SET A

A1

Diagram of various patterns and shapes.
SET B

1 2 3

4 5 6
SET C

C1

Diagram of various circle patterns and shapes.
SET D

D1

1  2  3  4

5  6  7  8
E5

Diagram:

1. [Diagram 1]
2. [Diagram 2]
3. [Diagram 3]
4. [Diagram 4]
5. [Diagram 5]
6. [Diagram 6]
7. [Diagram 7]
8. [Diagram 8]
Please fill up the following informations :-

1. Male or Female ..........................................................
2. Rural or Urban ..........................................................
3. Name (in complete) ....................................................
4. Age .......................................................... Years............... Months........
5. Job (if employed) ....................................................
6. Class or Course (if studying) ........................................
7. Caste Category : General/SC/BC/OBC ........................

DIRECTIONS

The scale has 7 parts. You are required to respond to all these parts and tick mark (✓) the statements which you think fit well in your case.

Informations supplied by you will be kept confidential. The scale intends to know where your family stands on the continuum of socio-economic status in Indian conditions. It has no other purpose whatsoever.

SCORING TABLE

<table>
<thead>
<tr>
<th>Parts</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>Interpretation</th>
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Estd. 1985  
☎: (0562) 2150013

RAKHI PRAKASHAN
6/9, H.I.G. Flats, Sanjay Place Housing Society, AGRA – 282 002
### PART – I (EDUCATION)

Indicate with a tick (✓) the highest class up to which you or members of family have studied.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Qualification</th>
<th>Self</th>
<th>Father</th>
<th>Mother</th>
<th>Brother</th>
<th>Sister</th>
<th>Total Ticks</th>
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<tbody>
<tr>
<td>1.</td>
<td>Ph.D.; D.Lit.; LL.D. etc.</td>
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<td>4.</td>
<td>M.A./M.Sc./M.Com./LL.M. etc.</td>
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<td>5.</td>
<td>B.A./B.Sc./B.Com LL.B. etc.</td>
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<tr>
<td>6.</td>
<td>+2 Senior Secondary</td>
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<td>7.</td>
<td>Matriculation</td>
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<td></td>
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<td>8.</td>
<td>Middle</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Primary</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Nil but literate</td>
<td></td>
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</tr>
</tbody>
</table>

### PART – II (PROFESSION)

Who in your family is working on these jobs? Indicate by a (✓) Marks.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Occupation</th>
<th>Self</th>
<th>Father</th>
<th>Mother</th>
<th>Brother</th>
<th>Sister</th>
<th>Total Ticks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Supreme Court Judge, President, P.M., C-in-C, C.M. Ambassador, Director of Multi-national concerns and national organisations. Proprietor/Owner of a Multi-national concern Factory, Business Firm.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2.</td>
<td>I.A.S./I.P.S./High Court Judges/ Central Government Class I Officer, Top Army or police Chiefs etc. Major Partner/Share Holder of a National Level Business.</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>S.No.</td>
<td>Occupation</td>
<td>Self</td>
<td>Father</td>
<td>Mother</td>
<td>Brother</td>
<td>Sister</td>
<td>Total Ticks</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------------------------------</td>
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<td>--------</td>
<td>---------</td>
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<td>-------------</td>
</tr>
<tr>
<td>3.</td>
<td>PCS, P.E.S., P.S.E. Provincial class I officer University Professors. Senior Army/ Police Officers.</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Senior Advocate, Managing Directors, Engineers, Doctors, Principals, Senior Executors/ Civil &amp; Army Officers, High Status Businessman Employing 100 persons or more.</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>7.</td>
<td>Jobs with +2 or Matriculation – Clerks, Typists, Steno’s Postal &amp; Railway Clerks, Salesman, receptionists Petty Shop-keeper, small merchant, General Merchant, Brokers, Commission Agents etc.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
8. Skilled jobs – Army jawans, constables, postmen, fire fighters, patwaris, printers, mechanics.

9. Skilled Craftsman-Cobblers, Barbers, Dry Cleaners, Carpenters, Welders masons.


### PART – III (MONTHLY INCOME)

What is the total monthly income of your family from salaries, Business, Agricultural Land or from other sources:

| (a) | Rs. 50,000 or more | ............................................................ |
| (b) | Between Rs. 20,001 and Rs. 50,000 | ............................................................ |
| (c) | Between 10,001 and Rs. 20,000 | ............................................................ |
| (d) | Between 5,001 and Rs. 10,000 | ............................................................ |
| (e) | Between Rs. 4,001 and Rs. 5,000 | ............................................................ |
| (f) | Between Rs. 3,001 and Rs. 4,000 | ............................................................ |
| (g) | Between Rs. 2,001 and Rs. 3,000 | ............................................................ |
| (h) | Between Rs. 1,001 and Rs. 2,000 | ............................................................ |
| (i) | Between Rs. 501 and Rs. 1,000 | ............................................................ |
| (j) | Less than Rs. 500 | ............................................................ |
PART – IV
Total Wealth in Cash or Debts indicate total money which your family has in Its possession. Also indicate debts if any. The third column may also be responded to

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>Column A in Bank/Post Office/ F.D. Unit Trust of India, Shares</th>
<th>Column B Debt</th>
<th>Column C If your monthly income stops suddenly for how long your family can pull on without borrowing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>More than Rs. 10 lakhs</td>
<td></td>
<td></td>
<td>5 years.....................................................................</td>
</tr>
<tr>
<td>2.</td>
<td>Between Rs. 5 and 10 lakhs</td>
<td></td>
<td></td>
<td>4 Years ....................................................................</td>
</tr>
<tr>
<td>3.</td>
<td>Between Rs. 1 and 5 lakhs</td>
<td></td>
<td></td>
<td>3 Years....................................................................</td>
</tr>
<tr>
<td>4.</td>
<td>Between Rs. 50,001 and Rs. 1 lakh</td>
<td></td>
<td></td>
<td>2 Years....................................................................</td>
</tr>
<tr>
<td>5.</td>
<td>Between Rs. 20,001 and Rs. 50,000</td>
<td></td>
<td></td>
<td>1 Year......................................................................</td>
</tr>
<tr>
<td>6.</td>
<td>Between Rs. 10,001 to and Rs. 20,000</td>
<td></td>
<td></td>
<td>4 months..................................................................</td>
</tr>
<tr>
<td>7.</td>
<td>Between Rs. 5,001 and Rs. 10,000</td>
<td></td>
<td></td>
<td>3 months..................................................................</td>
</tr>
<tr>
<td>8.</td>
<td>Between Rs. 2001 and Rs. 5,000</td>
<td></td>
<td></td>
<td>2 months..................................................................</td>
</tr>
<tr>
<td>9.</td>
<td>Upto Rs. 1,000</td>
<td></td>
<td></td>
<td>1 month....................................................................</td>
</tr>
<tr>
<td>10.</td>
<td>Less than Rs. 1,000</td>
<td></td>
<td></td>
<td>Can’t pull on at all..................................................................</td>
</tr>
</tbody>
</table>

PART – V (PROPERTY)

1. How many Houses/Kothi’s do you own?
   (a) more than three ............................................................... 
   (b) three ............................................................................ 
   (c) two ............................................................................... 
   (d) only one ........................................................................ 
   (e) none ............................................................................... 

2. If you have your own house, are you living?
   a) in full house ..................................................................... 
   b) in ½ house ........................................................................ 
   c) in ⅓ house ........................................................................ 

3. **How much agriculture land or plots you have.**
   - (a) more than 10 acres ................................................
   - (b) between 5 and 10 acres .............................................
   - (c) between 2 and 5 acres .............................................
   - (d) one acre ..................................................................
   - (e) less than one acre ....................................................
   - (f) No land or plot ..........................................................

4. **If you do not have your own house.**
   - (a) have you rented a full house ......................................
   - (b) have you rented a portion of a house? .........................

5. **In your rented or own house how many rooms are there.**
   - (a) more than 7 rooms ..................................................
   - (b) more than 5 rooms ..................................................
   - (c) more than 4 rooms ..................................................
   - (d) more than 3 rooms ..................................................
   - (e) more than 2 rooms ..................................................
   - (f) more than 1 room ....................................................

**PART – VI (YOUR SURROUNDING LOCALITY)**

1. **What type of a school you or your children, brothers, sisters studying.**
   - (a) Convent/Public School .............................................
   - (b) Govt. School ..........................................................
   - (c) Private School .......................................................

2. **How do you go to School?**
   - (a) By Car/Scooter .......................................................  
   - (b) On Auto Rickshaw .................................................
   - (c) By School Bus ........................................................
   - (d) On Rickshaw along with others .................................
   - (e) On Cycle ................................................................
   - (f) On Foot ..................................................................
3. Which of these persons you have in your house (full time or part time)?
   (a) Tutor ........................................
   (b) Cook ........................................
   (c) Governess ..................................
   (d) Servants 2 ..................................
   (e) Servant 1 ..................................
   (f) Maid – Servants ..........................
   (g) Mali ........................................
   (h) None ........................................

4. Which of these things you possess?
   (a) Three Cars ..................................
   (b) Two Cars .................................
   (c) One Car .................................
   (d) Nil ........................................

5. Three motor bikes/scooters
   (a) Two Scooters .............................
   (b) One Scooters ............................
   (c) Nil ........................................

6. (a) Three Mopeds ...........................
   (b) Three Mopeds ...........................
   (c) Two Mopeds ............................
   (d) Nil ........................................

7. (a) Three Bicycles ..........................
   (d) Two Bicycles ............................
   (e) One Bicycle ............................
   (e) Nil ........................................

