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APPENDICES
Appendix A
University of Calicut
Department of Education

SEMI STRUCTURED INTERVIEW SCHEDULE FOR
UPPER PRIMARY MATHEMATICS TEACHERS

<table>
<thead>
<tr>
<th>Dr. A. Hameed</th>
<th>Asha Paul</th>
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<tbody>
<tr>
<td>Assistant Professor</td>
<td>Research Scholar</td>
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<table>
<thead>
<tr>
<th>Name of the Teacher :</th>
<th>Gender :</th>
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<th>Name of the Institution :</th>
<th>Type of the Institution :</th>
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<tr>
<th>Educational Qualification :</th>
<th>Year of Experience :</th>
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1. Do you adopt any specific strategy to teach Mathematics at Upper Primary Level?

2. Suggest some of the strategy that you have attempted to teach Mathematics at Upper Primary level.

   __________________________________________________________
   __________________________________________________________

3. Have you ever experienced any constraints while adopting the strategies you suggested?

   ____________________________

   If yes, what are the constraints you faced?

   __________________________________________________________

4. Give you suggestions to overcome the constraints in implementing the different strategies.

   __________________________________________________________
   __________________________________________________________
Appendices

Appendix B

University of Calicut
Department of Education

LESSON TRANSCRIPT FOR BRAIN BASED LEARNING STRATEGY

Dr.A.Hameed                      Asha Paul
Assistant Professor             Research Scholar

Name of the teacher : Asha Paul  Unit : Area of a Triangle
Name of the school : G.M.H.S.S., C.U.Campus  Sub unit : Halving
Standard & Division : VII.A         Time duration: 40 minutes
Average age : 12                   Subject : Mathematics
Strength : 40

(Teacher enters the class and wishes the students. Students wishes back to students.
Teacher builds a rapport with the students.)

Teacher : Good Morning children. How are you all? Did you sleep yesterday? Did you eat your breakfast?

(Teacher interacts with the students and makes enough rapport with the students.)

Teacher : Do you like to play?

Students : Yes

Teacher : Can you say, with which organ do we learn?

Students : Head, Brain, Mind.

Teacher : Yes, some of you have said the answer. It is brain. Learning is actually done in brain with the help of the related senses and organs.
Students : Yes

Teacher : Brain likes to refresh and likes playing. While playing and walking brain gets more oxygen. And also, you should drink plenty of water before going to learn.

Students : Listen carefully

(Teacher asks students to get up and take a short warm up session. After that teacher asks them to drink water. Students does as per the instructions).

_______________________________

Stage I – Pre exposure

Teacher has posted an overview of the new topic on the bulletin board yesterday. In that, teacher asked the students to gather up as much information about rectangles, its perimeter and its area.

Teacher : Students, hope you have gathered more information about rectangles. Let us share the information.

(Teacher asks the students to share their experiences with the knowledge of rectangles. Familiar things related to rectangle.)

_______________________________

Stage II-Preparation

In this stage, teacher tries to immerse the learners in the concrete experience. As the teacher asked, students share their experiences they have with rectangle.

Teacher : Now, tell me about the information you gathered.

Students : Rectangular plot, board, table top, tiles have rectangular shape. Rectangles have four sides and four angles.

_______________________________

State III – Initiation and Acquisition

Teacher : As I have said, today we are going to learn about a property of rectangle. Shall we start?
Students : Yes

Teacher : All of you stand up. Warm up.

(Students perform a short exercise and settles down)

Teacher : Now let me draw some pictures on the blackboard of rectangles.

(Teacher was colour chalks to use visual perception) students suggest their worked out figures to draw on the board.

![Rectangle](image)

$Length = 10, Breadth = 5$

**Stage IV: Elaboration**

Teacher : All of your please have a close focus to these figures & all of you draw these figure as it is in your note book. (Students draw the figures in their note books).

Teacher : Now all of you find the area of the rectangle using the formula.

(Students finds the answer as 50. Since the formula is length $\times$ breadth)
Teacher : Teacher asks the students to divide the triangle by drawing a line through its diagonal.

(Students do the process)

What figure did you get out of this triangle?

Students : Two triangles

Teacher : Very good. We are going to find something new out of this. Are you ready?

(Students listen carefully and says yes.)

Teacher : What can you say about the two triangles you got from?

---

State V – Incubation and memory encoding

(Teacher now provide time for unguided reflection. Teacher provides a stretching and relaxation exercise).

Teacher : Tell me about the triangles, you got by halving the rectangle. Is there any similarity between the triangles?

Students : They are equal.

Teacher : Very good. It is the half of the rectangle. Then what can you say about its area?

Student : It is half of the area of the rectangle.
**Stage VI – Verification and Confidence check**

(Now the teacher encourages the students to define the area of a triangle and write in their own words. Students write the definition of "area of a triangle" in the given sheet provided).

**Teacher**

Collects and asks one or two pupils to read aloud what they have written.

Teacher corrects the mistake and gives the original definition.

**Teacher**

Area of a triangle will be half of the area of the given rectangle.

(Students writes the definition in their note books)

**Teacher**

Now tell me what will be the area of this triangle which we taken from the rectangle. (Teacher points on to the black board)

**Students**

It is half of 50. That is 25.

(Teacher appreciates the students)

---

**Stage VII – Celebration and Integration**

**Teacher**

This is a time to make fun and to make learning joyful.

(Teacher plays a light music. Teacher provides a sharing time to relax)

**Teacher**

Now let me show you some figures of rectangles with its area. Tell me the area of the triangles marked in the figure.

