**CRITIRCAL AND CREATIVE THINKING ITEMS**

**CLASS X : CHAPTER 1 : REAL NUMBERS**

**INDEX**

|  |  |
| --- | --- |
| **S.No.** | **Theme of the item** |
|  | **Fundamental Theorem of Arithmetic** |
|  | **What am I?** |
|  | **Step Up Step Down** |
|  | **LCM & HCF** |
|  | **Packaging supports** |
|  | Food Suppliers |
|  | Seating Plan |
|  | **Indian Army** |
|  | Origin of real number |
|  | **Special Olympiad World Game (SOWG)** |

## CCT PRACTICE ITEM - 01

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| **Domain:**  Mathematical Literacy | | |  | **Theme:**  **Fundamental Theorem of Arithmetic** | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)**   * Develop mastery of basic algebraic skills. * To develop ability to think and analyze logically. * Feel the flow of reason while solving a problem. | |
|  | **yes** | Text |
| **yes** | Image |
|  | Table |
|  | Graph |
|  | Map |
|  | Poem |

Sundaram joined a company for a fixed salary per month. After few months, the management felt happy with his work and multiplied his salary by some n times. This happened every few months and his salary kept getting multiplied and he reached a salary of 360 zeds. Every time the management increased the salary by a prime number of times only and his initial salary was 5 zeds.



(Image source – google)

Question: 1

**1.1**How many times management did give incentive to Sundaram?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 1 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

**1.2**What is the maximum increment he got in his salary?

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Description of Answer Key and Credits:

Answers:

**1**

**.**

**1**

Full credit: 5 times.

Nil credit: Any other responses.

Explanation:

**1**

**.**

**1**

Prim

e factorization of 360 will be



so number of increments, he

will get is 5.

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

Answers:

**1.2**Full credit: 3 Zeds

Nil credit: Any other responses.

Explanation:

**1.2** Highest prime factor included in 360 is 3, so 3 zeds will be the highest increments which he got.

**1.3**What is the least incentive he got? What would be his salary had he got the same type of increment every time?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of answer keys and explanation:

Answers:



**1.3**Full credit: 2 zeds and 160 zeds Nil Credit: Any other responses.

Explanation:

**1.3** Least prime factor involved in factorization of 360 is 2, so the least incentive he got is

2 zeds. If he got the same kind of increment in his salary which is 2 zeds then his salary

would be 160 zeds

**1.4**Had his first salary ~~had~~ been 9 zeds what would be his present Salary?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

Answers:

**1**

**.**

**4**

Full credit: 648 zeds

Nil Credit: Any other responses.

Explanation:

**1.4**

If his fi

rst salary had been 9 zeds then his present salary can be calculated as



## CCT PRACTICE ITEM - 02

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| **Domain:**  Mathematical Literacy | | |  | **Theme: What am I?** | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)**   * Understanding of different numbers. * Use of constructive approach. | |
|  | **yes** | Text |
|  | Image |
| **Yes** | Table |
|  | Graph |
|  | Map |
|  | Poem |

Question: 2 Look at the table given below and answer the following questions:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **-.8** | **-.12** | |  |  | **533** |
| **234** | 5 |  | 7.7 | |-.4| | 1/1 |
| **2π** | 645 | | -.1 | a | .39 |
| **2/1** | b | |  | -12 | -0.1 |
| **√3** | -1/2 | | |1.4| | 5.7 | 1/7 |

**2.1** What would be the ~~any~~ possible value of a, if a is the least number in the table?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number System |
| Overarching Idea | Rational and Irrational number |
| Context | Types of Numbers |
| Item Format | close constructed response |
| Cognitive Process | Analysis and Synthesis |
| Proficiency Level | 1 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points Nil Credit: 0 points

|  |
| --- |
| **Answers:**  2.1Full credit: Open ended answer but ‘a’ should satisfy the condition. Nil Credit: Any other responses.  **Explanation:**  2.1Least number present in the table is -12 so any number less than this will be the correct answer. |

2.2What could be the possible value of b, if b is the highest number in the table?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number System |
| Overarching Idea | Rational and Irrational number |
| Context | Types of Numbers |
| Item Format | close constructed response |
| Cognitive Process | Analysis and Synthesis |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil

Credit: 0 points

**Answers**

2

.