8. TV’s a) Three or more....... b) Two ....... c) One...... d) No......

9. V.C.R’s a) Three or more....... b) Two ....... c) One...... d) No......

10. V.C.P. a) Three or more....... b) Two ....... c) One...... d) No......
11. Fridge  a) Three or more........  b) Two ........  c) One.......  d) No........
12. Sofa Sets a) Three or more........  b) Two ........  c) One.......  d) No........
13. Dining Table a) Three or more........  b) Two ........  c) One.......  d) No........
14. Dinning Set a) Three or more........  b) Two ........  c) One.......  d) No........
15. Geyser a) Three or more........  b) Two ........  c) One.......  d) No........
16. Electric Press a) Three or more........  b) Two ........  c) One.......  d) No........
17. Electric Fans a) Three or more........  b) Two ........  c) One.......  d) No........
18. Mixers a) Three or more........  b) Two ........  c) One.......  d) No........
19. Double Beds a) Three or more........  b) Two ........  c) One.......  d) No........
20. News Papers a) Three or more........  b) Two ........  c) One.......  d) No........
21. Magazines a) Three or more........  b) Two ........  c) One.......  d) No........

PART – VII (SOCIAL STATUS)

1. How many invitations to social functions/birthday parties/marriage ceremonies/ religious functions etc. does your family receive every month.
   a) More than 10 ........................................
   b) 6 to 9 ...................................................
   c) 3 to 5 ...................................................
   d) 2 ......................................................
   e) Nil .....................................................

2. In your family has any one including you ever been a –
   a) Minister ..............................................
   b) M.P. .....................................................
   c) M.L.A. ..................................................
   d) M. Commissioner/Sarpanch  ................................
   e) Member of any organisation like  ................................
      • Mohalla Committee ..................................
      • Temple Committee ..................................
      • Any other ..........................................

3. **Most people living in your locality are -**
   a) Very rich and famous people ...........................................
   b) Fairly rich people ....................................................
   c) Middle class people ...................................................
   d) Hand to Mouth type ...................................................
   e) Poor people ..............................................................

4. **Do you think your family is economically**
   a) Very rich ..............................................................
   b) Above average .........................................................
   c) Average ...............................................................
   d) Below Average .........................................................
   e) Poor ...............................................................

5. **In your opinion your family has a social rating**
   a) High ..............................................................
   b) Above average .........................................................
   c) Average ...............................................................
# STANDARD PROGRESSIVE MATRICES
**SETS A, B, C, D, & E**

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<tr>
<td>Age</td>
<td>Birthday</td>
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<td>Test begun</td>
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<th>D</th>
<th>E</th>
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<table>
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<tr>
<th>Time</th>
<th>Total</th>
<th>Grade</th>
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</thead>
</table>

Notes

Tested by ---------------
APPENDIX - C

SELF CONCEPT INVENTORY
Dept. of Psychology, Kurukshetra University

Name ............................................ Age .................. Sex .............. School..............................

Education .......................... Occupation ........................... Marital Status : Married/Unmarried

Family Type : Joint/Unitary Family Size ............. Income............. Domicile : Urban/Rural

Example

<table>
<thead>
<tr>
<th>शब्द</th>
<th>वाक्य में भरने के बाद</th>
<th>छुट रहि</th>
<th>एक छुट रहि व्यक्ति हैं।</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>बहुत हो</th>
<th>कम बार</th>
<th>कमता की 50% बार</th>
<th>बहुत हो लगाना होगा</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️</td>
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</tbody>
</table>

Blank I भरने के लिए –

<table>
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<tr>
<th>शब्द</th>
<th>वाक्य में भरने के बाद</th>
<th>छुट रहि</th>
<th>एक छुट रहि व्यक्ति हैं।</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>बहुत हो</th>
<th>कम बार</th>
<th>कमता की 50% बार</th>
<th>बहुत हो लगाना होगा</th>
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Blank II भरने के लिए –

Example

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<th>छुट रहि</th>
<th>एक छुट रहि व्यक्ति कन्हा/कन्ही।</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>बहुत हो</th>
<th>कम बार</th>
<th>कमता की 50% बार</th>
<th>बहुत हो लगाना होगा</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

प्रत्येक शब्द के मूल्यांकन करने के बाद दूसरे शब्द को सुरू कीजिए। कुप्तता किसी भी शब्द को विंचा मूल्यांकन के मत छोड़ो।
<table>
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<th>शब्द</th>
<th>Words</th>
<th>Blank I</th>
<th>Blank II</th>
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<tbody>
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<td>Coward</td>
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</tr>
<tr>
<td>2.</td>
<td>Sympathetic</td>
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<tr>
<td>3.</td>
<td>Inferior</td>
<td></td>
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<tr>
<td>4.</td>
<td>Honest</td>
<td></td>
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<tr>
<td>5.</td>
<td>Optimist</td>
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<td>Obedient</td>
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<td>Shirker</td>
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<td>9.</td>
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<td>10.</td>
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<td>11.</td>
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<tr>
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<tr>
<td>16.</td>
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<tr>
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<tr>
<td>18.</td>
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<td>19.</td>
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<td>20.</td>
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<td>21.</td>
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<td>22.</td>
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<td>23.</td>
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<td>24. स्वावलंबी को गंगार या नीच रंगपरे वाला (Snobbish)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>25. तुषार (Quite)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>26. धेराबुद्धि (Hateful)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>27. आकर्षक (Attractive)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>28. कठोर (Stern)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>29. तेवट (Jealous)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>30. अनुशासक (Disciplined)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>31. चौकिना (Cautious)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
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<td>32. छल्लु (Quarrelsome)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
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<td>33. चौर (Brave)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>34. नावस्ती (Superficial)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>35. साधा (Simple)</td>
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<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>36. उत्ताख (Impatient)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>37. अट्टामनंदित (Self-Control)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>38. ग्यानिन्द्र (Sarcastic)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>39. शरीर (Noble)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
<td>इलेक्ट्रॉनिक्स</td>
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<td>40. रसेंत्र (Affectionate)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
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<td>41. भष्यवादी (Frank)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
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<td>42. सत्त्व (Alert)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
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<td>43. साधन सम्पन्न (Resourceful)</td>
<td>वास्तव लोग</td>
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<td>44. वरोदकारी (Charitable)</td>
<td>वास्तव लोग</td>
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<td>45. विद्वद्व (Obstinate)</td>
<td>वास्तव लोग</td>
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<td>46. धार्मिक (Religious)</td>
<td>वास्तव लोग</td>
<td>याकृति संस्कृत</td>
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<td>47. विचार वा मानने कारण सक्रीय बात (Expressive)</td>
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<td>48. तकनी (Suspicious)</td>
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<td>49. निज़तापूर्ण (Friendly)</td>
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<td>50. निवेदकपूर्ण (Reasonable)</td>
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<td>51. अस्पष्ट (Vague)</td>
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<td>52. प्रसन्नलिंग (Cheerful)</td>
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<td>53. शैल (Well-mannered)</td>
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<td>54. बुद्धावृत्त (Hostile)</td>
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<td>55. बहुल (Kind)</td>
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<td>56. संक्षिप्तवादी (Conservative)</td>
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<td>57. निगमन वृत्त (Sensitive)</td>
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<td>58. धृष्ट (Rude)</td>
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<td>59. निरामय (Unselfish)</td>
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<td>60. निरोगिक्ष (Irritable)</td>
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<td>61. उत्साही (Enthusiastic)</td>
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<td>62. दुसरों पर निर्भर (Dependent)</td>
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<td>63. बहुमतावल</td>
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<td>64. ट्रेड (Trady)</td>
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<td>65. मिनी (Modest)</td>
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<td>66. भोक्ता (Boastful)</td>
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<td>67. सहयोगी (Cooperative)</td>
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<td>68. झूठी (Shy)</td>
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ACHIEVEMENT TEST (FIRST DRAFT)

CLASS – VII

Name:---------------------   Age:---------------------
Class:--------------------   Roll Number:--------------
School:--------------------- Date:---------------------

General instructions:

This is a test of what you know about the chapters Rational Numbers, Practical Geometry, Perimeter and Area, Algebraic Expressions, Exponents and powers of your Mathematics class VII syllabus. The results of this test will be used to clear any points of difficulty and thus help you to complete the course successfully.

This test contains 112 objective type questions in all. Attempt all the questions. Each question will carry one mark. Encircle the appropriate answer.

• Q. No. 1 to Q. No. 56 are Multiple choice type questions.
• Q. No. 57 to Q. No. 75 are Fill in the Blanks.
• Q. No. 76 to Q. No. 91 are True False type questions.
• Q. No. 92 to Q. No. 112 are Short Answer type questions.
ACHIEVEMENT TEST

This test contains 120 objective type questions in all. Each question will carry one mark. Encircle the appropriate answer.