![Area of the rectangle is 240 cm²](image)

![Area of the rectangle is 1140 cm²](image)
Students : 120cm and 720 cm

Teacher : Yes very good. Today we've learnt how to find the area from a given rectangle. Tomorrow we'll learn more about triangles.

Check the notice board for next assignment before leaving the school.

Thank you Children. Take care. Have a nice day.

(Students say Thank you & teacher leaves the class).
Assignment for the next day:

* Make a cardboard rectangle of length 10 cm and breadth 6 cm. And divide the rectangle into two triangles and find the area of each triangle.

* Make two equal triangles and try to make a rectangle
Appendices

Appendix C

University of Calicut
Department of Education

LESSON TRANSCRIPT FOR CIRCLES OF LEARNING STRATEGY

Dr. A. Hameed
Assistant Professor

Asha Paul
Research Scholar

Name of the teacher : Asha Paul
Name of the school : Puthur Pallikal U.P. School
Standard & Division: VII.A

Unit : Area of a Triangle
Sub unit : Halving
Time duration: 40 minutes

Average age : 12
Subject : Mathematics
Present : 38

(Teacher enters the class and greets the students with pleasant gestures. Students also greet their teacher)

Teacher : Good morning Children, How would you like to learn in a classroom?

Students : Playing, Activity.

Teacher : Ok good. You might have learnt through activities. Let me ask you, have everyone in each group enthusiastically participated in each group activity? Have you helped each other?

Students : No

Teacher : Some of you may have participated and some of you may not have participated. So we can make these activities in a little more interesting and joyful. Are you interested to make it happen?

Students : Yes
Teacher : OK. Now we are going to learn Mathematics in an interesting and co-operative way let's start our learning?

(Now the teacher explains the steps in Circles of learning)

Teacher : We are going to learn mathematics through a new method called Circles of Learning (Co-operative learning). What do you mean by co-operation?

Students : Helping, unity etc.

Teacher : Very good. We have to share, help and co-operate while learning. In this method, first we have to divide the whole class into different groups. This grouping will be temporary. We will change the composition of the Groups frequently. This method of learning has so many benefits like achievement, retention, social support, interpersonal attachment, self esteem etc.

(Students listen and clarifies their doubts)

Teacher : In this method, you have freedom to interact and it is a must that the assignment is completed until all group members have successfully understood and completed it.

---

Specifying the instructional objectives and Making pre-instructional Decisions

Teacher then divides the whole class into different groups according to their previous test scores (they were divided into Eight groups, each group consisted of five including high, low and medium score students and of mixed gender)

(As teacher calls the names, students form a group according to her instructions)
Teacher: Now we have formed the groups and we have to arrange the seating.

(Teacher along with the students arrange the room, so that each members of a group can communicate effectively)

Teacher: Now we are set for the learning experience. In Circles of learning, in each class we are suppose to learn mathematics as well as a social skill

(Students keenly listens what the teacher says)

Teacher: Today we are going to learn a new concept in Mathematics regarding a triangle. The social skill we are going to practice is "helping each other in group activity"

Explaining the task and goal structure

(Teacher gives each group and assignment sheet with instructions)

Teacher: I remind you that, the assignment will be completed only if all the members of a group learn the concept. Before going to do the assignment, all groups must select a group leader and group name.

(Each group selects a leader and group name: Groups were named as suggested by the
Teacher distributes the assignment sheet to each group and asks every group to go through the assignment sheet and do the assignment

**Assignment Sheet**

Instructions: All group members have to exchange it and complete the learning tasks within the stipulated time.

15 minutes

(a) \( l = 10, b = 4 \)  
(b) \( l = 2, b = 1 \)  
(c) \( l = 12, b = 1 \)  
(d) \( l = 5, b = 5 \)

1. Examine the figures.
2. Check its side and try to find out its Perimeter and area.
3. Remember the formula to find the area of the rectangle.

Teacher: Now each Group members should check the given cards and discuss it.

(Students start doing the assignment).

Teacher: Each group members have to participate in the group discussion. For those who are not good at the concepts other group members should help them do the learning activities. At the end, each group member should be capable of answering the questions.

(Students do the work and remember the formula that the area of a rectangle is length \( \times \) breadth. Each group finds out the answer and teacher checks each group.)

Teacher: Now we are going to learn about triangle. You all know what a triangle is. How many sides and angles does a triangle have?
Students : Three.

Teacher : Good. Now we will learn to find its area. For that I will give you some models of rectangle.

(Teacher provides each group two rectangle cardboard models)

---

**Setting the cooperative lesson in motion**

(Teacher asks the students to divide each rectangle through its diagonals. Teacher makes sure that everyone in the group actively participates in the activity.)

Teacher : Each group members have to participate actively in the group

You have divided the rectangles into two triangles. So just discuss and find if there is any relation with the area of the rectangle and the triangles you got?

(Teacher actively and passively observes and clarified the doubts if necessary. Group members help each other and tries to do the activity.)

---

**Monitoring the effectiveness of cooperative learning groups and intervening as necessary**

(Teacher encourages each group on doing the assignment and also asks them to develop the social skill by helping each other to achieve the group goal. After the stipulated time for assignment teacher asks to stop the activity).

Teacher : The time for the activity is over. Did everyone participate in the activity? Can you give any explanations?

Students : Yes.

