description of Answer Key and Credits**

**Full credit: 02** 2800/400+w hr. 2800/400-w hr.

**Partial credit: 01** writing any one expression correctly

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class:IX**  **Expected time: 3 minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |

33.2 What is the flight time in each direction if the wind speed is 10 miles per hour ?

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | employing mathematical concepts |
| Overarching Idea | Space and Shape |
| Context | Scientific |
| Item Format | Short Answer |
| Cognitive process | Skill |
| Proficiency Level | 1 |

**Full credit: 02** About 6 hr 50 min ; About 7 hr 11 min

**Partial credit: 01** Writing any one correctly

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |

[](https://www.google.com/imgres?imgurl=https://img.freepik.com/free-photo/child-eats-ice-cream-selective-focus_73944-3318.jpg?size=626&ext=jpg&imgrefurl=https://www.freepik.com/premium-photo/child-eats-ice-cream-selective-focus_3853217.htm&docid=wojrDEdxfrQRQM&tbnid=Ui-l4801VYdufM:&vet=12ahUKEwjA_fvNzqbnAhXG4jgGHXGIBR44ZBAzKFgwWHoFCAEQwwE..i&w=626&h=416&bih=523&biw=1138&q=%20eating%20icecream%20cone&ved=2ahUKEwjA_fvNzqbnAhXG4jgGHXGIBR44ZBAzKFgwWHoFCAEQwwE&iact=mrc&uact=8)

Item : (34) What’s the Scoop?

34.1 For their ice cream stores , Scoops wants to design a new cone that is 12cm high and holds ¼ litre (250cm3 ) of ice cream when completely filled and topped with a hemispherical scoop. Give a polynomial function V(r) for the volume of the cone and hemisphere?

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Space and Shape |
| Context | Scientific |
| Item Format | Short Answer |
| Cognitive process | Skill |
| Proficiency Level | 3 |

**Description of Answer Key and Credits**

**Full credit: 02**  V(r) = 2/3 ∏ r3 + 4∏ r2

**Partial credit: 01** writing any one expression correctly

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class:IX**  **Expected time: 3 minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |

34.2 What radius the cone should be in order to hold ¼ litre

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | employing mathematical concepts |
| Overarching Idea | Space and Shape |
| Context | Scientific |
| Item Format | Short Answer |
| Cognitive process | Skill |
| Proficiency Level | 1 |

**Full credit: 02** About 3.54 cm

**Partial credit: 01** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 4minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |

If an explosion in a fireworks display radiates sound uniformly in all directions, the intensity at any distance r is I



P/(4
r
2), where P is the sound power of the explosion.

Item : (35) Fire worksKaboom

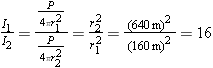
35.1 During a fireworks display, a rocket explodes high in the air, as above figure. Assume that the sound spreads out uniformly in all directions and that reflections from the ground can be ignored. When the sound reaches listener 2, who is *r*2http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif=http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif640 m away from the explosion, the sound has an intensity of *I*2http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif=http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif0.10 W/m2. What is the sound intensity detected by listener 1, who is *r*1http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif=http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif160 m away from the explosion?

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Space and Shape |
| Context | Scientific |
| Item Format | Short Answer |
| Cognitive process | Skill |
| Proficiency Level | 3 |

**Description of Answer Key and Credits**

**Full credit: 02**



*I*1http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif=http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif(16)*I*2http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif=http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif(16)(0.10 W/m2)http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gif=http://demo.webassign.net/ebooks/cj6demo/art/common/pixel.gifhttp://demo.webassign.net/ebooks/cj6demo/art/math/c16/math022.gif.

**Partial credit: 01 16**

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



Item 36 : Auto fare

36.1 The Auto fare is found as minimum Rs.`25 for 3 kilo meter and thereafter Rs.` 12 per kilo meter. Which of the following equations represents the relationship between the total cost ‘c’ in rupees and the number of kilometers n?