2

Full credit: Open ended answer but’ b’ should satisfy the condition.

Nil Credit: Any other responses.

**Explanation:**

Highest number present in the table is

2.2



so any number greater than this

will be the correct answer.

2.3What are the types of numbers given in the table?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number System |
| Overarching Idea | Rational and Irrational number |
| Context | Types of Numbers |
| Item Format | Short response items and close constructed response |
| Cognitive Process | Analysis and Synthesis |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points Nil Credit: 0 points

**Answers:**

**2.3** Full credit: positive integers, negative integers, rational numbers, irrational number, repeating rational number and unknown numbers (Real numbers). Nil Credit: Any other response.

**Explanation:**

**2.3** All type of numbers are needed to be mentioned after proper analysis of table.

2.4Which type of numbers are missing in the table?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number System |
| Overarching Idea | Rational and Irrational number |
| Context | Types of Numbers |
| Item Format | Short response items and close constructed response |
| Cognitive Process | Analysis and Synthesis |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points Nil Credit: 0 points

|  |
| --- |
| **Answers:**  2.4 Full credit: Imaginary numbers, non-repeating numbers  Nil Credit: Any other responses.  **Explanation:**  2.4 Missing types of number are needed to find out from the given table. |

2.5Replace a and b from the missing type of values?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number System |
| Overarching Idea | Rational and Irrational number |
| Context | Types of Numbers |
| Item Format | Short response items and close constructed response |
| Cognitive Process | Analysis and Synthesis |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  **2.5** Full credit: a and b can be replaced by imaginary and non-repeating non terminating numbers.  Nil credit: Any other responses.  **Explanation:**  **2.5** Any number from missing type of numbers is required to write. |

# CCT PRACTICE ITEM - 03

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| **Domain:**  Mathematical Literacy | | |  | **Theme:**  **Step Up Step Down** | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)**   * To acquaint students with different aspects of mathematics used in real life. * To develop interest in mathematics as a problem solving tool. | |
|  | **yes** | Text |
| **Yes** | Image |
|  | Table |
|  | Graph |
|  | Map |
|  | Poem |

Nobita, Zian and Suzuko are playing a game. Nobita climbs 5 stairs and gets down 2 stairs in one turn. Zian goes up by 7 stairs and comes down by 2 stairs every time. Suzuko goes 10 stairs up and 3 stairs down each time. Doing this they have to reach to the nearest point of 100th stairs and they will stop once they find it impossible to go forward. (They have less number of stairs than required forward stairs).



(Image source – Google)

**3.1** Who reaches the nearest point?

1. Nobita
2. Zian
3. Suzuko
4. All together reach to the nearest point.

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Algebra |
| Overarching Idea | LCM & HCF |
| Context | Application of real numbers in real situation |
| Item Format | simple MCQs |
| Cognitive Process | Problem Solving |
| Proficiency Level | 1 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  3.1Full credit: Nobita.  Nil Credit: Any other responses. Explanation:  3.1Nobita will reach up to 93 steps then he will go for 5 steps up and 2 steps down hence covering 96 steps. Since 100 th step is final, so he will not cover more steps. Zian will reach up to 95 steps, since 100 th step is final, so he will not cover more steps. Suzuko will reach up to 91 steps, since 100 th step is final, so she will not cover more steps. |

**3.2**How many times can they meet in between on same step?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Algebra |
| Overarching Idea | LCM & HCF |
| Context | Application of real numbers in real situation |
| Item Format | Closed constructed |
| Cognitive Process | Problem Solving |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  3.2Full credit: No, they cannot meet in between on same step.  Nil Credit: Any other responses.  Explanation:  3.2 Since, LCM (3, 5, 7) =105 step. Since, total steps are 100 steps only. |

**3.3**What is the first stair where any two out of three will meet together?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Algebra |
| Overarching Idea | LCM & HCF |
| Context | Application of real numbers in real situation |
| Item Format | Closed constructed |
| Cognitive Process | Problem Solving |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  3.3Full credit: After 15 steps Nobita and Zian will meet for the first time. Nil Credit: Any other responses. Explanation:  3.3 Since LCM of(3,5)=15 ;LCM(5,7)=35 ;LCM(3,7)=21. Since, 15 is the smallest so Nobita and Zian will meet for the first time after 15 steps. |

3.4Who takes least number of steps to reach near hundred?