(Each group said their findings like,

Students : The two triangles have same measures.)
Two triangles have same shape

Two triangle can be joined to form a triangle

Area of the triangle will be half of the rectangle.

Teacher: Very good. Your findings are really appreciable.

(Teacher asks several questions regarding the activity)

(Group leaders of each group report their answers with the task cards)

---

**Evaluating learning and processing interaction**

(Teacher evaluates the work of each group. Teacher also congratulates each group on doing their activity well)

Teacher: Every group has done their work in a good manner. To conclude this assignment, let me consolidate what we have learnt, through this assignment.

Students: OK, Teacher.

Teacher: What we did in this class was finding the area of a triangle. So that we divided a rectangle and made two triangles. We know that the area of a rectangle = length × breadth. So, from the group work, we concluded that the area of a triangle will be half of the rectangle.

(Teacher concludes the class and students note down the facts in their notebooks that, area of a triangle will be half of the rectangle from which triangles are considered).

Teacher: Did you enjoy the learning?

Students: Yes

Teacher: There is a follow up activity. For tomorrow each group should make a cardboard rectangle of length 10 cm and breadth 6 cm. And divide the rectangle into two triangles and find the area of each triangle.
Thank you. Meet you the next day.

Students : Thank you Teacher.
Appendices

Appendix D

University of Calicut
Department of Education

LESSON TRANSCRIPT FOR ACTIVITY ORIENTED METHOD OF TEACHING

Dr. A. Hameed
Assistant Professor

Asha Paul
Research Scholar

Name of the teacher: Asha Paul
Name of the school: A.M.U.P. School
Standard & Division: VII.B
Average age: 12
Strength: 40

Unit: Parallel lines
Sub unit: Two types of lines
Time duration: 40 minutes
Subject: Mathematics

Curriculum Statements

1. To know the concept of area of a triangle.
2. To know how to find area of a triangle from a given rectangle.

Process Competencies

Observing, discussing, communicating, classifying, and inferring.

Previous Knowledge

Pupil already learnt and has notions about

- Rectangle
- Area of a rectangle
- Formula of finding a rectangle
Learning Aids

Task cards for doing activities, chart showing the consolidation of taught idea.

<table>
<thead>
<tr>
<th>Learning Activities</th>
<th>Evaluation/Response</th>
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<tbody>
<tr>
<td>Teacher checks the previous knowledge of students regarding the area of a rectangle. Teacher then asks the students how to find the area of a given rectangle with sides 8 cm and 6 cm</td>
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<tr>
<td><strong>Activity – 1</strong></td>
<td>Each student does the activity. And they find the answer as 48 cm².</td>
</tr>
<tr>
<td>Teacher asks the students to draw a triangle with sides 8 cm and 6 cm and find the area of a rectangle.</td>
<td>Students remember the formula and say, area of a rectangle is its length ( \times ) breadth.</td>
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<tr>
<td>Teacher once again checks their knowledge by asking the formula to find the area of the rectangle.</td>
<td></td>
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<tr>
<td><strong>Activity – 2</strong></td>
<td>Each student draws a rectangle of using the scale.</td>
</tr>
<tr>
<td>Teacher asks the students to draw a rectangle with a scale in their note book of with measures length = 6 cm and breadth = 4 cm. and to find its area.</td>
<td>Students also find the area of the</td>
</tr>
</tbody>
</table>
After the students draw the rectangle, teacher asks them to draw a line through its diagonal so as to divide the rectangle.

What did you get after dividing the rectangle?

Now, tell me what peculiarity does these two triangles have?

Good. So can you tell me about the area of one triangle?

Teacher consolidates that the two lines whose distance between them are equal and which never intersects are called parallel lines.

Teacher appreciates and asks them to describe on how they get to the answer.

Teacher concludes that the area of the given triangle is the half of the rectangle which you draw. So the area of the triangle will also be half of the rectangle.
Teacher shows the following chart and makes a student to read it aloud.

<table>
<thead>
<tr>
<th>Area of a triangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>The area of a triangle will be half of the area of the given rectangle.</td>
</tr>
</tbody>
</table>

**Follow up Activity**

1. Make two cardboard rectangles of length and breadth,
   a) 9 and 6       b) 12 and 6

2. Cut the rectangles into two triangles through its diagonal.

3. Find out the area of each triangle.
Appendix E

University of Calicut
Department of Education

Achievement Test in Mathematics- ATM
(Standard VII)
(Draft)

Time: 60 Minutes                                                                      Maximum Marks: 82

Dr. A. Hameed                  Asha Paul
Assistant Professor            Research Scholar

Instructions

• This is a Mathematical test. Do not write anything on the question paper. Separate response sheet is provided to mark the answers.

• For each question, four alternatives A, B, C, D are given. Only one among them is correct. After finding out the right answer for each question, mark (✓) it on the respective alphabet in the response sheet.

• If wrongly answered, for changing the answer, draw a rectangle (□) around the first answer and put (X) mark in the right place.

• Mark the correct option in the provided answer sheet only. One mark is given for each correct answer.