Multiple choice type questions:

Q. 1. Which type of this number i.e. -3/-5 is

(a) Rational number        (b) Positive rational number
(b) Negative rational number (d) Not a rational number

Q. 2. Standard form of -45/30 is

(a) 3/2                  (b) -3/2
(c) 2/3                  (d) 5/6

Q. 3. Which set of numbers is in ascending order

(a) -1/5, -2/5, -3/5, -5/5  (b) -5/5, -3/5, -2/5, -1/5
(c) -3/5, -5/5, -2/5, -1/5  (d) -2/5, -3/5, -5/5, -1/5

Q. 4. (6/5) – (-2/5) gives

(a) 4/5                   (b) -4/5
(c) 8/5                   (d) -8/5

Q. 5. (-3/5) x 3 gives

(a) -9/5                 (b) 9/5
(c) -3/15                (d) 3/15

Q. 6. Pythagoras theorem applies in

(a) Right angle triangle  (b) Acute triangle
(c) Obtuse triangle       (d) Scalene triangle
Q.7. In the congruency rules of triangles, two sides and the angle between them gives criterion
(a) SSA   (b) ASS
(c) SAS   (d) None of these

Q.8. How many sides are equal in an isosceles triangle
(a) three   (b) two
(c) zero   (d) none of these

Q.9. Area of path (shaded region) is given by
(a) Outer area ÷ Inner area   (b) Outer area + Inner area
(c) Outer area x Inner area   (d) Outer area - Inner area

Q.10. Circumference of the circle is equal to
(a) $2\pi r$   (b) $\pi r$
(c) $\pi r^2$   (d) none of these

Q.11. Perimeter of rectangle is equal to
(a) length + breadth   (b) 2(length + breadth)
(c) (length + breadth)/2   (d) length x breadth

Q.12. Area of the square is equal to
(a) side x side   (b) side + side
(c) 4 x side   (d) none of these

Q.13. Area of triangle is
(a) (1/2) x (b x h)   (b) b x h
(c) (b + h)/2   (d) b + h
Q.14. If the length of rectangular garden = 20 m and its breadth = 7m, then area will be
(a) 140 m²  (b) 140 m  
(c) 54 m²  (d) 70 m²

Q.15. If the diameter of the circle = 70 cm, then area will be;
(a) 70 π  (b) (70 x 70) π  
(c) (35 x 35) π  (d) 35 π

Q.16. Area of a parallelogram is 60 cm² and base is 12 cm, then its height is
(a) 3 cm  (b) 7 cm  
(c) 5 cm  (d) 6 cm

Q.17. The coefficient of ‘x’ in 4x-3y is
(a) 4  (b) -3  
(c) 4x  (d) -3y

Q.18. Which type of expression is $z^2 - 3z + 8$ ?
(a) monomial  (b) binomial  
(c) trinomial  (d) none of these

Q.19. Find the value of 100 – 10 x³ when x = 2 is
(a) 82  (b) 20  
(c) 80  (d) 92

Q.20. State which of the following pair of terms are of like terms
(a) 7 x, 12y  (b) 15 x, -21 x  
(c) mn², 10mn  (d) 3xy, 3x
Q.21. Classify trinomial in the following expression

(a) \( y^2 \)  
(b) \( 4p^2q - 4pq^2 \) 
(c) \( ab - a - b \)  
(d) \( 4y - 7z \)

Q.22. Find the value of the expression \(-3p^2 + 4p + 7\), if \( p = -2 \),

(a) 0  
(b) 11  
(c) -13  
(d) -27

Q.23. If \( a = 2, b = -2 \), the value of the expression \( a^2 - b^2 \) is

(a) -4  
(b) -8  
(c) 4  
(d) 0

Q.24. What does \((-2)^3\) mean

(a) 8  
(b) 6  
(c) -6  
(d) -8

Q.25. \( \frac{3^7}{3^4} \) gives

(a) \(3^{\frac{7}{4}}\)  
(b) \(3^{7+4}\)  
(c) \(3^{7\times4}\)  
(d) \(3^{7-4}\)

Q.26. 243 can be written as

(a) \(3^7\)  
(b) \(5^3\)  
(c) \(7^5\)  
(d) \(3^5\)

Q.27. \(0 \times 10^2\) gives

(a) 100  
(b) 1000  
(c) 1  
(d) 0

Q.28. What does \((2 \times 3)^5\) mean

(a) \(2^5 + 3^5\)  
(b) \(2^5\)  
(c) \(2^5 \times 3^5\)  
(d) \(2^5 - 3^5\)
Q.29. $\left(2^3\right)^2$ gives
(a) $2^6$  
(b) $2^5$
(c) $4^2$  
(d) $3^4$
Q.30. $\left(-4m\right)^3 = ?$
(a) $-12m$  
(b) $64m^3$
(c) $-64m^3$  
(d) $-64$
Q.31. Transform 59 into standard form as
(a) $5.9 \times 10^2$  
(b) $5.9 \times 10^{-2}$
(c) $0.59 \times 10$  
(d) $5.9 \times 10$
Q.32. $7^y \times 7^2$ gives
(a) $7^{y+2}$  
(b) $7^{2y}$
(c) $2^{7y}$  
(d) $2^{7+y}$
Q.33. Expanded form of 47561 will be
(a) $4 \times 10^4 + 7 \times 10^3 + 5 \times 10^2 + 6 \times 10^1 + 1 \times 10^0$
(b) $4 \times 10^5 + 7 \times 10^4 + 5 \times 10^3 + 6 \times 10^2 + 1 \times 10^1$
(c) $4 \times 10^3 + 7 \times 10^2 + 5 \times 10^1 + 6 \times 10^0$
(d) $4 \times 10^6 + 7 \times 10^5 + 5 \times 10^4 + 6 \times 10^3 + 1 \times 10^2$
Q.34. (-1) odd number = ?
(a) 0  
(b) 1
(c) -1  
(d) odd number
Q.35. (-3) X 2^0 = ?
(a) 0  
(b) -6
(c) 6  
(d) -3
Q.36. Equivalent form of -6/14 is
(a) -6/5    (b) -5/8
(c) -3/7    (d) None of these

Q.37. Reciprocal of -8/5 is
(a) -5/8    (b) 2/5
(c) -16/10  (d) 8/5

Q.38. The expression (-3/2) x (2/6) is equal to
(a) -1/4    (b) 6/12
(c) -6/14   (d) -1/2

Q.39. Value of (-4/7 + 4/7) is equal to
(a) -8/14   (b) 0
(c) -16/49  (d) 1

Q.40. If ABC is a right angle triangle and a, b, c are its sides then which statement is true
(a) \(a^2 + b^2 = c\)    (b) \(a^2 + c^2 = b^2\)
(c) \(a + c = b\)    (d) \(b - c = a\)

Q.41. Perimeter of a regular polygon is given by
(a) \(4 \times \text{side}\)    (b) \(\text{length} \times \text{breadth}\)
(c) \(\text{number of sides} \times \text{length of one side}\)
(d) \(4 + \text{side}\)

Q.42. Area of rectangle is
(a) \(\text{length} + \text{breadth}\)    (b) \(2(\text{length} + \text{breadth})\)
(c) \(\text{length} \times \text{breadth}\)    (d) \(4 \times \text{length of one side}\)
Q.43. Diameter of a circle is
(a) $2\pi$  
(b) $2r$
(c) $\pi r$  
(d) $2\pi r$

Q.44. $(1/2) \times$ area of parallelogram is equal to
(a) $2(1 + b)$  
(b) $1 \times b$
(c) $(\frac{1}{2})(b \times h)$  
(d) $b \times h$

Q.45. Perimeter of square is
(a) length $\times$ breadth  
(b) $4 \times$ side
(c) base $\times$ height  
(d) $(\frac{1}{2})(l \times b)$

Q.46. Convert $1 \text{ m}^2$ in cm
(a) $10000 \text{ m}^2$  
(b) $10000 \text{ cm}^2$
(c) $100 \text{ cm}^2$  
(d) $100 \text{ m}$

Q.47. $(11ab - 5ab)$ is equal to
(a) $6ab$  
(b) $6a + b$
(c) $16ab$  
(d) $a + 6b$

Q.48. The expression $8xy + 4xy - 7xy$ is equal to
(a) $12yx$  
(b) $7xy$
(c) $15xy$  
(d) $5xy$

Q.49. If $x = 2$, the value of $2x + 2$ is
(a) 2  
(b) 6
(c) 3  
(d) 0

Q.50. If $r = 7$, circumference of a circle is
(a) 40  
(b) 48
(c) 44  
(d) 0
Q.51. Complete the series: 3, 6, 9, 12, _
   (a) 17                               (b) 15
   (c) 14                               (d) 18
Q.52. $10^3$ is equal to
   (a) 100                               (b) 10000
   (c) 1000                              (d) none of these
Q.53. $( -1 ) ^3 = ?$
   (a) -1                               (b) 3
   (c) 1                                (d) -3
Q.54. $a^2 \times a^4$ is equal to
   (a) $a^2$                          (b) $a^8$
   (c) $a^6$                          (d) none of these
Q.55. Simplify $a^0 + 1^0$ is equal to
   (a) 0                               (b) 2
   (c) 1                               (d) $a + 1$
Q.56. Express $8 \times 8 \times 8 \times 8$ in exponential form
   (a) $2^8$                        (b) $4^2$
   (c) $8^4$                        (d) $4^8$

FILL IN THE BLANKS.

Q.57. 0 is neither a ______ nor a negative rational number.
Q.58. $(-2/7)$ ___ $1/2$          (fill <, >, or =)
Q.59. $5/4 + (-11/4) = \underline{\hspace{2cm}}$
Q.60. $2/3 \div (-7/8) = \underline{\hspace{2cm}}$. 
Q.61. Exterior angle of a triangle is equal to the sum of _______ angles.

Q.62. The total measure of three angles of a triangle is ________.

Q.63. The sum of the lengths of any two sides of a triangle is _______ than the length of the third side.

Q.64. Distance around a circular region is called__________.

Q.65. The value of $\pi$ is ________.

Q.66. Area of parallelogram is ________.

Q.67. 1 Hectare is ________.

Q.68. If $x = 5$ and $y = -7$ then $(x + y)/2$ is equal to ________.

Q.69. Numerical coefficients of $5 - 3t^2$ is ________.

