8/1/2025 (VVImp)

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4. Percentages Basic

① Percentage
② Profit & loss
③ Discount
④ simple Interest
⑤ compound Interest

→ Depends on percentage

Per Cent
Each 100

Ex → $x\% \Rightarrow \frac{x}{100}$

$20\% \Rightarrow \frac{20}{100} = \frac{1}{5}$

$25\% = \frac{25}{100} = \frac{1}{4}$

याद करो

Imp Fractions:-

$100\% = 1$
$75\% = \frac{3}{4}$
$50\% = \frac{1}{2}$
$25\% = \frac{1}{4}$
$20\% = \frac{1}{5}$
$10\% = \frac{1}{10}$
$5\% = \frac{1}{20}$
$4\% = \frac{1}{25}$

$66\frac{2}{3}\% = 66.66\% = \frac{2}{3}$
$33\frac{1}{3}\% = 33.33\% = \frac{1}{3}$
$16\frac{2}{3}\% = 16.66\% = \frac{1}{6}$
$8\frac{1}{3}\% = 8.33\% = \frac{1}{12}$
$12\frac{1}{2}\% = 12.50\% = \frac{1}{8}$
$6\frac{1}{4}\% = 6.25 = \frac{1}{16}$
$37\frac{1}{2}\% = 37.50\% = \frac{3}{8}$

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$14\frac{2}{7}\% = 14.29\% = \frac{1}{7}$

$11\frac{1}{9}\% = 11.11\% = \frac{1}{9}$

$9\frac{1}{11}\% = 9.09\% = \frac{1}{11}$

Important Fractions: $\frac{1}{1}, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}, \frac{1}{11}, \frac{1}{12}, \frac{3}{4}, \frac{3}{8}, \frac{1}{16}, \frac{2}{3}$

(1) $x\%$ of $y = \frac{x \times y}{100}$

30% of 40 $= \frac{30 \times 40}{100} = \underline{12}$

(2) x is what % of $y = \frac{x}{y} \times 100$

12 is what % of 40 $= \frac{12^{3}}{40} \times 100$

$= \underline{30\%}$

75.0 ← decimal one digit right side

10% ⟶ 75

20% ⟶ 150 (×2)

40% ⟶ 300 (×2, ×3)

60% ⟶ 450 (×3)

750 ← decimal two digit right side

1% ⟶ 7.5

2% ⟶ 15

3% ⟶ 22.5 (×2)

6% ⟶ 45

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125 ← decimal three digit right side

0.1% → 0.125

450

10% → 45

5% → 22.5

15% $\xrightarrow{10\%+5\%}$ $\underset{45+22.5}{}$ 67.5

20% → 90

22% $\xrightarrow{20\%+2\%}$ $\underset{90+9}{}$ 99

35% $\xrightarrow[40\%-5\%]{}$ 157.5
$\underset{180-22.5}{}$

38% $\xrightarrow[180-9]{40\%-2\%}$ 171

44% $\xrightarrow[180+18]{40\%+4\%}$ 198

59% $\xrightarrow[270-45]{60\%-1\%}$ 265.5

63% $\xrightarrow[270+13.5]{60\%+3\%}$ 283.5

78% $\xrightarrow[360-9]{80\%-2\%}$ 351

88% $\xrightarrow[360+36]{80\%+8\%}$ 396

1) If a number increase by $14\frac{2}{7}\%$ then its value become 648. Find the original number.

⇒

$14\frac{2}{7}\% = \frac{1}{7}$ ← increase/decrease

1 out of 7

↑ original number

7 $\xrightarrow{+1}$ 8 → 648 → 81

$\frac{81}{8\,\cancel{6}\cancel{4}\cancel{8}}$

7×81
= 567

2) If a number increase by $12\frac{1}{2}\%$ then its value become 558. Find the original number.

⇒

$12\frac{1}{2}\% = \frac{1}{8}$

1 out of 8

62
×8
496

8 $\xrightarrow{+1}$ 9 → 558 → 62

$\frac{62}{9\,\cancel{5}\cancel{5}\cancel{8}}$

62×8
= 496

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3) If a number decreases by $14\frac{2}{7}\%$ then its value become 336. Find the original number.

⇒

$$14\frac{2}{7}\% = \frac{1}{7}\downarrow$$

7 $\xrightarrow{-1}$ 6

336 → 6 parts

1 → 56

$56 \times 7 = 392$

4) If a number decrease by $16\frac{2}{3}\%$ then its value become 575. find the original number.

