



BANK- PO/CLERK

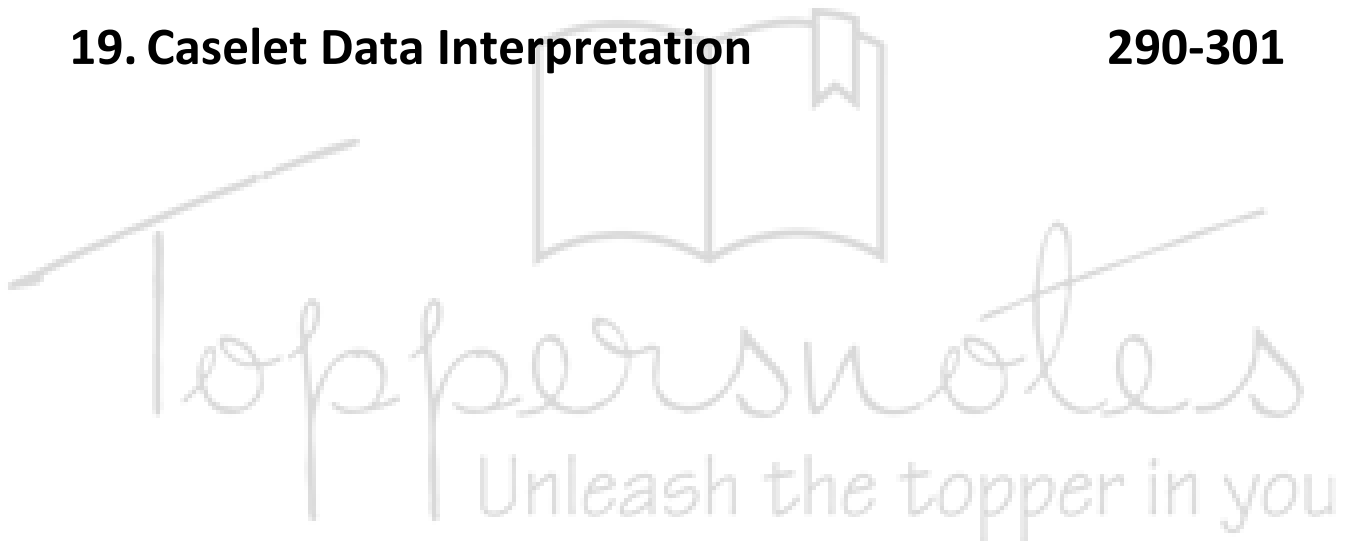
**IBPS, SBI, RBI, IBPS-RRB, LIC, NABARD &
ALL OTHER BANKING & INSURANCE EXAMS**

Quantitative Aptitude

Contents

1. Simplification & Approximation	01-22
2. Ratio & Proportion	23-40
3. Percentage	41-55
4. Average	56-71
5. Mixture & allegation	72-88
6. Time & Work	89-103
7. Simple & Compound interest	104-118
8. Pipe & cistern	119-124
9. Age Problems	125-132
10. Time & Distance	133-146
11. Profit , Loss & Discount	147-166
12. Boat & Stream	167-180
13. Partnership	181-192

14. Quadratic Equation	193-209
15. Mensuration	210-227
16. Permutation & Combination	228-247
17. Probability	248-264
18. Data Interpretation	265-289
19. Caselet Data Interpretation	290-301