Q.70. $-(a - b)$ becomes __________.

Q.71. Value of $7x - 3$ for $x = -5$ is ________.

Q.72. $8^2 \text{__________} 2^8$ (fill the symbols, <, >, or =) .

Q.73. $5^3 \times 5^7 \times 5^{12} = \text{__________}$.

Q.74. Standard form of 590 is ________.

Q.75. $2^0 \times 3^0 \times 4^0 = \text{__________}$.

STATE TRUE/FALSE TO THE FOLLOWING STATEMENTS:

Q.76. $2/ -3$ is a rational number.

Q.77. 0 is a rational number.

Q.78. $4/-9$ and $-12/36$ represent the same rational number.

Q.79. The numbers $-1/3$ and $2/7$ are in standard form.

Q.80. Area of triangle = $(1/2) \times \text{Area of parallelogram} = (1/2) \times \text{(base \times height)}$.

Q.81. The area of circle is given by $\pi r$.

Q.82. The product (side $\times$ side) gives the perimeter of a square.
Q.83. Two terms, 14xy and -17yx are in pair of like terms.

Q.84. The nth term of a number pattern 11, 21, 31, 41, -------- is (n+10).

Q.85. Third term of $n^2 + 1$ is 9.

Q.86. $(-2)^4 = 16$

Q.87. 625 can be written in the exponential form as $5^5$.

Q.88. The terms $a^3b^2$, $a^2b^3$, $b^2a^3$ and $b^3a^2$ are same.

Q.89. $(2^3)^2$ can be written as $(2^2)^3$.

Q.90. A regular polygon is the figure with all sides of equal length.

Q.91. If ABC is a triangle and a, b, c, are its sides then $a + b > c$.

**SHORT ANSWER TYPE QUESTIONS:**

Q.92. Fill the boxes $5/4 = \text{--}/16$

Q.93. Find two rational numbers between $-3/5$ and $-1/3$?

Q.94. Write two more numbers in the following pattern:

\[-1/3, -2/6, -3/9, -4/12, \text{--}.

Q.95. Find the value of $19/5 + (-7)/5$.

Q.96. Find the value of $(-3/5) \div 2$

Q.97. If the area of a rectangular sheet is 500 cm$^2$ and length of the sheet is 25 cm, what is its width?

Q.98. If the base of a parallelogram is 5cm and height is 7 cm then what will be its area?

Q.99. What is the circumference of a circle of radius 5 cm? ($\pi = 22/7$)

Q.100. Find base, if the area of triangle is 36 cm$^2$ and height is 3 cm?

Q.101. Convert 10 m$^2$ in cm$^2$.

Q.102. What are the coefficients of $x$ and $y$ in $8 - x + y$?
Q.103. Identify like terms in the following:

\[ xy^2, -4yx^2, 8x^2, 2xy^2, -11x^2, -100x, -11yx, 20x^2y, 2xy, 3x \]

Q.104. Subtract \(24ab - 10b - 18a\) from \(30ab + 12b + 14a\)?

Q.105. Simplify: \((-3) \times (-2)^3\).

Q.106. Simplify: \((3^0 + 2^0) \times 5^0\).

Q.107. Express in standard form: 70, 00,000.

Q.108. Simplify: \(p - (p - q) - q - (q - p)\).

Q.109. Find the value of \(5n - 2\) when \(n = -2\)

Q.110. Express 256 as a power of 2.

Q.111. Construct a right-angled triangle whose hypotenuse is 6cm long and one of the legs is 4cm long.

Q.112. Identify terms which contain \(y^2\) and give the coefficient of \(y^2\) in the expression

\[ 2x^2y - 15xy^2 + 7y^2 \].
<table>
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<tr>
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<th>S.No.</th>
<th>Answer Key</th>
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ACHIEVEMENT TEST (FINAL DRAFT)

CLASS – VII

Name :---------------------                     Age :---------------------

Class :---------------------                     Roll Number :----------

School :---------------------                     Date :---------------------

General Instructions :

This is a test of what you know about the chapters Rational Numbers, Practicial Geometry, Perimeter and Area, Algebraic Expressions, Exponents and powers of your Mathematics class VII syllabus. The results of this test will be used to clear any points of difficulty and thus help you to complete the course successfully.

This test contains 70 objective type questions in all. Attempt all the questions. Each question will carry one mark. Encircle the appropriate answer.

- Q. No. 1 to Q. No. 40 are Multiple choice type questions.
- Q. No. 41 to Q. No. 51 are Fill in the Blanks.
- Q. No. 52 to Q. No. 59 are True False type questions.
- Q. No. 60 to Q. No. 70 are Short Answer type questions.
ACHIEVEMENT TEST

This test contains 70 objective type questions in all. Each question will carry one mark. Encircle the appropriate answer.

Multiple choice type questions:

Q.1. Standard form of -45/30 is
   (a) 3/2                     (b) -3/2
   (c) 2/3                 (d) 5/6

Q. 2. Which type of this number i.e. -3/-5 is
   (a) Rational number                        (b) Positive rational number
   (b) Negative rational number         (d) Not a rational number

Q.3. (-3/5) x 3 gives
   (a) -9/5                    (b) 9/5
   (c) -3/15              (d) 3/15

Q.4. In the congruency rules of triangles, two sides and the angle between them gives criterion
   (a) SSA                    (b) ASS
   (c) SAS               (d) None of these

Q.5. In an isosceles triangle, how many sides are equal?
   (a) three                     (b) two
   (c) zero              (d) none of these

Q.6. State which of the following pair of terms are of like terms
   (a) 7 x, 12y                     (b) 15 x, -21 x
   (c) mn², 10mn              (d) 3xy, 3x
Q.7. Classify trinomial in the following expression
   (a) \( y^2 \) \hspace{1cm} (b) \( 4p^2q - 4pq^2 \)
   (c) \( ab - a - b \) \hspace{1cm} (d) \( 4y - 7z \)

Q.8. Equivalent form of \(-6/14\) is
   (a) \(-6/5\) \hspace{1cm} (b) \(-5/8\)
   (c) \(-3/7\) \hspace{1cm} (d) None of these

Q.9. Reciprocal of \(-8/5\) is
   (a) \(-5/8\) \hspace{1cm} (b) \(2/5\)
   (c) \(-16/10\) \hspace{1cm} (d) \(8/5\)

Q.10. The expression \((-3/2)x(2/6)\) is equal to
   (a) \(-1/4\) \hspace{1cm} (b) \(6/12\)
   (c) \(-6/14\) \hspace{1cm} (d) \(-1/2\)

Q.11. Value of \((-4/7 + 4/7)\) is equal to
   (a) \(-8/14\) \hspace{1cm} (b) \(0\)
   (c) \(-16/49\) \hspace{1cm} (d) \(1\)

Q.12. Perimeter of a regular polygon is given by
   (a) \(4 \times \text{side}\)
   (b) \(\text{length} \times \text{breadth}\)
   (c) \(\text{number of sides} \times \text{length of one side}\)
   (d) \(4 + \text{side}\)

Q.13. Area of rectangle is
   (a) \(\text{length} + \text{breadth}\) \hspace{1cm} (b) \(2(\text{length} + \text{breadth})\)
   (c) \(\text{length} \times \text{breadth}\) \hspace{1cm} (d) \(4 \times \text{length of one side}\)
Q.14. Diameter of a circle is
(a) \(2\pi\)          (b) \(2r\)
(c) \(\pi r\)         (d) \(2\pi r\)

Q.15. Perimeter of square is
(a) length \times breadth      (b) 4 \times side
(c) base \times height         (d) \(\frac{1}{2} (\text{base} \times \text{height})\)

Q.16. \((11a - 5a) - b\) is equal to
(a) \(6ab\)                (b) \(6a + b\)
(c) \(16ab\)               (d) \(a + 6b\)

Q.17. The expression \(8xy + 4xy - 7xy\) is equal to
(a) \(12yx\)              (b) \(7xy\)
(c) \(15xy\)              (d) \(5xy\)

Q.18. If \(x = 2\), the value of \(2x + 2\) is
(a) \(2\)             (b) \(6\)
(c) \(3\)              (d) \(0\)

Q.19. If \(r = 7\), circumference of a circle is
(a) \(40\)            (b) \(48\)
(c) \(44\)             (d) \(0\)

Q.20. Complete the series: 3, 6, 9, 12, _
(a) \(17\)            (b) \(15\)
(c) \(14\)             (d) \(18\)

Q.21. \(10^3\) is equal to
(a) \(100\)       (b) \(10000\)
(c) \(1000\)         (d) none of these
Q.22. \((-1)^3 = ?\)
(a) -1  (b) 3  
(c) 1  (d) -3

Q.23. \(a^2 \times a^4\) is equal to
(a) \(a^2\)  (b) \(a^8\)
(c) \(a^6\)  (d) none of these

Q.24. Area of path (shaded region) is given by
(a) Outer area ÷ Inner area  (b) Outer area + Inner area  
(c) Outer area x Inner area  (d) Outer area - Inner area

Q.25. Area of the square is equal to
(a) side \(\times\) side  (b) side + side 
(c) 4 \(\times\) side  (d) none of these

Q.26. Area of triangle is
(a) \((1/2) \times (b \times h)\)  (b) \(b \times h\)
(c) \((b + h)/2\)  (d) \(b + h\)

Q.27. Area of a parallelogram is 60 cm\(^2\) and base is 12 cm, then its height is
(a) 3 cm  (b) 7 cm 
(c) 5 cm  (d) 6 cm