1. Nobita
2. Zian
3. Suzuko
4. All of them take equal number of steps.

|  |  |
| --- | --- |
| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Algebra |
| Overarching Idea | LCM & HCF |
| Context | Application of real numbers in real situation |
| Item Format | Closed constructed |
| Cognitive Process | Problem Solving |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  **3.4**Full credit: Suzuko will take least number of steps. Nil Credit: Any other responses. Explanation:  3.4 Nobita will take 32 steps, Zian will take 19 steps and Suzuko will take 13 steps to reach to 96 steps, 95 steps and 91 steps respectively. |

## CCT PRACTICE ITEM - 04

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| --- | --- | --- | --- | --- | --- |
| **Domain:**  Mathematical Literacy | | |  | **Theme: LCM & HCF** | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)**   * Employ conceptual knowledge in day to day life. * Consolidate the Mathematical knowledge and skills acquired at the upper primary stage. | |
|  | **Yes** | Text |
| **Yes** | Image |
|  | Table |
|  | Graph |
|  | Map |
|  | Poem |

Question: A woman wants to organize her birthday party. She was happy on her birthday but there was a problem that she does not want to serve fast food to her guests because she is very health conscious. She has 15 apples and 40 bananas at home and decided to serve them. She want to distribute fruits among guests. She does not want to discriminate among guests so she decided to distribute equally among all. So,



(Image source – google)

4.1How many guests she can invite?

1. 6
2. 5
3. 3
4. 4

|  |  |
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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Quantity based problem |
| Overarching Idea | Use of real Number |
| Context | LCM & HCF |
| Item Format | Simple MCQ |
| Cognitive Process | Logical thinking |
| Proficiency Level | 1 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  4.1Full credit: 5 GUESTS any other response Nil Credit.  Explanation:  4.1We need to calculate HCF (15, 40) = 5 ie fruits will be equally distributed among 5 guests. |

4.2How many apples and bananas will each guest get?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Quantity based problem |
| Overarching Idea | Use of real Number |
| Context | LCM & HCF |
| Item Format | Closed and Open Constructive question |
| Cognitive Process | Logical thinking |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  1Full credit: 3 apples and 8 bananas any other response Nil Credit.  Explanation:  1Out of 15 apples, each guest will get (15 ÷ 5) = 3 apples and out of 40 bananas, each guest will get (40 ÷ 5) = 8 bananas. |

4.3If a guest claims that he got the highest no of fruits amongst all, is this situation possible? If yes, what will be the number of fruits that person got?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Quantity based problem |
| Overarching Idea | Use of real Number |
| Context | LCM & HCF |
| Item Format | Closed and Open Constructive test item |
| Cognitive Process | Logical thinking |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  4.3 Full credit: Not possible any other response Nil Credit Explanation:  4.3 No guest can get fruits more than any guest. |

4.4If the number of guests double then is it possible to distribute the fruits equally?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Quantity based problem |
| Overarching Idea | Use of real Number |
| Context | LCM & HCF |
| Item Format | Simple MCQ & Closed and Open Constructive answer |
| Cognitive Process | Logical thinking |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  4.4Full credit: 1.5 apples and 4 bananas any other response Nil Credit.  Explanation:  4.4 Out of 15 apples, each guest will get (15 ÷ 10) = 1.5 apples and out of 40 bananas, each guest will get (40 ÷ 10) = 4 bananas. |