(a) c = 25 + n (b) c = 25 + 12n (c) c = 25 + (n–3)12 (d) c = (n–3)12

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Change and relationship |
| Context | Occupational |
| Item Format | MCQ |
| Cognitive process | Knowledge |
| Proficiency Level | 2 |

**Description of Answer Key and Credits**

**Full credit: 02** c

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 3minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



Item 37 : KVS VOLLEY Ball TOURNAMENT FOR STAFF

37.1KVS has organized Volley ball tournament for KVS staff during winter break 2019 in Bhubaneswar. The number of volleyball games that must be scheduled in a league with n teams is given by G(n)=where each team plays with every other team exactly once. A league schedules 25 games. How many teams are in the league?

(a) 2 (b) 25 (c) 30 (d) 20

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Quantity |
| Context | Societal |
| Item Format | MCQ |
| Cognitive process | Knowledge |
| Proficiency Level | 2 |

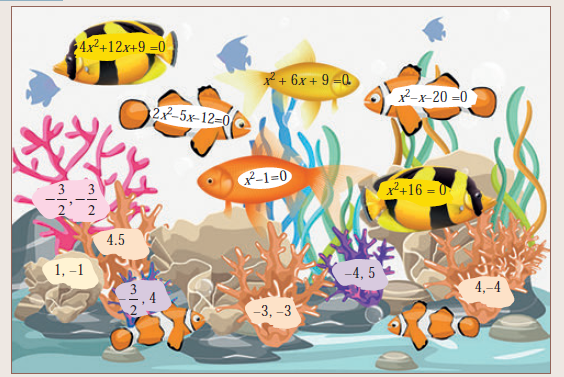
**Description of Answer Key and Credits**

**Full credit: 02** b

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



Item 38 : Aquarium

38.1 Serve the fishes (Equations) with its appropriate food (real roots). Identify a fish which cannot be served?

(a) (b) (c) x2+16=0 (d)

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Quantity |
| Context | Personal |
| Item Format | MCQ |
| Cognitive process | Knowledge |
| Proficiency Level | 1 |

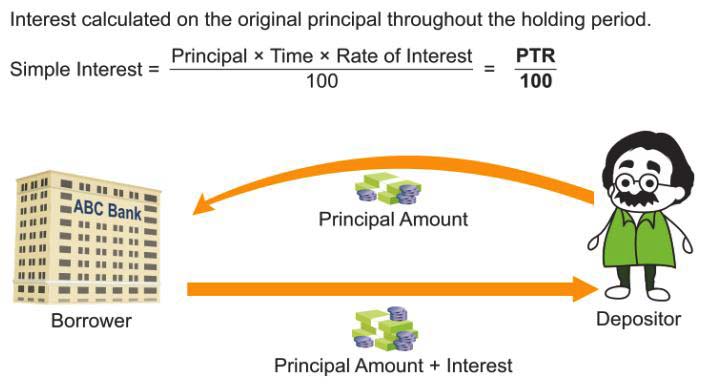
**Description of Answer Key and Credits**

**Full credit: 02** c

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



Item 39 : Simple Interest

39.1 Find the simple interest on Rs. x2-xy+y2 for 10 years at (x+y)% per annum.

(a) (b) (c) (d) )

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Quantity |
| Context | Personal |
| Item Format | MCQ |
| Cognitive process | Knowledge |
| Proficiency Level | 1 |

**Description of Answer Key and Credits**

**Full credit: 02** d

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



Item 40 : Picnic

40.1 Mohan working in Chennai plans to gotoOoty along with his family during summer vacation by his own car.He drives his car at a uniform speed of (x + 8) km/hr. and had driven the car (x + 8) hours. Find the distance between Chennai and Ooty as Polynomial.