Q.28. Which type of expression is \(z^2 - 3z + 8\)?
(a) monomial  (b) binomial 
(c) trinomial  (d) none of these
Q.29. Find the value of \(100 - 10x^3\) when \(x = 2\) is

(a) 82  (b) 20  
(c) 80  (d) 92

Q.30. If \(a = 2, b = -2\), the value of the expression \(a^2 - b^2\) is

(a) \(-4\)  (b) \(-8\)  
(c) 4  (d) 0

Q.31. What does \((-2)^3\) mean

(a) 8  (b) 6  
(c) \(-6\)  (d) \(-8\)

Q.32. \(3^7 / 3^4\) gives

(a) \(3^{7/4}\)  (b) \(3^{7+4}\)  
(c) \(3^{7\times4}\)  (d) \(3^{7-4}\)

Q.33. 243 can be written as

(a) \(3^7\)  (b) \(5^3\)  
(c) \(7^5\)  (d) \(3^5\)

Q.34. \(0 \times 10^2\) gives

(a) 100  (b) 1000  
(c) 1  (d) 0

Q.35. \((2^3)^2\) gives

(a) \(2^6\)  (b) \(2^5\)  
(c) \(4^2\)  (d) \(3^4\)

Q.36. \((-4m)^3 = ?\)

(a) \(-12m\)  (b) \(64m^3\)  
(c) \(-64m^3\)  (d) \(-64\)
Q. 37. Expanded form of 47561 will be
(a) \(4 \times 10^4 + 7 \times 10^3 + 5 \times 10^2 + 6 \times 10^1 + 1 \times 10^0\)
(b) \(4 \times 10^5 + 7 \times 10^4 + 5 \times 10^3 + 6 \times 10^2 + 1 \times 10^1\)
(c) \(4 \times 10^3 + 7 \times 10^4 + 5 \times 10^2 + 6 \times 10^1 + 1\)
(d) \(4 \times 10^6 + 7 \times 10^5 + 5 \times 10^4 + 6 \times 10^3 + 1 \times 10^2\)

Q. 38. Which set of numbers is in ascending order
(a) \(-1/5, -2/5, -3/5, -5/5\)  
(b) \(-5/5, -3/5, -2/5, -1/5\)  
(c) \(-3/5, -5/5, -2/5, -1/5\)  
(d) \(-2/5, -3/5, -5/5, -1/5\)

Q. 39. \((6/5) – (-2/5)\) gives
(a) \(4/5\)  
(b) \(-4/5\)  
(c) \(8/5\)  
(d) \(-8/5\)

Q. 40. Pythagoras theorem applies in
(a) Right angle triangle  
(b) Acute triangle  
(c) Obtuse triangle  
(d) Scalene triangle

FILL IN THE BLANKS.

Q. 41. The total measure of three angles of a triangle is _________.

Q. 42. 0 is neither a ________ nor a negative rational number.

Q. 43. \(5/4 + (-11/4) = \) ________.

Q. 44. \(2/3 ÷ (-7/8) = \) ________.

Q. 45. Exterior angle of a triangle is equal to the sum of ________ angles.

Q. 46. The sum of the lengths of any two sides of a triangle is ________ than the length of the third side.

Q. 47. Distance around a circular region is called__________.

Q. 48. The value of \(\pi\) is ________.
Q.49. Area of parallelogram is ________.

Q.50. Value of \(7x - 3\) for \(x = -5\) is ______.

Q.51. Simplify the product of exponents \(5^3 \times 5^7 \times 5^{12}\) = ________.

STATE TRUE/FALSE TO THE FOLLOWING STATEMENTS:

Q.52. Area of triangle = \((1/2)\times\) area of parallelogram = \((1/2)\) (base \times height).

Q.53. The area of circle is given by \(\pi r\).

Q.54. The product (side \times side) gives the perimeter of a square.

Q.55. Two terms, 14xy and -17yx are in pair of like terms.

Q.56. \((-2)^4 = 16\)

Q.57. 625 can be written in the exponential form as \(5^5\).

Q.58. The terms \(a^3b^2, a^2b^3, b^2a^3\) and \(b^3a^2\) are same.

Q.59. If ABC is a triangle and a, b, c, are its sides then \(a + b > c\).

SHORT ANSWER TYPE QUESTIONS:

Q.60. Write a number in the following pattern:

\(-1/3, -2/6, -3/9, -4/12, \ldots\).

Q.61. Find the value of \(19/5 + (-7)/5\).

Q.62. Fill the boxes \(\frac{5}{4} = \ldots/16\).

Q.63. Find two rational numbers between \(-3/5\) and \(-1/3\).

Q.64. Find the value of \((-3/5) \div 2\).

Q.65. If the area of a rectangular sheet is 500 cm\(^2\) and length of the sheet is 25 cm, what is its width?

Q.66. If the base of a parallelogram is 5cm and height is 7 cm then what will be its area?
Q.67. Simplify: \((-3) \times (-2)^3\).

Q.68. Simplify: \(p - (p - q) - q - (q - p)\).

Q.69. Find the value of \(5n - 2\) when \(n = -2\)

Q.70. Express 256 as a power of 2.
# SCORING KEY FOR ACHIEVEMENT TEST (FINAL DRAFT)

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<th>Answer Key</th>
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<td>43.</td>
<td>-3/2</td>
</tr>
<tr>
<td>7.</td>
<td>c</td>
<td>44.</td>
<td>-16/21</td>
</tr>
<tr>
<td>8.</td>
<td>c</td>
<td>45.</td>
<td>interior opposite</td>
</tr>
<tr>
<td>9.</td>
<td>a</td>
<td>46.</td>
<td>greater</td>
</tr>
<tr>
<td>10.</td>
<td>d</td>
<td>47.</td>
<td>circumference</td>
</tr>
<tr>
<td>11.</td>
<td>b</td>
<td>48.</td>
<td>22/7</td>
</tr>
<tr>
<td>12.</td>
<td>c</td>
<td>49.</td>
<td>base x height</td>
</tr>
<tr>
<td>13.</td>
<td>c</td>
<td>50.</td>
<td>-38</td>
</tr>
<tr>
<td>14.</td>
<td>b</td>
<td>51.</td>
<td>52°</td>
</tr>
<tr>
<td>15.</td>
<td>b</td>
<td>52.</td>
<td>T</td>
</tr>
<tr>
<td>16.</td>
<td>a</td>
<td>53.</td>
<td>F</td>
</tr>
<tr>
<td>17.</td>
<td>d</td>
<td>54.</td>
<td>F</td>
</tr>
<tr>
<td>18.</td>
<td>b</td>
<td>55.</td>
<td>T</td>
</tr>
<tr>
<td>19.</td>
<td>c</td>
<td>56.</td>
<td>T</td>
</tr>
<tr>
<td>20.</td>
<td>b</td>
<td>57.</td>
<td>F</td>
</tr>
<tr>
<td>21.</td>
<td>c</td>
<td>58.</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>22.</td>
<td>a</td>
<td>59</td>
<td>T</td>
</tr>
<tr>
<td>23.</td>
<td>c</td>
<td>60</td>
<td>-5/15</td>
</tr>
<tr>
<td>24.</td>
<td>d</td>
<td>61</td>
<td>12/5</td>
</tr>
<tr>
<td>25.</td>
<td>a</td>
<td>62</td>
<td>20</td>
</tr>
<tr>
<td>26.</td>
<td>a</td>
<td>63</td>
<td>either -8/15 or -7/15 or -6/15</td>
</tr>
<tr>
<td>27.</td>
<td>c</td>
<td>64</td>
<td>-3/10</td>
</tr>
<tr>
<td>28.</td>
<td>b</td>
<td>65</td>
<td>20 cm</td>
</tr>
<tr>
<td>29.</td>
<td>b</td>
<td>66</td>
<td>35 cm²</td>
</tr>
<tr>
<td>30.</td>
<td>d</td>
<td>67</td>
<td>24</td>
</tr>
<tr>
<td>31.</td>
<td>d</td>
<td>68</td>
<td>p-q</td>
</tr>
<tr>
<td>32.</td>
<td>d</td>
<td>69</td>
<td>-12</td>
</tr>
<tr>
<td>33.</td>
<td>d</td>
<td>70</td>
<td>2⁸</td>
</tr>
<tr>
<td>34.</td>
<td>d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX-H

FORMATIVE TEST

Name: ------------     Class: -----------     Section: ------------ Roll no.:----------------

EXPONENTS AND POWER
This test contains 40 objective type questions in all. Each question will carry one mark. Choose the appropriate answer.

1. Match up the following: (5)

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>( - 1 )^3</td>
<td>10000cm^2</td>
</tr>
<tr>
<td>a^2 x a^4</td>
<td>-1000</td>
</tr>
<tr>
<td>1</td>
<td>1/27</td>
</tr>
<tr>
<td>1m^2</td>
<td>-1</td>
</tr>
<tr>
<td>(1/3) x (1/3) x (1/3)</td>
<td>(-100)^0</td>
</tr>
<tr>
<td>a^6</td>
<td></td>
</tr>
</tbody>
</table>

2. State True / False to the following (8)
   (a) 2^3 > 5^2
   (b) 3^0 = (1000)^0
   (c) 10 x 10^{11} = 100^{11}
   (d) 3^2 = 2^3
   (e) a^0 + 1^0 = 1
   (f) 8 x 8 x 8 x 8 = 8^4
   (g) 8^2 > 2^8
   (h) (-2)^4 = 16

3. Simple one word answers (5)
   (a) What will come? : 2^0 x 3^0 x 4^0 = ?
   (b) Write 243 in the terms of power of 3.
   (c) (-3) x (-2)^3 = ?
   (d) Simplify the expression (3^0 + 2^0) x 5^0 = ?
   (e) In (-8)^4, identify the base?