• All questions are compulsory and the maximum allotted time is 60 minutes

Model Question and Answer

1) A rectangle has -------- number of angles.
   A) Four       B) Two       C) One       D) Five

Answer

1.   A✓   B   C   D

Questions

1. Imagine a square with side ‘x’, then its perimeter is written as ________
   A.  \( \frac{x}{5} \)       B. 4x       C. 5x       D.  \( \frac{4}{x} \)
2. Given that the length and breadth of a rectangle are 5cm and 4cm. Its perimeter can be found out using the formula,
A. \(2 \div (l+b)\)  
B. \(2 + (l+b)\)  
C. \(2 \times (l+b)\)  
D. \(1 + b\)

3. \(2 + 3\) can also be written as
A. \((2 \times 1) + 1\)  
B. \((2 \times 3) + 1\)  
C. \(2 \times 3\)  
D. \((2 \times 2) + 1\)

4. \(x + (x+1) = _____ + 1\)
A. \(2x\)  
B. \(2\)  
C. \(x + 1\)  
D. \(1\)

5. In mathematics we use letters to write shorthand form and this is named as
A. number  
B. algebra  
C. subtraction  
D. addition

6. \((a+b) - b = _____\)
A. \(a\)  
B. \(0\)  
C. \(b\)  
D. \(1\)

Write the following in algebraic expression (Qn no:7-10)

7. From a numbers, subtract another and then add thrice the subtracted number.
A. \(x+y+3y\)  
B. \(x-y+3y\)  
C. \(x-y+2y\)  
D. \(x-3+3y\)

8. Add four times a number with three times the same number
A. \(4a+3b\)  
B. \(4a+3a\)  
C. \(4+3a\)  
D. \(4+3\)

9. Add two consecutive natural numbers and find the number, one less than this.
A. \(2+5-1\)  
B. \(2+3+1\)  
C. \(5-6+1\)  
D. \(5+6-1\)

10. Add to a number the double of itself
A. \(\frac{a}{2a}\)  
B. \(a+a\)  
C. \(a+2a\)  
D. \(a+3a\)

11. \(2x + 2y = \) ______________
A. \(2+x+y\)  
B. \(2(x+y)\)  
C. \(x+y\)  
D. \(2x+y\)

12. \((x+y)+z = \) ______________, for all numbers \(x, y, z\)
A. \(x + y\)  
B. \(y + z\)  
C. \(x+z\)  
D. \(x+(y+z)\)

13. \(x + (x+1) = \) __________, for every number \(x\).
A. \(2x\)  
B. \(x^2 + 1\)  
c) \(2x+1\)  
D. \(x+x\)
14. \((x-y)-z = \) __________, for all numbers \(x, y, z\).
   A. \(x-(y-z)\)  
   B. \(x+(y-z)\)  
   C. \(x-(y+z)\)  
   D. \(x+(y+z)\)

15. There were 40 children when the class started. 3 students came in late. sometimes later, 4 went to attend Math club meeting. How many are in the class now?
   A. 43  
   B. 39  
   C. 47  
   D. 44

Using the idea, \((x+y)-z = x+(y-z)\), for all numbers \(x, y, z\) with \(y>z\).
(Questions 15&16)

16. Find \((128 + 79)-29\) = ______
   A. 172  
   B. 179  
   C. 178  
   D. 150

17. Find \((149 + 3\frac{1}{2} ) - 2\frac{1}{2} = \) ______
   A. 149  
   B. 149 +\(\frac{1}{2}\)  
   C. \(\frac{149}{2}\)  
   D. 150

18. Raju had 200 rupees in his savings box. He took out 25 rupees to buy a note book. He got notebook for 20 rupees. He returned 5 rupees to the box. The remaining money can be found out using __________
   A. \((200-25)+5\)  
   B. \((200-25)+20\)  
   C. 200-25  
   D. \((200-25)-5\)

19. \((x-y)+z = \) ________________, for all numbers \(x,y,z\) with \(y>z\).
   A. \((x-y)-z\)  
   B. \(x-y\)  
   C. \(x+y\)  
   D. \(x-(y-z)\)

20. \((x+y) + \) ________ = 2x.
   A. \(x\)  
   B. \(x-y\)  
   C. \(x+y\)  
   D. 2x

Given below the sum and difference of some pairs of numbers. Find the numbers. (Questions 22-23)

21. Sum 10 and difference 2
   A. \(x= 6 & y=4\)  
   B. \(x=4 & y=2\)  
   C. \(x=3 & y=4\)  
   D. \(x=2 & y=5\)

22. Sum 20 and difference 5
   A. \(x= 8 & y = 12\)  
   B. \(x=12 & y = 5\)  
   C. \(x=12.5 & y=7.5\)  
   D. \(x=10, y=10\)

23. Sum 140 and difference 80
   A. \(x=110 & y=30\)  
   B. \(x=100 & y=40\)  
   C.\(x=80 & y=60\)  
   D. \(x=90 & y=70\)
Questions 24-27: Answer the questions using the given calendar.

Given a Calendar with month May. Date 15th is considered as x.

May

M   T   W   T   F   S   S
    1   2   3   4   5   6
  7   8   9  10  11  12  13
 14  15  16  17  18  19  20
 21  22  23  24  25  26  27
 28  29  30  31

24. Justify the relation with 22?
   A. x+7   B. x-7   C. x   D. x+1

25. Justify the relation with 16?
   A. x+7   B. x+1   C. x-1   D. x+8

26. Justify the relation with 9?
   A. x-1   B. x+6   C. x-6   D. x+2

27. Justify the relation with 14?
   A. x-1   B. x+2   C. x+0   D. x-2

Given a box with 36 numbers. Taken x=16. Find answers for the following questions (28-32):