SIMPLIFICATION

Fraction

$1 = 100\%$

$\frac{1}{2} = 50\%$

$\frac{1}{3} = 33.33\%$

$\frac{1}{4} = 25\%$

$\frac{1}{5} = 20\%$

$\frac{1}{6} = 16.66\%$

$\frac{1}{7} = 14.28\%$

$\frac{1}{8} = 12.5\%$

$\frac{1}{9} = 11.11\%$

$\frac{1}{10} = 10\%$

$\frac{1}{11} = 9.09\%$

$\frac{1}{12} = 8.33\%$

$\frac{1}{13} = 7.69\%$

$\frac{1}{14} = 7.14\%$

$\frac{1}{15} = 6.66\%$

$\frac{1}{16} = 6.25\%$

$\frac{1}{17} = 5.88\%$

$\frac{1}{18} = 5.56\%$

$\frac{1}{19} = 5.26\%$

$\frac{1}{20} = 5\%$

$\frac{3}{8} = 37.5\%$

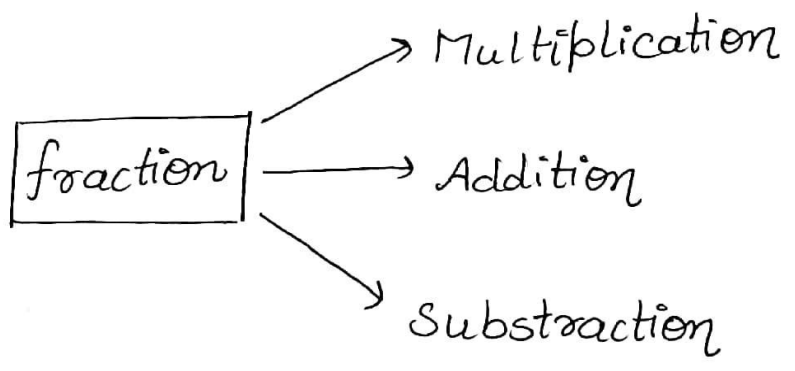
$\frac{5}{8} = 62.5\%$

$\frac{7}{8} = 87.5\%$

$\frac{5}{6} = 83.33\%$

$\frac{11}{12} = 91.67\%$

संजीवनी



शख भी बिकेगी; सोने के भाव, जल कर ली देख

Multiplication form:

(a) $\frac{1}{7} = 14.28\%$
 $\left(\begin{array}{l} \times \frac{1}{2} \\ \rightarrow \end{array} \right) \frac{1}{14} = 7.14\%$

(b) $\frac{1}{4} = 25\%$
 $\left(\begin{array}{l} \times \frac{1}{2} \\ \rightarrow \end{array} \right) \frac{1}{8} = 12.5\%$
 $\left(\begin{array}{l} \times \frac{1}{2} \\ \rightarrow \end{array} \right) \frac{1}{16} = 6.25\%$

(c) $\frac{1}{6} = 16.66\%$
 $\left(\begin{array}{l} \times \frac{1}{2} \\ \rightarrow \end{array} \right) \frac{1}{12} = 8.32\%$

(d) $\frac{1}{11} = 9.09\%$
 $\left(\begin{array}{l} \times 2 \\ \rightarrow \end{array} \right) \frac{2}{11} = 18.18\%$

Addition form:

(a) 107.69%
 $\rightarrow 100\% + 7.69\%$
 $= 1 + \frac{1}{13} = 1\frac{1}{13}$

(b) 116.66%
 $\rightarrow 100\% + 16.66\%$
 $= 1 + \frac{1}{6} = 1\frac{1}{6}$

(c) 137.5%
 $\rightarrow 100\% + 37.5\%$
 $= 1 + \frac{3}{8} = 1\frac{3}{8}$

(d) 162.5%
 $\rightarrow 100\% + 62.5\%$
 $= 1 + \frac{5}{8}$
 $= 1\frac{5}{8}, \frac{13}{8}$

Subtraction form:

(a) 90.91%.

→ 100% - 9.09%.

$$1 - \frac{1}{11}$$

$$= \frac{10}{11} \text{ Ans}$$

(b) 87.5%.

→ 100% - 12.5%.

$$1 - \frac{1}{8}$$

$$= \frac{7}{8} \text{ Ans}$$

(c) 92.86%.

→ 100% - 7.14%.