## CCT PRACTICE ITEM - 05

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Domain:**  Mathematical Literacy | | |  | **Theme:**  **Packaging supports** | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 Points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)**   * Acquire knowledge of basic concepts. * Apply the knowledge and skills needed to solve the problems, wherever possible. | |
|  | **yes** | Text |
| **yes** | Image |
| **yes** | Table |
|  | Graph |
|  | Map |
|  | Poem |

An online shopping website sells `10 types of items which are packed into various sizes of cartons which are given below.

|  |  |
| --- | --- |
| Carton type | Inner Dimensions (l x w)cm2 |
| Small | 6X8 |
| Medium | 12X24 |
| Large | 24X 36 |
| Extra large | 36 X 48 |
| XXL | 48 X 96 |

(Image source – google)

The company places supporting thermocol sheets inside every package along the edges. The company thought of procuring same sized sheets for all types of cartons.

**5.1**What should be the maximum size of the sheet that fits into all type of cartons?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Shape and Sizes |
| Overarching Idea | Geometry |
| Context | LCM & HCF |
| Item Format | Closed constructive responses |
| Cognitive Process | Data & geometry analysis |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  5.1Full credit: Dimension of required sheet is 6 x 4 and no credit for other responses.  Explanation:  5.1To find dimension of maximum sized sheet which can be fitted in all carton, it is required that we should find HCF of length of all different sized cartons that  is HCF(6,12,24,36,48) = 6 and HCF of width of all cartons that is HCF(8,24,36,48,96) = 4. |

5.2How many such sheet sizes are possible?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Shape and Sizes |
| Overarching Idea | Geometry |
| Context | LCM & HCF |
| Item Format | Closed constructive responses |
| Cognitive Process | Data & geometry analysis |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  5.2 Full credit: Only one and no credit for other responses.  Explanation:  5.2 Because HCF of certain numbers is always unique so only one sized sheet is possible. |

5.3The company later introduced a new size of carton called semi large whose measurements are 14 X 15. Whether the existing maximum size sheet fits this shape?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Shape and Sizes |
| Overarching Idea | Geometry |
| Context | LCM & HCF |
| Item Format | Closed constructive responses |
| Cognitive Process | Data & geometry analysis |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  5.3 Full credit: No and no credit for other responses.  Explanation:  5.3 14 is not multiple of 6 and 15 is not multiple of 4 so it is not possible to have a carton with dimension 14 x 15. |

5.4What should have been the size of the semi large carton (which is larger than medium carton but smaller than large carton) so that the maximum sized sheet remains same?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Shape and Sizes |
| Overarching Idea | Geometry |
| Context | LCM & HCF |
| Item Format | Closed constructive responses |
| Cognitive Process | Data & geometry analysis |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  5.4Full credit: Open ended question but answer should be in the following form 18 x (multiple of 4 but not greater than 36) and no credit for other responses.  Explanation:  5.4 18 is the only multiple of 6 between 12 & 24 for length of semi sized carton and there are choices for width of semi sized cartons from 28 and 32, so possible answers are 18 x 28 and 18 x 32. |

CCT PRACTICE ITEM - 06

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Domain:**  Mathematical Literacy | | |  | **Theme:** Food Suppliers | **Class:** X  **Expected Time:** 30 Minutes  **Total Credit:** 10 Points |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT):**   * To develop necessary skills of maths to understand real life problems. * To correlate acquired knowledge and understanding to real life problem solving process. | |
|  | **yes** | Text |
| **yes** | Image |
|  | Table |
|  | Graph |
|  | Map |
|  | Poem |

An agency supplies bread and jams to three places -a hospital, a bank and a school. Bread comes in a bunch of 8 pieces and Jam comes in a pack of 6 pieces. On a particular day, agency has supplied x packets of bread and y packets of jam to the school. On the same day, agency has supplied 3x packets of bread along with sufficient packets of jam to hospital. It is known that the number of students in the school are between 500 and 550.