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28. Find x+6?
   A. 21  B. 6  C. 22  D. 10
29. Find x-12?
   A. 4  B. 0  C. 14  D. 5
30. Find the relation of ‘x’ with 28?
   A. x+18  B. x+19  C. x+20  D. x+17
31. Find the relation of ‘x’ with 10?
   A. x+6  B. x+16  C. x-16  D. x-6
32. Find x+x+1?
   A. 30  B. 33  C. 32  D. 36
33. (63x12) + (37x12) can be written as __________
   A. 12 x (63+37)  B. (63+37)  C. (12x63)  D. 12 x (63-37)
34. (13.5 x 40) – (3.5x40) can be written as __________
   A. 40 x 13.5  B. 13.5 – 3.5  C. 40x(13.5+3.5)  D. 40x(13.5-3.5)
35. xz –yx = _______ for all numbers x, y, z.
   A. xz  B. z × (x-y)  C. x-y  D. yz
36. 10 raised to 10 can be written as __________
   A. 10^0  B. 10x10  C. 10^{10}  D. 10^5
37. Find the error in the following sentence
   Volume is measured in cm^2
   A. Volume is measured in cm^5  B. Volume is measured in cm^3  C. Volume is measured in cm^4  D. Volume is measured in cm
38. Repeated multiplication is known as
   A. Multiplication  B. Addition  C. Division  D. Exponentiation
39. Third power of a number is ________________
   A. Cube          B. Square          C. One          D. Quartet

40. From the following find out which is not included in the four basic operation?
   A. Addition     B. Exponentiation      C. Division     D. Subtraction

**Compute 41 to 43**

41. \(1^{10} = \) ______
   A. 0          B. 100          C. 10          D. 1

42. \(0^{30} = \) ________________
   A. 0          B. 20          C. 1          D. 100

43. \(100^4 = \) ________________
   A. 10,000      B. 10,00,00,000    C. 10,00,000    D. 1000

44. Write ten thousand as power of 10
   A. \(10^6\)      B. \(10^3\)      C. \(10^4\)      D. \(10^5\)

45. \(1221 = (1x10^3) + (2x__) + (2x10) +1\)
   A. \(10^2\)      B. \(10^3\)      C. 10          D. 1

46. \(23.54 = (2x10) + 3 + (5x__) + (4x\frac{1}{100})\)
   A. 10          B. \(\frac{1}{10}\)    C. \(\frac{1}{100}\)  D. 100

47. Write 625 as the product of power of prime numbers
   A. \(5^4\)      B. \(3^2 \times 2^3\)    C. \(5^3 \times 1^5\)  D. \((3+2)^2\)

48. The shaded portion of the above figure can be represented by -------
   A. \(\frac{1}{16}\)  B. \(\frac{1}{4}\)  C. \(\frac{1}{8}\)  D. \(\frac{1}{3}\)
49. Repeated addition is known as __________
   A. Division  B. Multiplication  C. Addition  D. Subtraction

50. In \(5^6\), 6 is called the __________
   A. Exponent  B. Denominator  C. Numerator  D. None

51. Any power of 1 is __________
   A. 0  B. 1  C. 10  D. None

52. Any power of zero is __________
   A. One  B. Hundred  C. Zero  D. None

53. Any power of an even number is a/an __________ number.
   A. Even  B. Odd  C. Two  D. Zero

54. \(10^0 = \) __________
   A. 0  B. 10  C. 1  D. 100

55. Last digit of every power of 10 is ______
   A. 1  B. 10  C. 5  D. 0

56. Last digit of every power of 5 is
   A. 0  B. 5  C. 2  D. 4

57. \(2^{15} = \) __________
   A. \((2^6)^2\)  B. \((2^5)^3\)  C. \((2^5)^2\)  D. \((2^3)^6\)

58. Complete \((2\frac{1}{2})^3\)
   A. 1.25  B. \(\frac{1}{8}\)  C. \(\frac{8}{2}\)  D. \(\frac{125}{8}\)

59. Power of \(\frac{1}{2}\) will ________
   A. Decrease  B. be same  C. Zero  D. Increase

60. Compute \((0.02)^2\)
   A. 0.0004  B. 0.004  C. 0.04  D. 0.4

61. \(3^3 \times 3^5 = \) __________
   A. \(3^{15}\)  B. \(3^7\)  C. \(3^5\)  D. \(3^8\)

62. \(x^m \times x^n = \) __________
   A. \(x^m\)  B. \(x^n\)  C. \(x^{m+n}\)  D. \(x^{mxn}\)

63. What power of 2 is twice \(2^{10}\)?
   A. \(2^{12}\)  B. \(2^{11}\)  C. \(2^{20}\)  D. \(2^{22}\)
64. What must be multiplied to $5^{10}$ to get $5^{11}$
A. 4  B. 3  C. 2  D. 5

65. $32 \times 16$ can be written as
A. $2^5 \times 2^3$  B. $2^4 \times 2^3$  C. $2^5 \times 2^4$  D. $2^3 \times 2^2$

66. $8^8 \div 8^5 = ______$
A. $8^3$  B. $8^5$  C. $8^2$  D. $8^{13}$

67. What should be multiplied to $7^6$ to get $7^2$
A. $7^4$  B. $\frac{1}{7^2}$  C. $\frac{1}{7^4}$  D. $7^2$

68. $\frac{x^m}{x^n} = \frac{1}{____}$, if $m < n$
A. $x^{n-m}$  B. $x^n$  C. $x^{m-n}$  D. $x^{m+n}$