⇒

$$16\frac{2}{3}\% = \frac{1}{6}\downarrow$$

6 $\xrightarrow{-1}$ 5

575 → 5 parts

1 → 115

$115 \times 6 = 690$

successive ↑ or ↓ question

5) A number first increase by 10% then again increase by 10%. Find the net % change in the number.

⇒

(M1) Formula method

$$\pm A\% \pm B\% \pm \frac{AB}{100}$$

$$10\% + 10\% + \frac{100}{+100}$$

21%

(M2)

100 $\xrightarrow[+10]{10\%\uparrow}$ 110 $\xrightarrow[+11]{10\%\uparrow}$ 121

21%

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Imp Useful

(M3)

$\frac{1}{10}\uparrow$ $\frac{1}{10}\uparrow$

$10 \times 10 \longrightarrow 11 \times 11$

$100 \longrightarrow 121$

21%

successive ↑ or ↓

Imp

① 10% ↑ 10% ↑ ⟶ 21%

② 20% ↑ 20% ↑ ⟶ 44%

(M1)

$20 + 20 + \frac{400}{100}$

$= 44\%$

(M2)

$100 \xrightarrow{20\%\uparrow} 120 \xrightarrow{20\%\uparrow} 144$

$+20 \qquad +24$

$= 44\%$

(M3)

$\frac{1}{5}\uparrow$ $\frac{1}{5}\uparrow$

$5 \times 5 \longrightarrow 6 \times 6$

$25 \longrightarrow 36$

11

11 हे 25 चे किती %

आहे कळेल ↗

$\longrightarrow \frac{11}{25} \times 100 = 44\%$

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(3) 10% ↑ 10% ↓ ⟶ −1%

(M1)

10 −10 −100/100

= −1

(M2)

100 —10%↑ +10→ 110 —10%↓ −11→ 99

−1%

(M3)

$\frac{1}{10}$ ↑ $\frac{1}{10}$ ↓

10 ⟶ 11

10 ⟶ 9

100 99

−1%

Top

(4) 20% ↑ 20% ↓ ⟶ −4%

(5) 10% ↑ 20% ↓ ⟶ −12%

(6) 10% ↓ 20% ↑ ⟶ 8%

6) Salary of a person increased by $16\frac{2}{3}\%$ then decrease by $14\frac{2}{7}\%$. Find the net % change in salary

$16\frac{2}{3}\% = \frac{1}{6}$ ↑ $14\frac{2}{7}\% = \frac{1}{7}$ ↓

6 ⟶ 7

7 ⟶ 6

42 42

0% ⟵ No change

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7) Salary of a person first increased by $12\frac{1}{2}\%$, then again increased by $14\frac{2}{7}\%$. if total increment is 4000. Find the original salary and net % change in salary.

⇒

$12\frac{1}{2}\% = \frac{1}{8}\uparrow$ $\quad$ $14\frac{2}{7}\% = \frac{1}{7}\uparrow$

8 → 9
× 7 → × 8
7 | 9

2 → 4000
1 → 2000

$14\frac{2}{7}$ double $\frac{2}{7} = 28\frac{4}{7}\%$

original salary
$= 7 \times 2000$
$= 14,000$

8) An employee of the company got three successive increment of 10%, $11\frac{1}{9}\%$, and $12\frac{1}{2}\%$ in his salary. if total increment of his salary is 6000. Find his initial salary.

⇒

$10\% = \frac{1}{10}\uparrow$ $\quad$ $11\frac{1}{9}\% = \frac{1}{9}\uparrow$ $\quad$ $12\frac{1}{2}\% = \frac{1}{8}\uparrow$

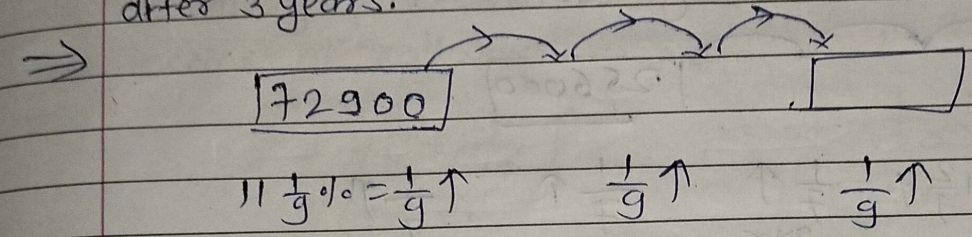
10 → 11
× 9 → × 10
× 8 → × 9
8 | 11

diff
3 → 6000
1 → 2000

original salary
$= 8 \times 2000$
$= 16000$

9) Population of a town increase by $11\frac{1}{9}\%$ per year. If Present population is 729000, find the population after 3 years.