Question:

6.1How many students are there in school?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 1 |

#### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  6.1Full credit: 504 students  Nil credit: Any other responses.  Explanation:  6.1Firstly we will find LCM (8, 6) =24. Now we will find a multiple of 24 in between 500 and 550 i.e., 504. |

6.2How many packets of bread are distributed in the school?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 1 |

#### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  6.2 Full credit: 63 packets of bread are distributed in the school. |
| Nil credit: Any other responses. Explanation:  6.2 For equal distribution of bread among each student, we need 504 pieces of bread. Hence, we need (504/8=63) i.e. 63 packets of bread. |

6.3 How many packets of jams are distributed in the school?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  6.3Full credit: 84 packets of jam are distributed in the school. Nil Credit: Any other responses.  Explanation:  6.3 For equal distribution of jam pieces among each student, we need 504 pieces of jam. Hence, we need (504/6=84) i.e. 84 packets of bread. |

6.4 How many packets of bread are distributed in the hospital?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  6.4Full credit: 189 packets of bread are distributed in the hospital.  Nil Credit: Any other responses. Explanation:  6.4 For hospital, we need 3x packets of bread i.e. 3X 63= 189 packets of bread. |

6.5 How many packets of jams are distributed in the hospital?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution |
| Context | Multiplication of prime numbers |
| Item Format | Closed response |
| Cognitive Process | Analysis & Application |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  6.5Full credit: 252 packets of jam are distributed in the hospital. Nil credit: Any other responses.  Explanation:  6.5Since, number of bread pieces are (189X8=1512 pieces), 1512 pieces of bread are required and so we need same number of jam pieces. Hence (1512/6=252) 252 packets of jam are distributed in the hospital. |

## CCT PRACTICE ITEM - 07

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| --- | --- | --- | --- | --- | --- |
| **Domain:**  Mathematical Literacy | | |  | **Theme:**  Seating Plan | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 Points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)**   * Develop mastery of basic algebraic skills. * Feel the flow of reason while solving a problem. | |
|  | **yes** | Text |
| **yes** | Image |
|  | Table |
|  | Graph |
|  | Map |
|  | Poem |

A hall has a certain number of chairs. Guests want to sit in different groups like in pairs, triplets, quadruplets, fives and sixes etc. When organizer arranges chairs in such pattern like in 2’s, 3’s, 4’s 5’s and 6’s then 1, 2, 3, 4 and 5 chairs are left respectively. But when he arranges in 11's, no chair will be left.



(Image source – google)

Question: 7

7.1In the hall, how many chairs are available?

(a) 407 (b) 143 (c) 539 (d) 209

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution to real life problems |
| Context | Euclid’s division Lemma |
| Item Format | Closed constructive response and MCQ |
| Cognitive Process | Problem solving strategy |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  7.1 Full credit: 539 chairs.  Nil credit: Any other responses. Explanation:  7.1By dividing all the options by 2,3,4,5,6 and 11, we will get that 539 is the only option which leaves remainder 1,2,3,4,5,0 on division by the numbers 2,3,4,5,6,11 respectively. |

7.2If one chair is removed, which arrangements are possible now?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution to real life problems |
| Context | Euclid’s division Lemma |
| Item Format | Closed constructive response and MCQ |
| Cognitive Process | Problem solving strategy |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  7.2 Full credit: pairs of 2 chairs is only possible now. Nil credit: Any other responses. Explanation:  7.2 After removing 1 chair, we are left with 538 chairs. On arranging chairs in pair of 3's,4's,5's,6's,11's ;1,2,3,4,10 chairs are left. So, only pair of 2 chairs is possible now. |

7.3If one chair is added to the total number of chairs, how many chairs will be left when arranged in 11's.