69. $(3^5)^3 = ______$
A. $3^8$  B. $3^{15}$  C. $3^5$  D. $3^7$

70. Factors of 15 are,
A. 5, 2  B. 5, 3  C. 3, 2  D. 7, 8

71. If $5^6 \times \frac{1}{5^x} = \frac{1}{5^{10}}$, what is $x$?
A. 10  B. 4  C. 6  D. 16

72. Simply $\frac{2^5 \times 2^6}{2^4 \times 2^4}$
A. 16  B. 8  C. 32  D. 42

73. In natural numbers, the powers of consecutive numbers will get ______.
A. Smaller  B. Equal  C. Lesser  D. Larger

74. Number of factors is calculated by multiplying ______ added to the powers.
A. 0  B. 10  C. 1  D. 100

75. In a mango tree, mangoes are seen in such a way that in the 1st day there is one mango, in the 2nd day two mangoes, 3rd day four mangoes, 4th day eight mangoes and so on. Half of the tree will be filled by mangoes on the 15th day. Then how many days more is needed to fill the whole tree with mangoes?
A. 32  B. 33  C. 1  D. 16
76. A triangle with a right angle at one corner is called _____
   A. acute angle  B. right angled triangle  C. obtuse angle
   D. equilateral triangle
77. Quadrilateral with only one pair of parallel sides is called a _____
   A. Rectangle  B. Square  C. Trapezium  D. Parallelogram
78. The area of a right angled triangle is ______ x base x height.
   A. $\frac{1}{4}$  B. $\frac{1}{5}$  C. $\frac{1}{3}$  D. $\frac{1}{2}$
79. Find the area of the given triangle.
   \[
   \begin{array}{c}
   6cm \\
   10cm
   \end{array}
   \]
   A. 15cm\(^2\)  B. 30cm\(^2\)  C. 60cm\(^2\)  D. 16cm\(^2\)
80. From the area of the given triangle.
   A. 15cm\(^2\)  B. 9cm\(^2\)  C. 81cm\(^2\)  D. 80cm\(^2\)
81. The area of given triangle can be written as
   \[
   \begin{array}{c}
   A. \frac{1}{2} (x+y)z \\
   b) \frac{1}{2} (x+y) \\
   C. \frac{1}{2} (x+y+z) \\
   D. \frac{x+y}{z}
   \end{array}
   \]
82. In Δ ABC, the angle at B is right angle. Its area is 48 cm² and the length of base BC is 8cm. The side of BC is extended to 6 cm to D. What is the area of Δ ADC?

A. 36cm²  B. 12cm²  C. 84cm²  D. 22cm²
Appendix F
University of Calicut
Department of Education
ACHIEVEMENT IN MATHEMATICS (ATM)
(DRAFT)
RESPONSE SHEET

Name of the student .......................................................... Boy/Girl..................
Class : .................................. School: ..........................................................

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### Appendix G

University of Calicut  
Department of Education  

ACHIEVEMENT IN MATHEMATICS (ATM)  
(DRAFT)  

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Appendix H
University of Calicut
Department of Education

Achievement Test in Mathematics
(Standard VII)
(Final)

Time: 60 Minutes
Marks: 60

Maximum Marks: 60

Dr. A. Hameed
Assistant Professor

Asha Paul
Research Scholar

Instructions

- This is a Mathematical test. Do not write anything on the question paper. Separate response sheet is provided to mark the answers.
- For each question, four alternatives A, B, C, D are given. Only one among them is correct. After finding out the right answer for each question, mark (√) it on the respective alphabet in the response sheet.
- If wrongly answered, for changing the answer, draw a rectangle (□) around the first answer and put (X) mark in the right place.
- Mark the correct option in the provided answer sheet only. One mark is given for each correct answer.
- All questions are compulsory and the maximum allotted time is 60 minutes

Model Question and Answer

1) A rectangle has --------- number of angles.

   A) Four    B) Two    C) One    D) Five

   Answer:

   1.   A√ B  C  D
Questions

1. \[x + (x+1) = _____ +1\]
   A. 2x  B. 2  C. x +1  D. 1

2. \[(a+b) – b = _____,\]
   A. a  B. 0  C. b  D. 1

Write the following in algebraic expression (Qn no:3-8)

3. From a numbers, subtract another and then add thrice the subtracted number.
   A. \(x+y+3y\)  B. \(x-y+3y\)  C. \(x-y+2y\)  D. \(x-3+3y\)

4. Add two consecutive natural numbers and find the number, one less than this.
   A. 2+5-1  B. 2+3+1  C. 5-6+1  D. 5+6-1

5. Add to a number the double of itself
   A. \(\frac{a}{2a}\)  B. \(a+a\)  C. \(a+2a\)  D. \(a+3a\)

6. \[(x+y)+z = \text{____________},\] for all numbers x, y, z
   A. \(x +y\)  B. \(y + z\)  C. \(x+z\)  D. \(x+(y+z)\)

7. \[x + (x+1) = _____,\] for every number x.
   A. 2x  B. \(x^2 + 1\)  c) 2x+1  D. \(x+x\)

8. There were 40 children when the class started. 3 students came in late. sometimes later, 4 went to attend Math club meeting. How many are in the class now?
   A. 43  B. 39  C. 47  D. 44

Using the idea, \((x+y)-z = x+(y-z),\) for all numbers x, y, z with \(y>z.\)
(Questions 9 & 10)

9. Find \((128 + 79)-29 = _____\)
   A. 172  B. 179  C. 178  D. 150
10. Find \((149 + 3\frac{1}{2}) - 2\frac{1}{2} = \) \[\_\_\_\_\_\_\]  
A. 149  
B. 149 +\frac{1}{2}  
C. \frac{149}{2}  
D. 150