$$1 - \frac{1}{14}$$

$$= \frac{13}{14} \text{ Ans}$$

Eg:- $\boxed{1}$. 28.56% of 35 + 87.5% of 32 = x

$$= (2 \times \frac{1}{7}) \times 35 + (100\% - 12.5\%) \times 32 = x$$

$$= \frac{2}{7} \times 35 + (1 - \frac{1}{8}) \times 32$$

$$= \frac{2}{7} \times 35 + \frac{7}{8} \times 32$$

$$= 20 + 28 = 48 \text{ Ans}$$

$\boxed{2}$. 37.5% of 64 + 16.66% of 24 = $\sqrt{729} + x$

$$= 3(12.5\%) \times 64 + (\frac{1}{6}) \times 24 = 27 + x$$

$$= 3 \times \frac{1}{8} \times 64 + \frac{1}{6} \times 24 = 27 + x$$

$$= 24 + 4 = 27 + 2x$$

$$\boxed{2x = 1}$$

3. 48% of 2434

$$\begin{array}{l} \swarrow \\ 50\% - 2\% \end{array}$$

$$= 1217 - 48.68$$

$$= 1168.32 \text{ Ans}$$

$$100\% = 2434$$

$$50\% = 1217$$

$$1\% = 24.34$$

$$2\% = 48.68$$

4. 45% of 2460

$$\begin{array}{l} \swarrow \\ 50\% - 5\% \end{array}$$

$$1230 - 123$$

$$= 1107 \text{ Ans}$$

$$100\% \rightarrow 2460$$

$$50\% \rightarrow 1230$$

$$5\% \rightarrow 123$$

5. 55% of 525

$$\begin{array}{l} \swarrow \\ 50\% + 5\% \end{array}$$

$$262.5 + 26.25$$

$$= 288.75 \text{ Ans}$$

$$100\% \rightarrow 525$$

$$50\% \rightarrow 262.5$$

$$5\% = 26.25$$

6. 26% of 1248

$$\begin{array}{l} \swarrow \\ 25\% + 1\% \end{array}$$

$$312 + 12.48$$

$$= 324.48 \text{ Ans}$$

$$100\% \rightarrow 1248$$

$$25\% \rightarrow \frac{1}{4} \times 1248 = 312$$

$$1\% = 12.48\%$$

7. $67.66\% \text{ of } 3369$

\swarrow
 $66.66\% + 1\%$
 $2246 + 33.69$
 $= 2279.69$ Ans

66.66%

$\hookrightarrow \frac{2}{3} \times 3369$
 $= 2 \times 1123$
 $= 2246$

Brahmastro-2

$x\% \text{ of } y = y\% \text{ of } x$

$\frac{x}{100} \times y = \frac{y}{100} \times x$ Both are same

How it's works :

***56% of 50**

$\rightarrow 56\% \text{ of } 50 = 50\% \text{ of } 56$

\downarrow
 Dimag ko Sochna
 Padlega.

\downarrow
 Kuch bhi nahi Sochna,
 Direct

$= 28$ Ans.

68 % of 150?

→ 150 % of 68

100 % → 68

50 % → 34 +

102 Ans

90.6 % of 16.67?

→ 16.67 % of 90.6

$$\frac{1}{6} \times 90.6 = 15.1 \text{ Ans}$$

25.6 % of 250?

→ 250 % of 25.6

200 % → 51.2

50 % → $\frac{12.8}{64.0} = 64 \text{ Ans}$

Addition & Subtraction tricks

Q. [L.] $4859 + 6424 + 9234$

School Method

$$\begin{array}{r}
 \textcircled{0}\textcircled{0}\textcircled{0} \\
 4859 \\
 6424 \\
 + 9234 \\
 \hline
 20517 \text{ Ans}
 \end{array}$$

Sarkari Naukri lagane Wala Method

Q. $4859 + 6424 + 9234$

$$\begin{array}{r}
 4000 \\
 6000 \\
 \underline{9000} \\
 19000
 \end{array}
 +
 \begin{array}{r}
 800 \\
 400 \\
 \underline{200} \\
 1400
 \end{array}
 +
 \begin{array}{r}
 59 \\
 24 \\
 \underline{34} \\
 117
 \end{array}
 = 20517$$

Solve all Calculation in mind, not on pen & paper.

Solve in mind:

1. $4600 + 8400 + 7600 = 20,600$

2. $3848 + 5238 - 3316 = 5770$

3. $1184 + 1982 - 768 = 2398$

4. $2368 + 1464 + 108 - 29 = 3911$

5. $49352 + 61264 + 89316 = 1,99,932$

Multiplication trick

Multiply by 5

a) eg: 648×5

$$\frac{6480}{2} = 3240 \text{ Ans}$$

Helping hand

Multiply by 10 & then divide by 2; in mind not paper.

b) 3224×5

$$\rightarrow \frac{32240}{2} = 16120 \text{ Ans.}$$

c) 325×5

$$\rightarrow \frac{3250}{2} = 1625 \text{ Ans.}$$

d) 3223×5

$$= \frac{32230}{2} = 16115 \text{ Ans.}$$

Multiply by 25

eg: (a) 313×25

$$\rightarrow \frac{31300}{4} = 7825 \text{ Ans.}$$

Helping hand:
Multiply by 100 & then
divide by 4 in mind.