⇒



P $\xrightarrow{3yr}$ □

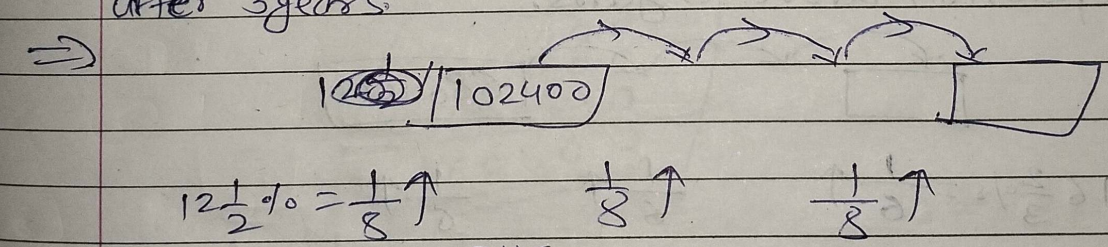
9	10
9	10
9	10
729	1000

729000 / 1000 = 1000

1000 × 1000 = 1000000

10) Population of a town increase by $12\frac{1}{2}\%$ per year. If Present population is 102400, find the population after 3 years.

⇒



P $\xrightarrow{3yr}$ □

8	9
8	9
8	9
512	729

Population after 3yr

729 × 200 = 145800

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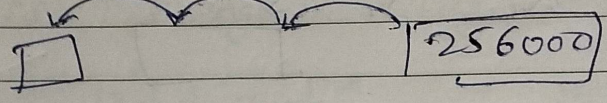
(11) Population of a town increase by $14\frac{2}{7}\%$ per year if present population is 256000, find the population before 3 years.

⇒



$14\frac{2}{7}\% = \frac{1}{7}\uparrow \quad \frac{1}{7}\uparrow \quad \frac{1}{7}\uparrow$

3yr ← Present

$7 \times 7 \times 7 = 343$ ← $8 \times 8 \times 8 = 512$ → 28600

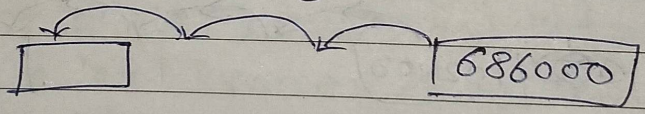
1 → 50

343×50

$= 17150$ ← before 3 year

(12) Population of a town increase by $16\frac{2}{3}\%$ per year. if present population is 686000, find the population before 3 years.

⇒



$16\frac{2}{3}\% = \frac{1}{6}\uparrow \quad \frac{1}{6}\uparrow \quad \frac{1}{6}\uparrow$

Present

$6 \times 6 \times 6 = 216$ ← $7 \times 7 \times 7 = 343$ → 686000

1 → 2000

216×2000

$= 432000$ before 3 year

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13) Price of railway ticket increase by $6\frac{1}{4}\%$ hence number of passengers decreased by 5% but income of railways increased by 1500. Find the original income of railways.

⇒

$6\frac{1}{4}\% = \frac{1}{16}$ ↑ (Price)

$5\% = \frac{1}{20}$ ↓ (Passenger)

Price	16	17
	×	×
Ticket	20	19
Income	320	323

3 → 1500

1 → 500

$\frac{500}{1500}$
3

original income
$= 320 \times 500$
$= 160000$

320
×500
000
0000
160000
160000

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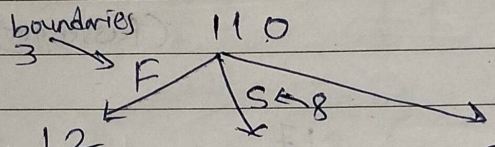
Percentage

1) A bastsman scored 110 runs which included 3 boundaries and 8 sixes. what Percent of his total score did he make by running between the wickets?

a) 45% b) 46% c) 54% d) 55%

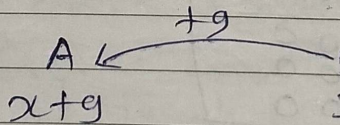


$\frac{50}{110} \times 100$

$\Rightarrow \frac{500}{11} \Rightarrow 45.4\%$

45%

2) Two students appeared at an examination. one of them secured 9 marks more than the other and his marks was 56% of the sum of their marks. The marks obtained by them are:



33

A ← 33+9 = 42

$x+9 = 56\%(x+9+x)$

$x+9 = \frac{14}{25}\cancel{\frac{56}{100}} \times (2x+9)$

$25x + 225 = 28x + 126$

$3x = 99$

$x = 33$

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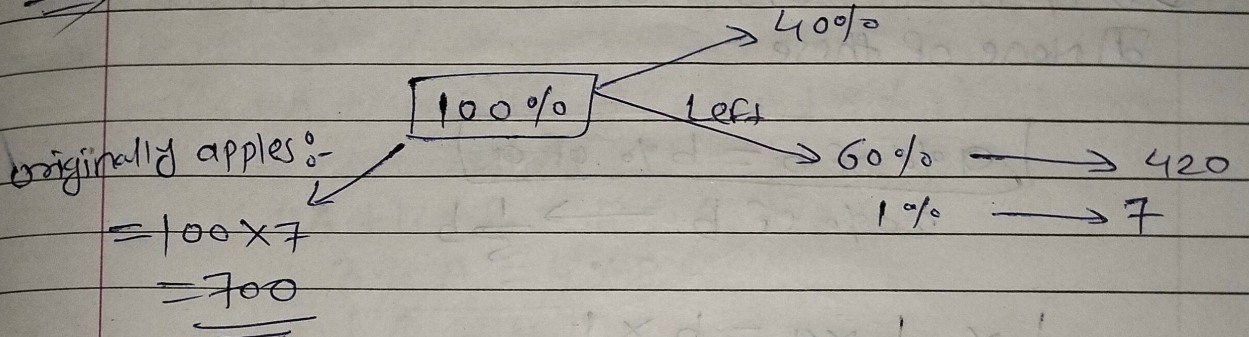
3) A fruit seller had some apples. He sells 40% apples and still has 420 apples. originally, he had:

⇒



$= 100 \times 7$

$= 700$

4) What Percentage of numbers from 1 to 70 have 1 or 9 in the units digit?

⇒

1	11	21	31	41	51	61
9	19	29	39	49	59	69

$7 \times 2 = 14$

$= \frac{14}{70} \times 100 = 20\%$

5) If A = X% of y and B = y% of x, then which of the following is true?

⇒ a) $A < B$ b) $A > B$ c) $A = B$ d) $A \neq B$

$A \Rightarrow \frac{xy}{100}$

$B \Rightarrow \frac{yx}{100}$

$A = B$

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6) If 20% of a = b, then b% of 20 is the same as :-

a) 4% of a b) 5% of a c) 20% of a
d) None of these

$$\boxed{a\% \text{ of } b = b\% \text{ of } a}$$

$$20\% \text{ of } b \longrightarrow \frac{1}{5}b$$

$$\frac{1}{5} \times \frac{1}{5} \times a = b \times \frac{1}{5}$$

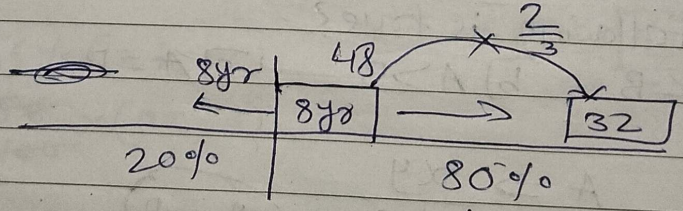
$$\frac{1}{25}a = b$$

$$\boxed{4\% \text{ of } a}$$

$$\boxed{a\% \text{ of } 4}$$

7) In a certain school, 20% of students are below 8 years of age. The number of students above 8 years of age is $\frac{2}{3}$ of the number of students of 8 years of age which is 48. what is the total number of students in the school?

$\Rightarrow$



Total
100%
× 100
100

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8) Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio of A : B.

⇒

$$(5\%A + 4\%B) = \frac{2}{3}(6\%A + 8\%B)$$

(multiply)

$$15\%A + 12\%B = 12\%A + 16\%B$$

$$3\%A = 4\%B$$

$$\boxed{\frac{A}{B} = \frac{4}{3}}$$

$$\boxed{A : B = 4 : 3}$$

9) A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the percentage error in the calculation.