11. Raju had 200 rupees in his savings box. He took out 25 rupees to buy a note book. He got notebook for 20 rupees. He returned 5 rupees to the box. The remaining money can be found out using ____________  
A. \((200-25)+5\)  
B. \((200-25)+20\)  
C. 200-25  
D. \((200-25)-5\)

12. \((x-y)+z = \) _________________, for all numbers \(x, y, z\) with \(y > z\).  
A. \((x-y)-z\)  
B. \(x-y\)  
C. \(x+y\)  
D. \(x-(y-z)\)

13. \((x+y) + \_\_\_\_\_\_\_\_\_ = 2x.\)  
A. \(x\)  
B. \(x-y\)  
C. \(x+y\)  
D. 2x

Given below the sum and difference of some pairs of numbers. Find the numbers. (Questions 14-16)

14. Sum 10 and difference 2  
A. \(x = 6 \& y = 4\)  
B. \(x=4 \& y=2\)  
C. \(x=3 \& y=4\)  
D. \(x=2 \& y=5\)

15. Sum 20 and difference 5  
A. \(x = 8 \& y = 12\)  
B. \(x = 12 \& y = 5\)  
C. \(x=12.5 \& y=7.5\)  
D. \(x=10, y=10\)

16. Sum 140 and difference 80  
A. \(x=110 \& y=30\)  
B. \(x=100 \& y=40\)  
C. \(x=80 \& y=60\)  
D. \(x=90 \& y=70\)
Appendices

Questions 17-20 : Answer the questions using the given calendar.
Given a Calendar with month May. Date 15\textsuperscript{th} is considered as \(x\).

\[\begin{array}{cccccc}
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7 & 8 & 9 & 10 & 11 & 12 & 13 \\
14 & 15 & 16 & 17 & 18 & 19 & 20 \\
21 & 22 & 23 & 24 & 25 & 26 & 27 \\
28 & 29 & 30 & 31 & \\
\end{array}\]

17. Justify the relation with 22?
   A. \(x + 7\)          B. \(x - 7\)          C. \(x\)          D. \(x + 1\)

18. Justify the relation with 16?
   A. \(x + 7\)          B. \(x + 1\)          C. \(x - 1\)          D. \(x + 8\)

19. Justify the relation with 9?
   A. \(x - 1\)          B. \(x + 6\)          C. \(x - 6\)          D. \(x + 2\)

20. Justify the relation with 14?
   A. \(x - 1\)          B. \(x + 2\)          C. \(x + 0\)          D. \(x - 2\)

Given a box with 36 numbers. Taken \(x = 16\). Find answers for the following questions (21-24):

\[\begin{array}{cccccc}
1 & 2 & 3 & 4 & 5 & 6 \\
7 & 8 & 9 & 10 & 11 & 12 \\
13 & 14 & 15 & 16 & 17 & 18 \\
19 & 20 & 21 & 22 & 23 & 24 \\
25 & 26 & 27 & 28 & 29 & 30 \\
31 & 32 & 33 & 34 & 35 & 36 \\
\end{array}\]
21. Find $x+6$?
   A. 21  B. 6  C. 22  D. 10
22. Find the relation of ‘$x$’ with 28?
   A. $x+18$  B. $x+19$  C. $x+20$  D. $x+17$
23. Find the relation of ‘$x$’ with 10?
   A. $x+6$  B. $x+16$  C. $x-16$  D. $x-6$
24. Find $x+x+1$?
   A. 30  B. 33  C. 32  D. 36
25. $(63 \times 12) + (37 \times 12)$ can be written as __________
   A. $12 \times (63+37)$  B. $(63+37)$  C. $(12\times 63)$  D. $12 \times (63-37)$
26. $(13.5 \times 40) - (3.5 \times 40)$ can be written as _________
   A. $40 \times 13.5$  B. $13.5 - 3.5$  C. $40 \times (13.5+3.5)$  D. $40 \times (13.5-3.5)$
27. $xz - yx = _______ \text{ for all numbers } x, y, z.$
   A. $xz$  B. $z \times (x-y)$  C. $x-y$  D. $yz$
28. $10$ raised to $10$ can be written as __________
   A. $10^0$  B. $10 \times 10$  C. $10^{10}$  D. $10^5$
29. Find the error in the following sentence
   
   Volume is measured in cm$^2$
   A. Volume is measured in cm$^5$
   B. Volume is measured in cm$^3$
   C. Volume is measured in cm$^4$
   D. Volume is measured in cm
30. Repeated multiplication is known as
   A. Multiplication  B. Addition  C. Division  D. Exponentiation
31. Third power of a number is ____________
   A. Cube  B. Square  C. One  D. Quartet
32. From the following find out which is not included in the four basic operation?
   A. Addition  B. Exponentiation  C. Division  D. Subtraction

**Compute 33 & 34**

33. \[10^{10} = \text{______}\]
   A. 0  B. 100  C. 10  D. 1

34. \[0^{20} = \text{______________}\]
   A. 0  B. 20  C. 1  D. 100

35. \[1221 = (1 \times 10^3) + (2 \times \text{___}) + (2 \times 10) + 1\]
   A. \(10^2\)  B. \(10^3\)  C. 10  D. 1

36. \[23.54 = (2 \times 10) + 3 + (5 \times \text{___}) + (4 \times \frac{1}{100})\]
   A. 10  B. \(\frac{1}{10}\)  C. \(\frac{1}{100}\)  D. 100

37. Write 625 as the product of power of prime numbers
   A. \(5^4\)  B. \(3^2 \times 2^3\)  C. \(5^3 \times 1^5\)  D. \((3+2)^2\)

38. 