(b) 1816×25

$$\rightarrow \frac{181600}{4} = 45400 \text{ Ans.}$$

(c) 2131×25

$$\rightarrow \frac{213100}{4} = 53275 \text{ Ans.}$$

Multiply by 125:

e.g. (a) 417×125

$$\rightarrow \frac{417000}{8} = 52125 \text{ Ans.}$$

Multiply by 1000 & then divide by 8 in mind.

(b) 3728×125

$$\rightarrow \frac{3728000}{8} = 464500 \text{ Ans.}$$

Do not learn any other tricks for Multiplication.

Smart Division Method

Helpful in solving DI.

$$\frac{273}{741} \approx \frac{249}{700} \approx .355$$

$\xrightarrow{-14}$
 $\xrightarrow{-41}$ \rightarrow Nearest 100 Multiple
 \rightarrow let's call it 42. $3 \rightarrow 42$
 $L \rightarrow 14$

\rightarrow Ratio of this fraction $\approx \frac{1}{3} \approx \left(\frac{250}{750}\right)$

$\frac{1}{3} \rightarrow 14$
 $\frac{1}{3} \rightarrow 42$

 \Rightarrow Maintaining Ratio everywhere.

Helping hand :

a) $\frac{273}{741} \approx \frac{\quad}{700}$

-41 →

Go to the nearest Multiple of 100.

(b) See the ratio of original fraction approximately.

$\frac{250}{750} \approx \frac{1}{3}$

(c) $-41 \approx -42 \Rightarrow$

$\frac{1}{3} \approx \frac{14}{42}$
 (x14) ↓ ↑ (x14)

(d) $\frac{273}{741} \approx \frac{249}{700}$

-14 ↓ -41 →

(e) divide

(i) $\frac{249}{7} = 35.5$

(ii) $\frac{35.5}{100} = .355$

2. $\frac{998}{1437}$

→ $\frac{998}{1437} \approx \frac{1000}{1400} \approx \frac{5}{7}$

$\frac{998}{1437} \approx \frac{973}{1400} \approx .72$
 (5x5 = -25) ↓

-37 →

7 → 35
1 → 5

Calculator showing $\approx .69$.

3. $\frac{537}{884}$

$\rightarrow \frac{5}{8} \approx \frac{537}{884} \approx \frac{553}{900} \approx 0.601$

(Diagram showing adjustments: $2 \times 8 = +16$ for numerator, $8 \rightarrow 16$ and $1 \rightarrow 2$ for denominator)

Calculator shows ≈ 0.607

This Method gives us approximate idea than we can calculate data by options easily.

Examples

Calculator results

i) $\frac{937}{1534} \approx 0.61$

ii) $\frac{1738}{937} \approx 1.85$

iii) $\frac{2097}{1352} \approx 1.55$

iv) $\frac{641}{937} \approx 0.68$

Squares

Squares of 1-50 :

$1^2 = 1$	$11^2 = 121$	$21^2 = 441$	$31^2 = 961$	$41^2 = 1681$
$2^2 = 4$	$12^2 = 144$	$22^2 = 484$	$32^2 = 1024$	$42^2 = 1764$
$3^2 = 9$	$13^2 = 169$	$23^2 = 529$	$33^2 = 1089$	$43^2 = 1849$
$4^2 = 16$	$14^2 = 196$	$24^2 = 576$	$34^2 = 1156$	$44^2 = 1936$
$5^2 = 25$	$15^2 = 225$	$25^2 = 625$	$35^2 = 1225$	$45^2 = 2025$
$6^2 = 36$	$16^2 = 256$	$26^2 = 676$	$36^2 = 1296$	$46^2 = 2116$
$7^2 = 49$	$17^2 = 289$	$27^2 = 729$	$37^2 = 1369$	$47^2 = 2209$
$8^2 = 64$	$18^2 = 324$	$28^2 = 784$	$38^2 = 1444$	$48^2 = 2304$
$9^2 = 81$	$19^2 = 361$	$29^2 = 841$	$39^2 = 1521$	$49^2 = 2401$
$10^2 = 100$	$20^2 = 400$	$30^2 = 900$	$40^2 = 1600$	$50^2 = 2500$