4. Fill in the blanks (8)
   (a) 9^5 ÷ 9^3 = ____________.
(b) \(10^4 = \) __________

(c) \(2^0 = \) __________

(d) \(a \times a \times a \times a \times a \times a \times a = \) ________

(e) \(2^0 + 3^0 + 4^0 = \) __________.

(f) In \((-7/3)^3\), -3 is called as ______.

(g) In power notation \(162/32\) can be expressed as __________.

(h) The value of \((-4)^2 \times (-4)^2\) is _________.

5. **Multiple choice questions (Tick the appropriate answer).**

(a) What does \((-2)^3\) mean by
   (i) 8     (ii) -8     (iii) 6     (iv) -6

(b) \(3^7 \times 3^4\) gives by
   (i) \(3^3\)     (ii) \(3^{7+4}\)     (iii) \(3^{7x4}\)     (iv) \(3^{7-4}\)

(c) \((2^3)^2\) gives
   (i) \(2^6\)     (ii) \(2^5\)     (iii) \(4^2\)     (iv) \(3^4\)

(d) \((2 \times 3)^5\) means
   (i) \(2^5 + 3^5\)     (ii) \(2^5 / 3^5\)     (iii) \(2^5 \times 3^5\)     (iv) \(2^5 - 3^5\)

(e) \((-4m)^3\) gives
   (i) -12m      (ii) 64 m^2     (iii) -64 m^3     (iv) -64 m

(f) \(7^y \times 7^2\) gives
   (i) \(7^{y+2}\)     (ii) \(7^{2x}\)     (iii) \(2 x\)     (iv) \(2^{7+x}\)

(g) Expanded form of 47561 will be
   i. \(4 \times 10^4 + 7 \times 10^3 + 5 \times 10^2 + 6 \times 10^1 + 1 \times 10^0\)
   ii. \(4 \times 10^5 + 7 \times 10^4 + 5 \times 10^3 + 6 \times 10^2 + 1 \times 10^1\)
   iii. \(4 \times 10^3 + 7 \times 10^4 + 5 \times 10^2 + 6 \times 10^1 + 1\)
   iv. \(4 \times 10^6 + 7 \times 10^5 + 5 \times 10^4 + 6 \times 10^3 + 1 \times 10^2\)

(h) \((-1)^{\text{odd number}} = ?\)
   (i) -1     (ii) 1     (iii) 0     (iv) odd number

(i) \((-3) \times 2^0 = ?\)
   (i) 0     (ii) -6     (iii) 6     (iv) -3

(j) 243 can be written as
   (i) \(3^7\)     (ii) \(5^3\)     (iii) \(7^5\)     (iv) \(3^5\)
(k) $0 \times 10^2$ gives
(i) 100  (ii) 1000  (iii) 1  (iv) 0

(l) What does $(2 \times 3)^5$ mean
(i) $2^5 + 3^5$  (ii) $2^5$  (iii) $2^5 \times 3^5$  (iv) $2^5 - 3^5$

(m) The value of $2^6$ is
(i) 32  (ii) 128  (iii) 64  (iv) 1024

(n) The exponential form of $(b \times b \times b \times b)$ is
(i) $b^3$  (ii) $(b^2)^2$  (iii) $b^5$  (iv) $b^b$
WOKSHEET-1
CHAPTER- RATIONAL NUMBER

Name: ----------- Class: --------------- Section: ------------ Roll no.:-------------

Q.1. A number that can be expressed in the form of p/q, where p and q are integers and q \(\neq 0\) is

(a) Whole number                            (b) Real number
(c) Rational number                         (d) Natural number

Q.2. \((-2)/(-3)\) is a negative rational number.                       (True/False)

Q.3. Reduce \((-15)/25\) to the standard form.

Q.4. Fill in the boxes with correct (answers) symbols >, <, and =,

(a) \((-3)/7\)               \(2/3\)               (b) \((-7)/8\)           \(13/(-16)\)
(c) \(5/(-11)\)          \((-5)/11\)          (d) \(0\)               \(6/5\)

Q.5. List three rational numbers between

(a) -2 and 0                         (b) 1/2 and 2/3

Q.6. Give two rational numbers equivalent to

(a) \(-2/5\)                             (b) 5/9

Q.7. Rewrite the following rational numbers in the simplest form:

(a) \(-10/6\)                             (b) \(-44/62\)

Q.8. Which is greater in each of the following:

(a) \((-5)/6\), \((-4)/3\)              (b) 7/8, 21/5

Q.9. Negative rational numbers of 6/11 and \((-2)/9\) are _____ and ______.

Q.10. Standard form of \((-8)/28\) is ________.
Lesson Plan

Topic: Exponents and Its Laws

Class: 7th Grade Mathematics Students

Cooperative Learning Model: STAD

The teacher will do part of the lab with students and explain different procedures. The students within a group are then responsible for making sure everyone in the group understands the lab, the concepts, how to solve problems and answer discussion questions. When the lab is completed each group is evaluated on the products of the lab activity. Individuals are evaluated on their independent formative tests following the lab activities. After scores are tallied and bonus points figured, the groups with the highest score will receive awards.

I. Entry Behaviour:

It is assumed that students are familiar with concept in which a number can be represented in terms of factors and powers but they cannot write rational numbers in exponential form, cannot follow the same rules and procedures as known for integers and cannot apply the laws of exponents.

II. Instructional Objectives:

At the end of instructions, students will be able to

- justify the need of exponents and powers recognize the base and exponent if a number expressed in exponential form.
- express a number in exponential form.
- recognize the base and exponent.
- write a number as a product of powers of prime factors.
- recall different laws of exponents.
- use the laws of exponents.
- simplify and write the answer in exponential form.
III. Instructional Material to be Used:
1). Chalk-board, Chalk, Duster, Pointer.
2). A chart showing the ‘Laws of Exponents’.

IV. Previous Knowledge Testing:

<table>
<thead>
<tr>
<th>Teacher’s activity</th>
<th>Student’s activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Write 125 into factors.</td>
<td>5×5×5</td>
</tr>
<tr>
<td>2. Write 5×5×5 in terms of powers.</td>
<td>5³</td>
</tr>
<tr>
<td>3. What do we get if 4×2 is multiplied by 5×5?</td>
<td>2³ 5²</td>
</tr>
<tr>
<td>4. In ( \left( \frac{2}{3} \right)^2 ), what do we call power ‘2’ in mathematical language and also ( \frac{2}{3} )?</td>
<td>Unsatisfactory response</td>
</tr>
</tbody>
</table>

V. Announcement of the Topic:

After getting unsatisfactory response of the last question from the students teacher will announce that dear students it is called as the ‘base’ and the ‘exponent’ and today we will learn about ‘Exponents and its laws’.

VI. Presentation:

<table>
<thead>
<tr>
<th>Teaching points</th>
<th>Teacher’s activity</th>
<th>Student’s activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exponential notation</td>
<td>Teacher will write 4×4×4 on the chalk-board and ask, how can we write in other form?</td>
<td>4×4×4 = 4³</td>
</tr>
</tbody>
</table>
Teacher will extend the idea by saying that this form of notation is known as exponential notation where 4 is called the **base** and 3 the **exponent** and $4^3$ is read as 4 raised to the power 3.

Similarly, $(-4)^3$ means $(-4) \times (-4) \times (-4)$ and is read as -4 raised to the power 3. Now, we will extend this theory for rational numbers. Rational numbers can be written in exponential form and follow the same rules and procedure as known for integers.

Then, teacher will give the example of rational number $\frac{8}{125}$ and ask, can we write the multiples of any type of numbers in exponential notation?

Thereafter, teacher will explain the term base and exponent. Here, $\frac{2}{5}$ is the base and 3 is exponent.

For example,

\[
\left(\frac{3}{7}\right)^3 = \left(\frac{3}{7}\right) \times \left(\frac{3}{7}\right) \times \left(\frac{3}{7}\right)
\]

\[
= \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = \frac{3^3}{7^3}
\]

\[
= \frac{27}{343}
\]

And,

\[
\frac{8}{125} = \frac{2 \times 2 \times 2}{5 \times 5 \times 5}
\]

\[
= \frac{2^3}{5^3}
\]

\[
= \frac{2}{5} \times \frac{2}{5} \times \frac{2}{5}
\]

\[
= \left(\frac{2}{5}\right)^3
\]

Students shall note down in their notebooks.
Reciprocal of a number in exponential form

\[
\left(\frac{-2}{5}\right)^4 = \left(\frac{-2}{5}\right) \times \left(\frac{-2}{5}\right) \times \left(\frac{-2}{5}\right) \times \left(\frac{-2}{5}\right)
\]

\[
= \frac{(-2)^4}{5^4}
\]

\[
= \frac{16}{625}
\]

So students, from the above examples, it is clear that, if \( p \) \( q \) is a rational number and \( k \) is a positive integer, then

\[
\left(\frac{p}{q}\right)^k = \frac{p^k}{q^k}
\]

Well students, do you find out the reciprocal of a rational number \( \frac{p}{q} \)?

Similarly, the reciprocal of \( \left(\frac{p}{q}\right)^k \) is \( \left(\frac{q}{p}\right)^k \), where \( k \) is a positive integer.