⇒

(✓) N = [ ] (✗)

$\frac{5}{3}$ $\frac{3}{5}$

Take N which is divisibal 3 and 5

i.e 30

$\frac{10}{30} \times \frac{5}{3}$ $\frac{6}{30} \times \frac{3}{5}$

50 18

calculate in %:-

100 → 64% → 36

$$\boxed{\text{Error} = 64\%}$$

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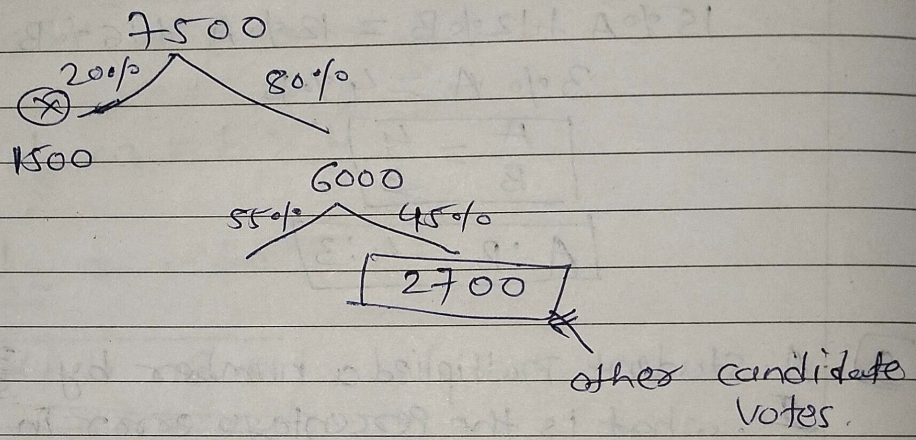
10] In an election between two candidates, one got 55% of the total valid votes 20% of the votes were invalid. if the total number of votes was 7500, the number of valid votes that the other candidate got, was :-



11] Three candidates contested an election and received 1136, 7636 and 11628 votes respectively. what Percentage of the total votes did the winning candidate get?

⇒

1136
7636
11628 → win
20400

~~570~~
~~969~~
~~2907~~
11628
20400 × 100
~~17~~ 57

57% votes wining candidate

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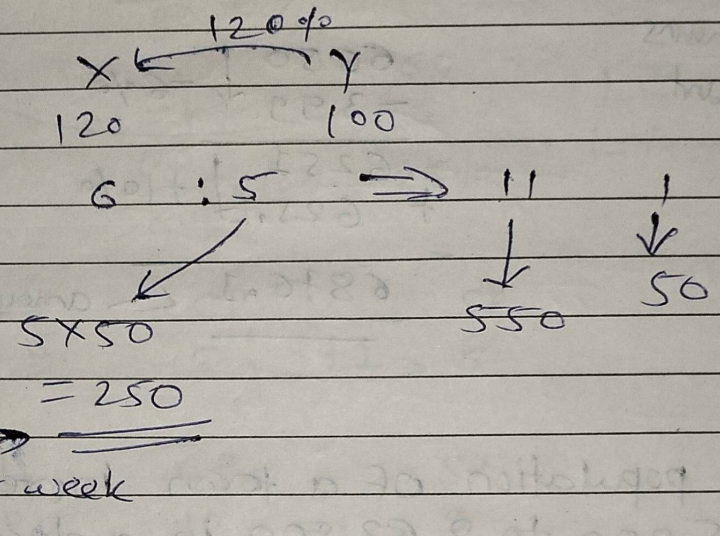
12] Two tailors X and Y are paid a total of Rs. 550 per week by their employer. if x is paid 120 percent. of the sum paid to Y, how much is Y paid per week?



*
13] Gauri went to the stationers and bought things worth Rs. 25, out of which 30 paise went on sales tax on taxable purchases. if the tax rate was 6%, then what was the cost of the tax free items?

⇒ TMP = Rs. 25

6% (TP) $\xrightarrow{\times 5}$ 30 Paise = 0.3 ₹

100% (TP) $\xrightarrow{\times 5}$ 500 P = 5 ₹

25.0
- 5.3
Rs. 19.7 ← tax Free Cost

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14) Rajeev buys good worth Rs. 6650. He gets a rebate of 6% on it. After getting the rebate, he pays sales tax @ 10%. Find the amount he will have to pay for the goods.

⇒

rebeat means discount

6650 ↓ −6%
−399
6251 ↓ +10%
+ 625.1
6876.1 ← amount he pay

15) The population of a town increased from 1,75,000 to 2,62,500 in a decade. The average percent increase of population per year is:
a) 4.37% b) 5% c) 6% d) 8.75%

70 → 105
175000 → 262500

decade = 10 years

70 —10yr→ 105
35

50% ← for 10 year

1 year → 5%