(a) (x2+64) km (b) (x2+16x+64) km (c)(x2+8x+64) km (d) (x2+16x+16) km

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Change and relationship |
| Context | Personal |
| Item Format | MCQ |
| Cognitive process | Knowledge |
| Proficiency Level | 2 |

**Description of Answer Key and Credits**

**Full credit: 02** b

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



Item 41 : Super Market

## 41.1 Reema used a polynomial in more than once when she went for shopping. She went to a super market AmbikaApplam at Adyar Chennai and wanted to know how much half of a kg of sugar, three kg of flour, two dozen eggs and three packets of milk cost. Construct a simple polynomial, letting "f" denote the price of flour, "e" denote the price of a dozen eggs "m" the price of a packet of milk and “s” the price of Sugar

## Mathematical Literacy

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | formulating situations mathematically |
| Overarching Idea | Change and relationship |
| Context | Personal |
| Item Format | Short Answer |
| Cognitive process | Knowledge |
| Proficiency Level | 2 |

**Description of Answer Key and Credits**

## Full credit: 02 3f + 2e + 3m+ 0.5s

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **Grocery shop** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



## 41.2 If sugar costs Rs 60 per kg, flour costs Rs. 50 per kg, eggs cost Rs 60 a dozen and milk costs Rs. 30 a packet, she will be charged ---------------- Rupees

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | Employing Mathematical Concepts, facts, porcedures and reasoning |
| Overarching Idea | Change and relationship |
| Context | Personal |
| Item Format | Short Answer |
| Cognitive process | Knowledge |
| Proficiency Level | 2 |

**Description of Answer Key and Credits**

**Full credit: 02** Rs.390

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS**  **Combo offer** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



## 41.3 To attract the customers the shopkeeper offered combo price “if you purchase, three kg of flour, two dozen eggs and three packets of milk” then 0.5kg sugar at free of cost. In this case what is the cost of three kg of flour, two dozen eggs, three packets of milk and 0.5kg sugar?

## Mathematical Literacy

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | Employing Mathematical Concepts, facts, porcedures and reasoning |
| Overarching Idea | Change and relationship |
| Context | Personal |
| Item Format | Short Answer |
| Cognitive process | Understanding |
| Proficiency Level | 2 |

**Description of Answer Key and Credits**

**Full credit: 02** Rs.**360**

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



## 41.4 On the occasion of Diwali he offered an cash back offer 20% for the above mentioned items up to Rs50/. She will be charged -----------------------Rupees

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | Employing Mathematical Concepts, facts, porcedures and reasoning |
| Overarching Idea | Change and relationship |
| Context | Personal |
| Item Format | Short Answer |
| Cognitive process | Application |
| Proficiency Level | 2 |

**Description of Answer Key and Credits**

**Full credit: 02** Rs.**.340**

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response

|  |  |  |
| --- | --- | --- |
| **Domain: Mathematics literacy** | **Theme:POLYNOMIALS** | **Class: IX**  **Expected time: 2minutes**  **Total credit: 2** |
| **Description of Item**   |  |  | | --- | --- | | **🗸** | **Text** | | **🗸** | **Image** | |  | **Table** | |  | **Graph** | |  | **Map** | |  | **Poem** | | **Learning outcome:**  **(as per NCERT)**  The learner identifies or classifies polynomialsamong algebraic expressions and also factorisesthem by applying appropriate algebraicidentities. | |



## 41.5 If gets 10% discount on each item during Republic day – 2020 then

## she will be charged -------------Rupees. Among all which ismore beneficial?

**Mathematical Literacy**

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency cluster | Interpreting, applying and evaluating mathematical outcomes |
| Overarching Idea | Change and relationship |
| Context | Personal |
| Item Format | Short Answer |
| Cognitive process | Understanding |
| Proficiency Level | 2 |

**Description of Answer Key and Credits**

**Full credit: 02 Rs.351, Cash back of 20% up to Rs50**

**Partial credit:** no partial credit

**No credit: 00 :**other response / no response