For example,

Reciprocal of \( \left(\frac{1}{7}\right)^3 \)

\[
= \left(\frac{7}{1}\right)^3 = \frac{7^3}{1^3}
\]

\[
= \frac{7^3}{1} = (7)^3
\]

In addition to above exponential notations, teacher will explain the different laws of exponents with the help of examples.
Laws of exponents

Consider,

\[ 5^3 \times 5^2 = (5 \times 5 \times 5) \times (5 \times 5) = 5^{3+2} \]

And,

\[ (-5)^3 \times (-5)^2 = [(-5) \times (-5) \times (-5)] \times [(-5) \times (-5)] \]

\[ = (-5)^5 = (-5)^{3+2} \]

Now,

\[ \left( \frac{6}{7} \right)^2 \times \left( \frac{6}{7} \right)^3 = \frac{6 \times 6 \times 6 \times 6}{7 \times 7 \times 7 \times 7} = \frac{6^5}{7^5} \]

\[ = \left( \frac{6}{7} \right) = \left( \frac{6}{7} \right)^{2+3} \]

Again,

\[ \left( \frac{-2}{3} \right)^2 \times \left( \frac{-2}{3} \right)^4 = \left( \frac{-2 \times -2 \times -2 \times -2}{3 \times 3 \times 3 \times 3} \right) \]

\[ = \left( \frac{-2}{3} \right)^6 = \left( \frac{-2}{3} \right)^{2+4} \]

Students will take interest.

From the above examples, students, what do we get?

Here, we get,

\[ \left( \frac{p}{q} \right)^m \times \left( \frac{p}{q} \right)^n = \left( \frac{p}{q} \right)^{m+n} \]

Where \( \frac{p}{q} \) is any rational number and m and n are positive integers.

In similar way, teacher will explain next law by examples.

As , we have

Students shall note down in their notebooks.

No response
<table>
<thead>
<tr>
<th>Laws of exponent</th>
<th>(2^5 ÷ 2^3 = \frac{2 \times 2 \times 2 \times 2 \times 2}{2 \times 2 \times 2} = 2^1 = 2^{5-3}) and</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\left(\frac{4}{5}\right)^4 ÷ \left(\frac{4}{5}\right)^3 = \frac{\frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}}{\frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}} = \left(\frac{4}{5}\right)^{1-3} = \left(\frac{4}{5}\right)^{-2})</td>
<td>Trying to draw rule.</td>
</tr>
</tbody>
</table>

Teacher will use inductive approach to introduce law.

From above examples what do we get?

Teacher will state that dear students here, we get

\[
\left(\frac{p}{q}\right)^m ÷ \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n}
\]

Where \(m > n\), \(\frac{p}{q}\) is any rational number and \(m, n\) are two positive integers.

Teacher will ask to simplify

\[
\left(\frac{1}{5}\right)^4 ÷ \left(\frac{1}{5}\right)^2
\]

by using law of exponents.

Students will simplify the problem.

\[
\left(\frac{1}{5}\right)^4 ÷ \left(\frac{1}{5}\right)^2
\]

Concluding statement:

So students, today we have learnt about base, exponent and different laws of exponent.
VII. Evaluation:

1. \((\frac{p}{q})^m \times (\frac{p}{q})^n = (\frac{p}{q})^{m+n}\)

2. \((\frac{p}{q})^m \div (\frac{p}{q})^n = (\frac{p}{q})^{m-n}\)

3. \((-2)^2 \div (-2)^5 = ?\)

4. Reciprocal of 5⁴ = ?

VIII. Practice /homework:

- Write laws of exponents.
- Simplify and express the result as a rational number
  1) \(\left(\frac{4}{9}\right)^2 \times \left(\frac{2}{9}\right)\)
  2) \(\left(\frac{2}{9}\right)^2 \times \left(\frac{3}{4}\right)^3\)

- Simplify and express in exponential form
  a) \(\left(\frac{7}{11}\right)^3 \div \left(\frac{7}{11}\right)\)
  b) \(\left(\frac{-3}{13}\right)^4 \times \left(\frac{-3}{13}\right)^9\)
LESSON PLAN

TOPIC: EXPONENTS AND ITS LAWS

CLASS: 7TH GRADE MATHEMATICS STUDENTS

Cooperative learning model: Jigsaw

The teacher will do part of the lab with students and explain structure of jigsaw method to them. The students within ‘Home group’ and ‘Expert group’ are then responsible for making sure everyone in the group understand the lab, the concepts, how to solve problems and answer-discussion questions. When the jigsaw procedure completed once, each group is evaluated on the products of the lab activity. Individuals are evaluated on their independent formative tests following the lab activities. After scores are tallies and bonus points figured, the groups with a highest score will receive awards.

1. Entry Behaviour:

It is assumed that students are familiar with concept in which a number can be represent in terms of factors and powers but they cannot write rational numbers in exponential form, cannot follow the same rules and procedures as known for integers and cannot apply the laws of exponents.

2. Instructional Objectives:

At the end of instructions, students will be able to

• justify the need of exponents and powers recognize the base and exponent if a number expressed in exponential form.
• express a number in exponential form.
• recognize the base and exponent.
• write a number as a product of powers of prime factors.
• recall different laws of exponents.
• use the laws of exponents.
• simplify and write the answer in exponential form.
3. Instructional Material to be Used:
   1). Chalk-board, Chalk, Duster, Pointer.
   2). A chart showing the ‘Laws of Exponents’.

4. Previous Knowledge Testing:

<table>
<thead>
<tr>
<th>Teacher’s activity</th>
<th>Student’s activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Write $125$ into factors.</td>
<td>$5 \times 5 \times 5$</td>
</tr>
<tr>
<td>6. Write $5 \times 5 \times 5$ in terms of powers.</td>
<td>$5^3$</td>
</tr>
<tr>
<td>7. What do we get if $4 \times 2$ is multiplied by $5 \times 5$?</td>
<td>$2^3 \times 5^2$</td>
</tr>
<tr>
<td>8. In $\left(\frac{2}{3}\right)^2$, what do we call power ‘2’ in mathematical language and also $\left(\frac{2}{3}\right)$?</td>
<td>Unsatisfactory response</td>
</tr>
</tbody>
</table>

5. Announcement of the Topic:

After getting unsatisfactory response of the last question from the students teacher will announce that dear students it is called as the ‘base’ and the ‘exponent’ and today we will learn about ‘Exponents and its laws’.

6. Presentation:

Teacher will break the topic, concept, and theme into parts e.g. four subunits named as I, II, III and IV. Teacher will distribute a set of subunits content to each group of students in the home group and move them to expert groups. Assign each group a piece of the content and ask them to develop an expertise in that
piece. Then teacher will send individual ‘experts’ into mixed groups (i.e. ones from different expertise) and there they will share their expertise.

**UNIT PLAN FOR EXPERT GROUP- I**

<table>
<thead>
<tr>
<th>Teaching points</th>
<th>Teacher’s activity</th>
<th>Student’s activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exponential notation</td>
<td>Students will read the content/material provided by teacher and try to get expertise over the content prescribed (subunit-1). Content will be in printed form, so that students in respective expert groups read and learn repeatedly. That is given below: We know that $4 \times 4 \times 4$ can be written as $4^3$. This form of notation is known as exponential notation. 4 is called the <strong>base</strong> and 3 the <strong>exponent</strong> and $4^3$ is read as 4 raised to the power 3. Similarly, $(-4)^3$ means $(-4) \times (-4) \times (-4)$ and is read as -4 raised to the power 3. Now, we will extend this theory for rational numbers. Rational numbers can be written in exponential form and follow the same rules and procedure as known for integers. Suppose, we have to find the value of $\left(\frac{3}{7}\right)^3$ and $\left(-\frac{2}{5}\right)^4$. We can write these as $\left(\frac{3}{7}\right)^3 = \frac{3}{7}\times\frac{3}{7}\times\frac{3}{7} = \frac{3\times3\times3}{7\times7\times7} = \frac{27}{343}$ and,</td>
<td></td>
</tr>
</tbody>
</table>
From the above two examples, it is clear that, if \( \frac{p}{q} \) is a rational number and \( k \) is a positive integer, then

\[
\left( \frac{p}{q} \right)^k = \frac{p^k}{q^k}
\]

Let us make it more clear with examples.

Q. Evaluate \( \left( \frac{2}{7} \right)^3 \)

Students will try to solve questions in their notebooks and discuss also with other members.

\[
\left( \frac{2}{7} \right)^3 = \frac{2^3}{7^3} = \frac{2 \times 2 \times 2}{7 \times 7 \times 7} = \frac{8}{343}
\]

**Sectional evaluation:**

1). In \( \left( \frac{5}{2} \right)^4 \), the base is _______ and the exponent is _______.

2). Evaluate \( \left( \frac{2}{9} \right)^2 \)

3). Express \( \left( \frac{-27}{512} \right) \) in exponential form.
## UNIT PLAN FOR EXPERT GROUP- II

<table>
<thead>
<tr>
<th>Teaching points</th>
<th>Teacher’s activity</th>
<th>Student’s activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base and exponent</strong></td>
<td>Teacher will move in class and carefully observe students’ activities. Teacher will motivate, stimulate and interfere if there would be any trouble arise. Teacher will try to resolve problems.</td>
<td>Students will read the content/material provided by teacher and try to get expertise over the content prescribed. As, we know that $4 \times 4 \times 4$ can be written as $4^3$. This form of notation is known as exponential notation. $4$ is called the <strong>base</strong> and $3$ the <strong>exponent</strong> and $4^3$ is read as $4$ raised to the power $3$. Similarly, $(-4)^3$ means $(-4) \times (-4) \times (-4)$ and is read as $-4$ raised to the power $3$. Now, we will extend this theory for rational numbers. Rational numbers can be written in exponential form and follow the same rules and procedure as known for integers. We know that reciprocal of a number $\frac{p}{q}$ is $\frac{q}{p}$. Similarly, the reciprocal of $\left(\frac{p}{q}\right)^k$ is $\left(\frac{q}{p}\right)^k$, where $k$ is a positive integer. For example, Reciprocal of $\left(\frac{1}{7}\right)^3 = \left(\frac{7}{1}\right)^3 = \frac{7^3}{1} = \frac{7^3}{1} = (7)^3$ and Reciprocal of $(-3)^2 = \left(\frac{1}{-3}\right)^2 = \left(\frac{-1}{3}\right)^2$ Simplifying $(-3)^2 = (-3) \times (-3) = 9$ and</td>
</tr>
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</table>
\[
\left( \frac{-1}{3} \right)^2 = \left( \frac{-1}{3} \right) \times \left( \frac{-1}{3} \right) = \frac{1}{9}
\]

This verifies the same law.