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution to real life problems |
| Context | Euclid’s division Lemma |
| Item Format | Closed constructive response and MCQ |
| Cognitive Process | Problem solving strategy |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  7.3 Full credit: 1 chair will be left.  Nil Credit: Any other responses Explanation:  7.3 539 chairs are already arranged in pair of 11's .On adding 1 extra chair, that 1 chair will be left only. |

7.4What will happen to the arrangement if same number of chairs will be arranged in 7’s?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Data Analysis |
| Overarching Idea | Finding solution to real life problems |
| Context | Euclid’s division Lemma |
| Item Format | Closed constructive response and MCQ |
| Cognitive Process | Problem solving strategy |
| Proficiency Level | 3 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  7.4 Full credit: No chair will be left.  Nil Credit: Any other responses.  Explanation:  7.4 On arranging chairs in pair of 7's, no chair will be left. |

## CCT PRACTICE ITEM – 08

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Domain:**  Mathematical Literacy | | |  | **Theme: Indian Army** | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)** To develop ability to think.  To develop an interest in students to study Mathematics as discipline. | |
|  | **yes** | Text |
| **yes** | Image |
|  | Table |
|  | Graph |
|  | Map |
|  | Poem |

Indian Army is the third biggest military contingent in the World next to USA and China.

However, there are many firsts that make Indian army stand out in the world, making us all Indians very proud. Knowing them, will help you celebrate Republic day with greater vigour and gratitude. Rena get the chance to see the republic day parade on the 71th republic day Parade in Delhi, where she see on the Raj path an Army contingent of 616 members is to march behind an army band of 32 members in a parade the sequence is followed by a CRPF troops with 468 soldiers are to march behind the 222 members of bikers. These two groups are to march in the same number of columns. This sequence of soldiers by different states Jhanki which are showing the culture of the respective states. Seeing all this she got thrilled with proud.



(

Image source

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google)



Questions:

8.1What is the maximum number of columns in which the army troop can march?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Real numbers |
| Context | Indian Army Parade |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  8.1Full credit: 8 columns.  Nil credit: Any other responses.  **Explanation:**  8.1We will find the HCF (616, 32) = 8. |

8.2What is the maximum number of columns in which the CRPF troop can march?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Real numbers |
| Context | Indian Army Parade |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  8.2Full credit: 6 columns.  Nil credit: Any other responses.  **Explanation:** |

8.2We will find the HCF (222,468) = 6.

8.3What value should be added or subtracted with the No of CRPF soldiers and the number of bikers so that combined value gives us maximum no of columns?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Real numbers |
| Context | Indian Army Parade |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  8.3Full credit: 9 Soldiers will be subtracted from CRPF Soldiers and 19 bikers will be added to the number of bikers.  **Explanation:**  8.3According to the question HCF= 468 x+ 222y now we will find the values of x and y and here HCF= 6. Hence, value of x= -9 and y =19. |

8.4Maximum no of columns in which total army soldiers & CRPF soldier’s together & Total band members & bikers together can march past?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Real numbers |
| Context | Indian Army Parade |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  8.4Full credit: 2.  Nil Credit: Any other responses.  **Explanation:**  8.4According to the question, we have to find out HCF (616+468, 222+32) =2. |

8.5What value makes the, product of no. of army soldiers and band members equal to the maximum no. of columns in which they can march?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Real numbers |
| Context | Indian Army Parade |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

### Credit Pattern:

Full Credit: 2 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  8.5 Full credit: 2464.  Nil Credit: Any other responses.  **Explanation:**  8.5According to the question, HCF X Value= Product of two numbers. Here Value= LCM .After putting all the values of HCF and Product of two numbers, we will get LCM=2464. |

## CCT PRACTICE ITEM - 09

|  |  |  |  |  |  |
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| **Domain:**  Mathematical Literacy | | |  | **Theme:**  Origin of real number | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 Points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)** To develop critical thinking.  To feel the flow of reasoning behind answer. | |
|  | **yes** | Text |
| **yes** | Image |
|  | Table |
|  | Graph |
|  | Map |
|  | Poem |

The world of numbers is an adventurous place, where the simplest idea of any number is related to counting. Obviously we cannot start counting from zero because in any situation if there is nothing to count then how anyone can count nothing?

Nothing can have many expressions, for example – In a cricket team, no player has been selected then it can be expressed as zero team, zero batsmen, zero bowlers etc. But in the world of numbers, zero plays a significant role to create difference between 1 & 10.

Then in this world new state comes into picture i.e negative numbers. They do express their own meaning which can be compared with our real life too,in which ~~is~~wecan we go back from present.