The shaded portion of the above figure can be represented by ______

A. \(\frac{1}{16}\)  B. \(\frac{1}{4}\)  C. \(\frac{1}{8}\)  D. \(\frac{1}{3}\)

39. Repeated addition is known as __________
   A. Division  B. Multiplication  C. Addition  D. Subtraction

40. In \(5^6\), 6 is called the __________
   A. Exponent  B. Denominator  C. Numerator  D. None

41. Any power of 1 is __________
   A. 0  B. 1  C. 10  D. None
42. Any power of zero is __________
   A. One  B. Hundred  C. Zero  D. None
43. Any power of an even number is a/an __________ number.
   A. Even  B. Odd  C. Two  D. Zero
44. Last digit of every power of 10 is ______
   A. 1  B. 10  C. 5  D. 0
45. Last digit of every power of 5 is
   A. 0  B. 5  C. 2  D. 4
46. $2^{15}$ = __________
   A. $(2^6)^2$  B. $(2^5)^3$  C. $(2^5)^2$  D. $(2^3)^6$
47. Power of $\frac{1}{2}$ will ______
   A. Decrease  B. be same  C. Zero  D. Increase
48. Compute $(0.02)^2$
   A. 0.0004  B. 0.004  C. 0.04  D. 0.4
49. $3^3 \times 3^5 = ______$
   A. $3^{15}$  B. $3^7$  C. $3^5$  D. $3^8$
50. $x^m \times x^n = ______$
   A. $x^m$  B. $x^n$  C. $x^{m+n}$  D. $x^{mn}$
51. $32 \times 16$ can be written as
   A. $2^5 \times 2^3$  B. $2^4 \times 2^3$  C. $2^5 \times 2^4$  D. $2^3 \times 2^2$
52. $8^8 \div 8^5 = _____$
   A. $8^3$  B. $8^5$  C. $8^2$  D. $8^{13}$
53. $(3^5)^3 = _____$
   A. $3^8$  B. $3^{15}$  C. $3^5$  D. $3^7$
54. Factors of 15 are,
   A. 5, 2  B. 5, 3  C. 3, 2  D. 7, 8
55. Simply $\frac{2^5 \times 2^6}{2^4 \times 2^4}$
   A. 16  B. 8  C. 32  D. 42
56. Number of factors is calculated by multiplying _______ added to the powers.
   A. 0  B. 10  C. 1  D. 100
57. The area of a right angled triangle is ______ x base x height.
   A. $\frac{1}{4}$  B. $\frac{1}{5}$  C. $\frac{1}{3}$  D. $\frac{1}{2}$

58. Find the area of the given triangle.

![Triangle with dimensions 10cm, 6cm](image)

A. 15cm$^2$  B. 30cm$^2$  C. 60cm$^2$  D. 16cm$^2$

59. From the area of the given triangle.

A. 15cm$^2$  B. 9cm$^2$  C. 81cm$^2$  D. 80cm$^2$

60. The area of given triangle can be written as

![Triangle with sides x, y, z](image)

A. $\frac{1}{2} (x+y)z$  b) $\frac{1}{2} (x+y)$  C. $\frac{1}{2} (x+y+z)$  D. $\frac{x+y}{z}$
Appendices

Appendix I

University of Calicut
Department of Education
ACHIEVEMENT IN MATHEMATICS (ATM)
(FINAL)
RESPONSE SHEET

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Class : .......................... School: .............................................................

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Appendices

Appendix J

University of Calicut
Department of Education

ACHIEVEMENT IN MATHEMATICS (ATM) (FINAL)

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Appendix K

University of Calicut
Department of Education
LEARNING STYLES INVENTORY
RESPONSE SHEET

Dr. A. Hameed
Assistant Professor

Meharunnisa Karadan
Research Scholar

Name of the student : ...................................................................................................

Name of the school : ......................................................................................... Class: ..........

Boy / Girl: .................. Govt. / Aided / Unaided ....................... 

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Appendix L

University of Calicut
Department of Education

SCALE OF SELF EFFICACY
RESPONSE SHEET

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Class : ..................  School: ..............................................................

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Appendix M

Department of Education
University of Calicut

VERBAL GROUP TEST OF INTELLIGENCE

RESPONSE SHEET

Name .......................................................... Class: ................. Age : ............
School : ....................................Govt./Aided.............Division :..........
Boy/Girl .............

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Appendix N

STANDARD PROGRESSIVE MATRICES
(Sets A, B, C, D and E)

RESPONSE SHEET

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Age:  
Class:  
Boy/Girl:  
Max Time 45 mts

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Appendix O

University of Calicut
Department of Education

CLASSROOM ENVIRONMENT INVENTORY

RESPONSE SHEET

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Appendix P

University of Calicut
Department of Education

GENERAL DATA SHEET

Instructions:
Read the questions carefully, given below and write down the answers wherever necessary. Put a tick mark (✓) against the correct answer, where the answers are given.

1. Name : 
2. Gender : Boy / Girl
3. Age : 
4. Standard & Division : 
5. Name of the School : 
6. Area in which your School is located : Panchayat / Municipality / Corporation
7. The information about the family members can be indicated in the columns given below

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