Trick of square of any two digit Number

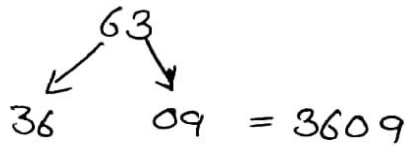
Brahmagostha -3

$\downarrow \cdot (63)^2$
 $\downarrow \downarrow$
 $36 \ 09$
 $360 \rightarrow 6 \times 3 \times 2 \times 10$

 3969

Steps

a) write the squares of individual number



b) Multiply the digits

$$6 \times 3 = 18$$

c) Multiply by 2, than 10

$$18 \times 2 = 36 \times 10 = 360$$

(d) Add (a) & (c)

$$3609 + 360 = 3969 \text{ Ans}$$

2. $(79)^2$

↓ ↓

49 81

12 60 → $7 \times 9 \times 2 \times 10$

6241

3. $(84)^2$

↓ ↓

64 16

640 → $8 \times 4 \times 2 \times 10$

7056 Ans

$$\begin{array}{r}
 4. (96)^2 \\
 \downarrow \downarrow \\
 8136 \\
 1080 \\
 \hline
 9216 \text{ Ans}
 \end{array}$$

Try to square at least 30 in mind.
Really it takes less than 10 second.

Square Root

$\sqrt{\quad}$ or $(\quad)^{\frac{1}{2}}$
 Always a positive Number.

$$\begin{aligned}
 1^2 &= 1 \\
 2^2 &= 4 \\
 3^2 &= 9 \\
 4^2 &= 16 \\
 5^2 &= 25 \\
 6^2 &= 36 \\
 7^2 &= 49 \\
 8^2 &= 64 \\
 9^2 &= 81 \\
 10^2 &= 100
 \end{aligned}$$

we observed that unit digit of square of any Number is only can be: 1, 4, 5, 6, 9

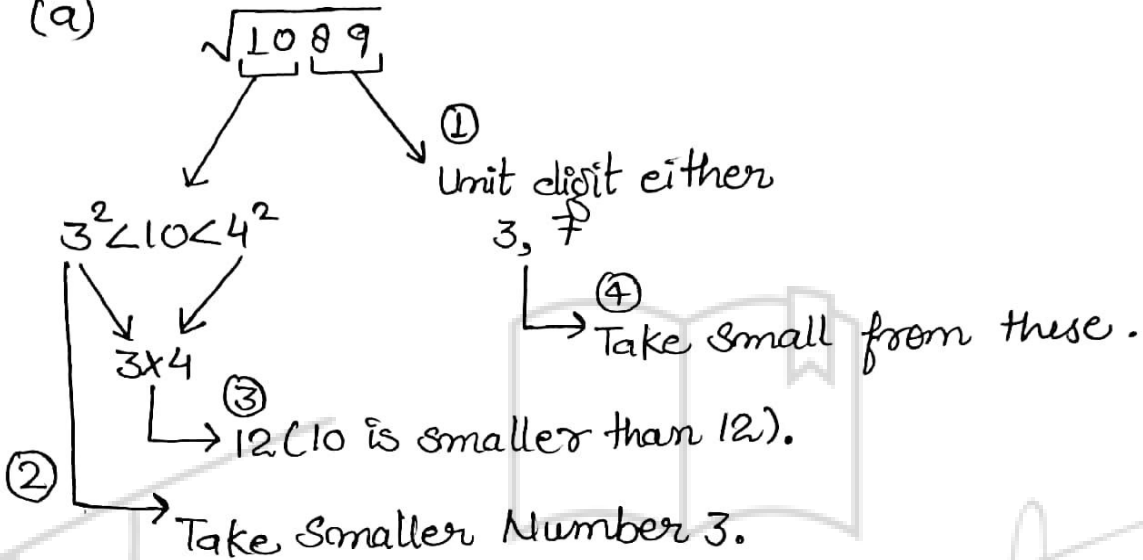
1 \rightarrow 1, 9
 4 \rightarrow 2, 8
 5 \rightarrow 5
 6 \rightarrow 4, 6
 9 \rightarrow 3, 7