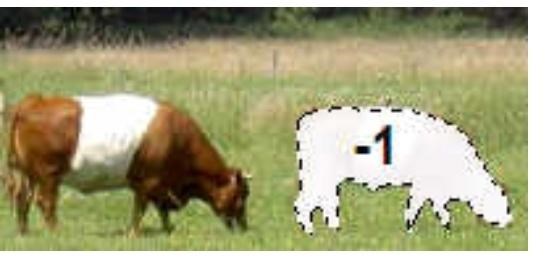
So ~~having~~ negative numbers enhance the capacity of numbers that is we can count forward and backward both.

Real numbers include two groups of numbers such as rational and irrational number.

Questions:

In reference of negative numbers can you check possibility of following situation in real life? Justify your answer with proper reasoning.

9.1 A farmer is having -1 number of cow.



(Image source – math is fun)

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Mathematical Literacy

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Introduction of numbers |
| Context | Evolution of numbers |
| Item Format | Closed and open constructed response |
| Cognitive Process | Employing the concept |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

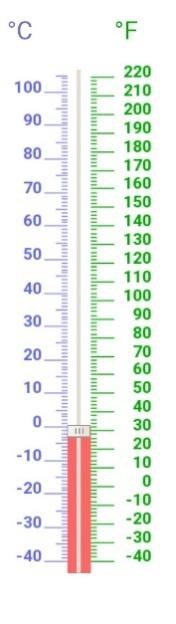
Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  9.1Full credit: Yes or No with right reasoning Nil credit: Any other responses.  Explanation:  9.1No, because objects cannot be represented in negative. Yes, it shows that the farmer has debt of one cow. |

9.2Temperature at Jammu ~~is~~ normally cross 00C in winters.

(Image source – google)

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Introduction of numbers |
| Context | Evolution of numbers |
| Item Format | Closed and open constructed response |
| Cognitive Process | Employing the concept |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

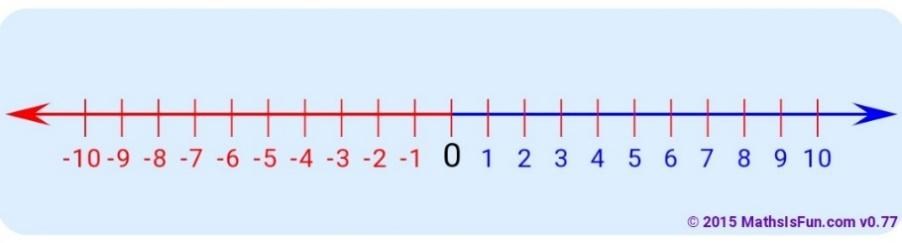
Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  9.2Full credit: Yes  Nil credit: Any other responses.  Explanation:  9.2 Yes, temperature can be negative and positive both. |

See following real line and answer following questions:



(Image source – math is fun)

9.3Arrange 2, 4,-5, 0,-2.5,-9.2, 6.3 in descending order.

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Introduction of numbers |
| Context | Evolution of numbers |
| Item Format | Closed and open constructed response |
| Cognitive Process | Employing the concept |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  9.3Full credit: 6.3>4>2>0>-2.5>-5>-9.2 Nil Credit: Any other responses.  Explanation:  9.3 Left to Right, value of numbers increase. |

9.4How many real numbers are possible between 1.2 & 1.23?

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Mathematical Literacy

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Introduction of numbers |
| Context | Evolution of numbers |
| Item Format | Closed and open constructed response |
| Cognitive Process | Employing the concept |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 point

Nil Credit: 0 point

Description of Answer Key and Credits:

|  |
| --- |
| Answers:  9.4Full credit: Infinite  Nil Credit: Any other responses.  Explanation:  9.4 In between any two real numbers, there exits infinite real numbers which include rational and irrational both. |