Students will try to solve questions in their notebooks and discuss with their group-mates.

**Sectional evaluation:**

1. Find the reciprocal of
   
   (a) \( \left( \frac{1}{2} \right)^5 \)
   
   (b) \((-6)^3\)

2. Write in exponential form
   
   \[ \left( \frac{-1}{6} \right) \times \left( \frac{-1}{6} \right) \times \left( \frac{-1}{6} \right) \]

3. Simplify \( \left( \frac{4}{9} \right)^2 \times \left( \frac{2}{9} \right) \)

---

### UNIT PLAN FOR EXPERT GROUP- III

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<tr>
<th>Teaching points</th>
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<th>Student’s activity</th>
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<td><strong>Exponential notation</strong></td>
<td>Teacher will move frequently in class and carefully observe students’ activities.</td>
<td>Students will read the content/material provided by teacher and try to get expertise over the content prescribed.</td>
</tr>
<tr>
<td><strong>Base and exponent</strong></td>
<td></td>
<td>As, we know that ( 4 \times 4 \times 4 ) can be written as ( 4^3 ). This form of notation is known as exponential notation. 4 is called the base and 3 the exponent and ( 4^3 ) is read as 4 raised to the power 3. Similarly, ((-4)^3) means ((-4) \times (-4) \times (-4)) and is read as -4 raised to the power 3. Now, we will extend this theory for rational numbers. Rational numbers can</td>
</tr>
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</table>
In this section, we are going to discuss some rules for evaluating exponential expressions.

Consider,

\[ 5^3 \times 5^2 = (5 \times 5 \times 5) \times (5 \times 5) = 5^{3+2} \]

And,

\[ (-5)^3 \times (-5)^2 = [(-5) \times (-5) \times (-5)] \times [(-5) \times (-5)] = (-5)^5 = (-5)^{3+2} \]

Now,

\[
\left( \frac{6}{7} \right)^2 \times \left( \frac{6}{7} \right)^3 = \frac{6}{7} \times \frac{6}{7} \times \frac{6}{7} \times \frac{6}{7} = \frac{6^5}{7^5}
\]

\[
= \left( \frac{6}{7} \right)^5 = \left( \frac{6}{7} \right)^{2+3}
\]

Again,

\[
\left( \frac{-2}{3} \right)^2 \times \left( \frac{-2}{3} \right)^4
= \left( \frac{-2}{3} \right) \times \left( \frac{-2}{3} \right) \times \left( \frac{-2}{3} \right) \times \left( \frac{-2}{3} \right) \times \left( \frac{-2}{3} \right)
= \left( \frac{-2}{3} \right)^6 = \left( \frac{-2}{3} \right)^{2+4}
\]

From the above examples, what do we get? We see that if \( \frac{p}{q} \) is any rational number and m and n are any integers, then

\[
\left( \frac{p}{q} \right)^m \times \left( \frac{p}{q} \right)^n = \left( \frac{p}{q} \right)^{m+n}
\]

Simplify and express in exponential form.

### Laws of exponents

\[
\left( \frac{p}{q} \right)^m \times \left( \frac{p}{q} \right)^n = \left( \frac{p}{q} \right)^{m+n}
\]
\[
\left( \frac{12}{13} \right)^4 \times \left( \frac{12}{13} \right)^5 = \left( \frac{12}{13} \right)^{4+5} = \left( \frac{12}{13} \right)^9
\]
and
\[
\left( \frac{-5}{11} \right)^3 \times \left( \frac{-5}{11} \right)^5 = \left( \frac{-5}{11} \right)^{3+5} = \left( \frac{-5}{11} \right)^8
\]

Students will try to solve questions in their notebooks and discuss with their group-mates.

**Sectional evaluation:**

Simplify and express in exponential form.

(a) \( \left( \frac{1}{7} \right)^3 \times \left( \frac{1}{7} \right)^5 \)

(b) \( \left( \frac{-3}{13} \right)^4 \times \left( \frac{-3}{13} \right)^9 \)

(c) \( \left( \frac{-2}{5} \right) \times \left( \frac{125}{32} \right) \)

(d) \( \left( \frac{2}{3} \right)^4 \times \left( \frac{-9}{8} \right)^2 \)

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**UNIT PLAN FOR EXPERT GROUP- IV**

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<th>Student’s activity</th>
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<td>Exponential notation</td>
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<td></td>
</tr>
</tbody>
</table>
### Base and Exponent

Laws of exponents

\[
\left( \frac{p}{q} \right)^{m} \div \left( \frac{p}{q} \right)^{n} = \left( \frac{p}{q} \right)^{m-n}
\]

Move frequently in class and carefully observe students’ activities. Teacher will motivate, stimulate and interfere if there would be any trouble arise. Teacher will try to resolve problems.

\((-4) \times (-4) \times (-4)\) and is read as -4 raised to the power 3. Now, we will extend this theory for rational numbers. Rational numbers can be written in exponential form and follow the same rules and procedure as known for integers.

In this section, we are going to discuss some rules for evaluating exponential expressions.

Consider,

\[2^4 \div 2^1 = \frac{2 \times 2 \times 2 \times 2}{2 \times 2} = 2^2 = 2^{5-3}\]

Again,

\[(-3)^6 \div (-3)^2 = \frac{(-3) \times (-3) \times (-3) \times (-3) \times (-3) \times (-3)}{(-3) \times (-3)} = (-3)^4 = (-3)^{6-2}\]

Now,

\[\left( \frac{4}{5} \right)^4 \div \left( \frac{4}{5} \right)^3 = \frac{4 \times 4 \times 4 \times 4}{5 \times 5 \times 5 \times 5} = \left( \frac{4}{5} \right)^1 = \left( \frac{4}{5} \right)^{4-3}\]

Again,

\[\left( -\frac{1}{7} \right)^4 \div \left( -\frac{1}{7} \right)^2 = \frac{-1 \times -1 \times -1 \times -1}{-1 \times -1} = \left( -\frac{1}{7} \right)^2 = \left( -\frac{1}{7} \right)^{4-2}\]

From the above examples, we can say that if \( \frac{p}{q} \) is...
any rational number and m and n are two positive integers, then

\[
\left( \frac{p}{q} \right)^m \div \left( \frac{p}{q} \right)^n = \left( \frac{p}{q} \right)^{m-n}
\]

To learn more, evaluate and express in exponential form

\[
\left( \frac{7}{13} \right)^6 \div \left( \frac{7}{13} \right)^4 = \left( \frac{7}{13} \right)^{6-4} = \left( \frac{7}{13} \right)^2
\]

and

\[
\left( \frac{-2}{7} \right)^8 \div \left( \frac{-2}{7} \right)^3 = \left( \frac{-2}{7} \right)^{8-3} = \left( \frac{-2}{7} \right)^5
\]

Students will try to solve questions in their notebooks and discuss with their group-mates.

**Sectional evaluation:**

Evaluate and express in exponential form

a. \[ \left( \frac{1}{5} \right)^2 \div \left( \frac{1}{5} \right)^4 \]

b. \[ \left( \frac{-2}{5} \right)^7 \div \left( \frac{-2}{5} \right)^5 \]

c. \[ \left( \frac{7}{11} \right)^3 \div \left( \frac{7}{11} \right) \]

7. Evaluation in home groups:
1) \( \left( \frac{p}{q} \right)^m \times \left( \frac{p}{q} \right)^n = \left( \frac{p}{q} \right)^{-}\)

2) \( \left( \frac{p}{q} \right)^m \div \left( \frac{p}{q} \right)^n = \left( \frac{p}{q} \right)^{-}\)

3) \( \left( \frac{-2}{5} \right)^7 \div \left( \frac{-2}{5} \right)^5 = ? \)

4) Reciprocal of \( 5^4 \) = ?

8 Practice /homework:

- Write laws of exponents.
- Simplify and express the result as a rational number
  a) \( \left( \frac{4}{9} \right)^2 \times \left( \frac{2}{9} \right) \)
  b) \( \left( \frac{7}{12} \right)^3 \div \left( \frac{7}{12} \right)^i \)

- Simplify and express in exponential form
  I. \( \left( \frac{7}{11} \right)^3 \div \left( \frac{7}{11} \right) \)
  II. \( \left( \frac{2}{9} \right)^2 \times \left( \frac{2}{9} \right)^3 \)
## ITEM ANALYSIS OF ACHIEVEMENT TEST

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<tr>
<th>Item No.</th>
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<th>Remarks</th>
<th>$r_b$</th>
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V.G. – Very Good, R.G. - Reasonably Good, M.I. – Marginal Items, V.P. – Very Poor