If unit digit of a Number is 2, 3, 7, 8 then square root is not a number.

$$\sqrt{173} \approx 13.15$$

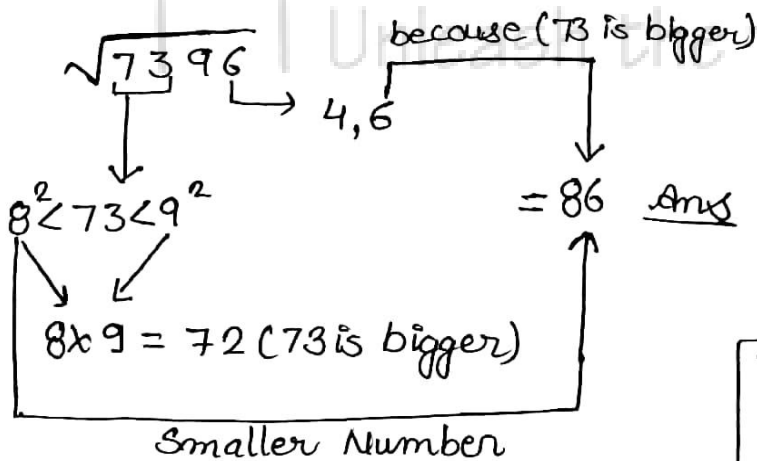
Trick

(a)

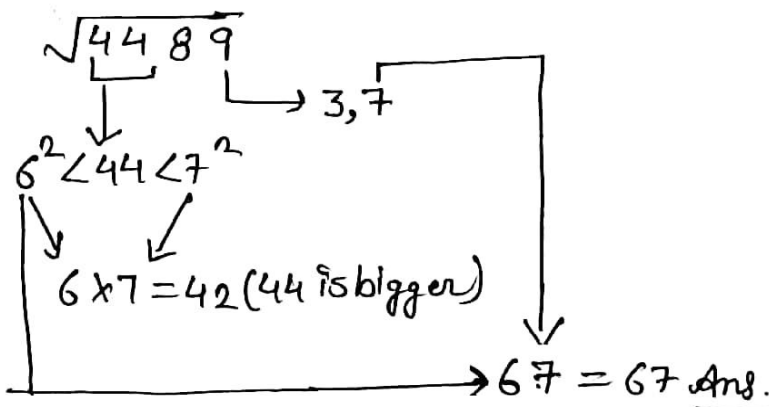


3 3 Ans

(b)



(c)



To achieve expertise in this trick. Find square root of atleast 10 No. by it.

Cube & Cube Root

$$1^3 = 1$$

$$11^3 = 1331$$

$$2^3 = 8$$

$$12^3 = 1728$$

$$3^3 = 27$$

$$13^3 = 2197$$

$$4^3 = 64$$

$$14^3 = 2744$$

$$5^3 = 125$$

$$15^3 = 3375$$

$$6^3 = 216$$

$$16^3 = 4096$$

$$7^3 = 343$$

$$17^3 = 4913$$

$$8^3 = 512$$

$$18^3 = 5832$$

$$9^3 = 729$$

$$19^3 = 6859$$

$$10^3 = 1000$$

$$20^3 = 8000$$

* Learn Cube of 1 to 20 for the faster Calculation.

* Trick to find Cube of any number:

Eg. $(12)^3$

(a) Make Cube of 1 & 2.

$1^3 = 1, 2^3 = 8 \leftarrow$ 3 digit necessary for cube,
 add 2 zero before 8.
 \Downarrow
 1008

(b) Multiple $(12)^3$ all digits.

$1 \times 2 \times 3 = 6$

(c) Multiply 6 by original Number (12).

$12 \times 6 = 72$

(d) Add the result of (a) & (c) according in following way.

e.g. 1.

1008	
72	\rightarrow This place is left always blank.
1728	

e.g. 2.