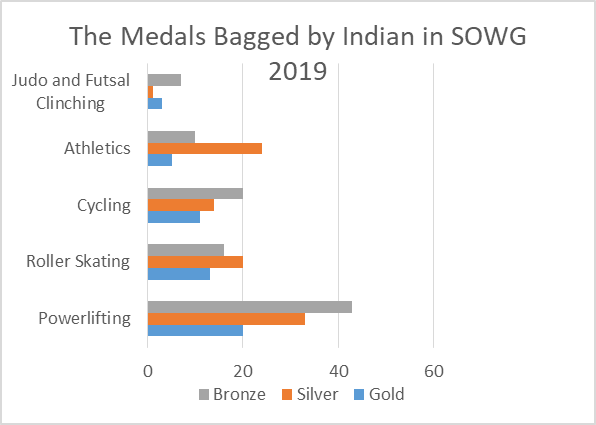
## CCT PRACTICE ITEM - 10

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Domain:**  Mathematical Literacy | | |  | **Theme: Special Olympiad World Game (SOWG)** | **Class:** X  **Expected Time: 15 minutes Total Credit: 10 points** |
| **Description of item”** | | |  | **Learning Outcome: (As per NCERT)** To develop ability to think.  To develop an interest in students to study Mathematics as discipline. | |
|  | **yes** | Text |
|  | Image |
| **yes** | Table |
| **yes** | Graph |
|  | Map |
|  | Poem |

India returned with a whopping tally of 368 medals as the Special Olympics World Game (SOWG) 2019 came to end in Abu Dhabi. India scripted history in UAE by scooping gold, silver and bronze medal.

Medals were won across all sports- athletics, golf, volleyball, aquatic, cycling, judo, powerlifting, TT, roller skating, badminton, basketball traditional, handball traditional, and football 7-side female. Indian bagged the medals as given in following table According to events.

|  |  |  |  |
| --- | --- | --- | --- |
| Events | Gold | Silver | Bronze |
| Powerlifting | 20 | 33 | 43 |
| Roller Skating | 13 | 20 | 16 |
| Cycling | 11 | 14 | 20 |
| Athletics | 5 | 24 | 10 |
| Judo and Futsal Clinching | 3 | 1 | 7 |

(Image source – google)

Question:

10.1 What is the HCF of the number of gold medal to the number of silver medal won by Indian player?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Application of LCM & HCF |
| Context | Global |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  10.1 Full credit: 4.  Nil credit: Any other responses.  **Explanation:**  10.1 We will find the sum of gold and silver medals first, then we will find HCF of total numbers. HCF (92, 52) =4. |

10.2 What is the least common multiple of total number of gold, silver and bronze medal?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Application of LCM & HCF |
| Context | Global |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  10.2 Full credit: 28704.  Nil credit: Any other responses.  **Explanation:**  10.2 We will find the LCM of total number of gold, silver and bronze medals. LCM (52, 92, 96) =28704. |

10.3 Using above information justify the statement

HCF (total gold, total silver, total bronze)  Product of total number of gold, silver and bronze medals. (YES/NO)

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Application of LCM & HCF |
| Context | Global |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  10.3 Full credit: YES.  Nil Credit: Any other responses.  **Explanation:**  10.3 The statement is correct. We can also prove it by taking total of gold, silver and bronze medal, then find LCM and HCF. |

10.4 What value makes the product of total number of gold and silver medals equal to the maximum no of medals they got in both?

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| **FRAMEWORK** | **CHARACTERISTICS** |
| Competency Cluster | Number system |
| Overarching Idea | Application of LCM & HCF |
| Context | Global |
| Item Format | Closed constructive responses |
| Cognitive Process | Constructive approach |
| Proficiency Level | 2 |

#### Credit Pattern:

Full Credit: 2.5 points

Partial Credit: 1 points

Nil Credit: 0 points

Description of Answer Key and Credits:

|  |
| --- |
| **Answers:**  10.4 Full credit: 1196.  Nil Credit: Any other responses.  **Explanation:**  10.4 According to the statement, we will use the concept HCF X LCM= PRODUCT OF TWO NUMBERS. Hence, find LCM. Hence, LCM = 1196. |

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Name of the Kendriya Vidyalaya: KV Rangapahar& KV Dimapur

KVS Region: Tinsukia Region