$(36)^3$	$\rightarrow 3 \times 6 \times 3 = 54$										
$\downarrow \downarrow$	$\rightarrow 36$										
27216	<table style="border-collapse: collapse;"> <tr><td style="text-align: right; padding-right: 5px;">36</td><td></td></tr> <tr><td style="text-align: right; padding-right: 5px;">x54</td><td></td></tr> <tr><td style="border-top: 1px solid black; text-align: right; padding-right: 5px;">144</td><td></td></tr> <tr><td style="text-align: right; padding-right: 5px;">180x</td><td></td></tr> <tr><td style="border-top: 1px solid black; text-align: right; padding-right: 5px;">1944</td><td></td></tr> </table>	36		x54		144		180x		1944	
36											
x54											
144											
180x											
1944											
\downarrow											
27216											
1944											
46656	Ans.										

e.g. 3.

$(23)^3$	$\rightarrow 2 \times 3 \times 3 = 18$
$\downarrow \downarrow$	$\rightarrow 18 \times 23 = 414$
8027	\downarrow
\rightarrow	8027
	414
	12167
	Ans.

This Method is very easy to find Cube root of any Number, Give efforts of Make atleast 15 Cube with this Method & you will Super Genius.

Cube Root of any Number

observe one thing in the Cube of 1-10 unit place digit is different for each Number.

$1^3 = 1$		
$2^3 = 8$	←	Interconnected → unit digit is same as Number.
$3^3 = 27$	←	
$4^3 = 64$	←	
$5^3 = 125$	←	
$6^3 = 216$	←	
$7^3 = 343$	←	
$8^3 = 512$	←	
$9^3 = 729$		
$10^3 = 1000$		

Unit digit of Cube root is same as the unit digit of that Cube root.

e.g. $\sqrt[3]{32768}$

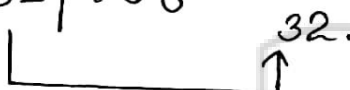
Unit digit is 8, which is also unit digit, of 2.

2.

write the Number after 3rd place (from right) of Number. i.e.

$$32 \overline{) 768}$$

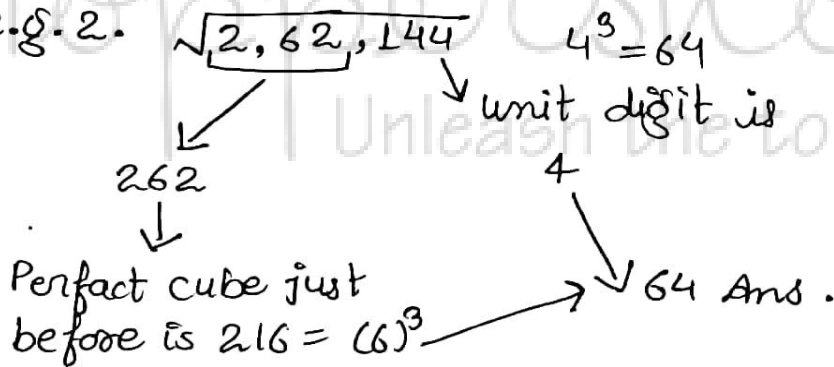
32.



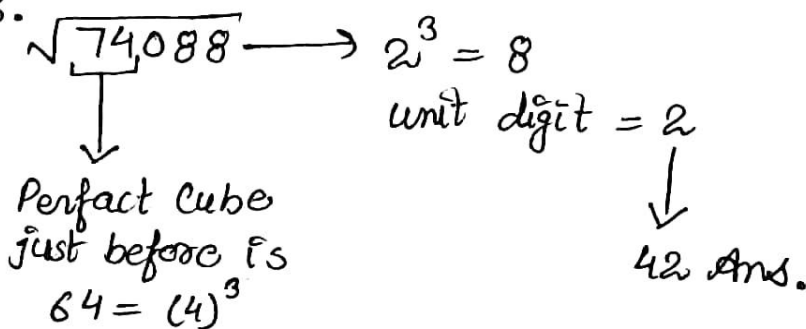
$3^3 < 32$

32 Ans.

e.g. 2.



e.g. 3.



Simplification Rule

VBODMAS Rule :

BODMAS is an acronym & it stand for bracket of division, Multiplication, Addition & Subtraction.

It explain the order of operation to solve an expression.

V \rightarrow Vinculum (Bar) \rightarrow (—)

B \rightarrow Bracket of

$() > \{ \} > []$
Small big

O \rightarrow of

D \rightarrow Division

M \rightarrow Multiplication

A \rightarrow Addition

S \rightarrow Subtraction

VBODMAS
 $\xrightarrow{\text{Left to right}}$

e.g. 1. solve: $1800 \div 100 \{ (12-6) + (24-12) \}$

$\longrightarrow 1800 \div 100 \{ 6 + 12 \}$ [solve () first]

$1800 \div 100 \{ 18 \}$

$1800 \div 1800$

$\longrightarrow = 1$ Ans.

e.g. 2. Solve:

$$\left[3\frac{1}{4} \div \left\{ 1\frac{1}{4} - \frac{1}{2} \left(2\frac{1}{2} - \frac{1}{4} - \frac{1}{6} \right) \right\} \right] \div \left(\frac{1}{2} \text{ of } 4\frac{1}{3} \right)$$

→ (a) first of all solve Bar (—) :-

$$= \left[3\frac{1}{4} \div \left\{ 1\frac{1}{4} - \frac{1}{2} \left(2\frac{1}{2} - \frac{1}{12} \right) \right\} \right] \div \left(\frac{1}{2} \text{ of } 4\frac{1}{3} \right)$$

(b) Solve small bracket :-

$$= \left[3\frac{1}{4} \div \left\{ 1\frac{1}{4} - \frac{1}{2} \left(\frac{5}{2} - \frac{1}{12} \right) \right\} \right] \div \left(\frac{1}{2} \text{ of } 4\frac{1}{3} \right)$$

$$= \left[3\frac{1}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left(\frac{29}{12} \right) \right\} \right] \div \left(\frac{13}{6} \right)$$

$$= \left[3\frac{1}{4} \div \left\{ \frac{5}{4} - \frac{29}{24} \right\} \right] \div \frac{13}{6}$$

(c) Solve { } Bracket :-

$$= \left[\frac{13}{4} \div \frac{1}{24} \right] \div \frac{13}{6}$$

(d) Solve [] Bracket :-

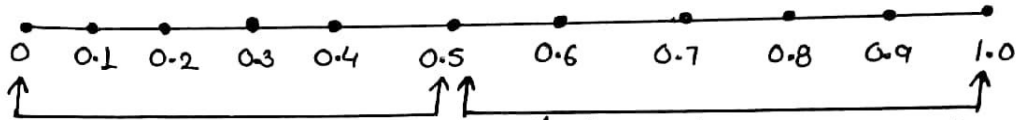
$$= \frac{13}{4} \times \frac{24}{1} \div \frac{13}{6}$$

$$= 78 \div \frac{13}{6}$$

$$= 78 \times \frac{6}{13}$$

$$= 36 \text{ Ans.}$$

Approximation



If the value is b/w 0 to 0.5 then, take the previous Integer.

$$\begin{aligned}
 21.46 &\approx 21 \\
 19.38 &\approx 19 \\
 237.467 &\approx 237
 \end{aligned}$$

If the value of Decimal b/w 0.5 to 1.0, then take the next Integer.

$$\begin{aligned}
 53.57 &\approx 54 \\
 534.97 &\approx 535 \\
 1089.76 &\approx 1090
 \end{aligned}$$

e.g. 1. $68.029 \div 33.939 = (x^2) - 18.79$

→ $68.029 \div 33.939 = x^2 - 18.79$

↓
 $68 \div 34 = x^2 - 19$

$$2 = x^2 - 19$$

$$x^2 = 21, \quad x = \sqrt{21}$$

$$= 4.8 \approx 5 \text{ Ans.}$$

e.g. 2. $13.689 \times 17.213 \times 21.864 \times 8.79 = ?$

↓
 $14 \times 17 \times 22 \times 9$

$$= 436 \approx 440 \text{ Ans.}$$

e.g. 3. 25.05% of 2845 + 14.95 × 2400

- A) 3800 B) 35600 C) 35800 D) 36700 ✓
 E) 36500