

Calculation का महत्त्व बेंच

Percentage

Type-1

$$50\% \rightarrow 0.5x$$

$$100\% \rightarrow 1x$$

$$150\% \rightarrow 1.5x$$

$$200\% \rightarrow 2x$$

$$100\% \rightarrow 720$$

$$10\% \rightarrow 72$$

$$1\% \rightarrow 7.2$$

720

10% → 286.4

1% → 28.64

2864

1% of 19 =

 **(a) 0.19**

(b) 1.9

(c) 0.019

(d) 19

10% of 118 =

(a) 1.18

✓ (b) 11.8

(c) 18.1

(d) 8.11

200% of 118 =

 **(a) 236**

(b) 354

(c) 177

(d) 218

1% of 143 =

☒ **(a) 1.43**

☐ **(b) 14.3**

☐ **(c) 143**

☐ **(d) 13.4**

1% of 27.5 =

 **(a) 0.275**

(b) 27.5

(c) 25.7

(d) 275

150% of 27.5 =

(a) 27.5

(b) 55

(c) 41.25

(d) 82.5

27.5
13.75



150% of 298 =

(a) 149

(b) 223.5

(c) 298

(d) 447

$$\begin{array}{r} 298 \\ 149 \\ \hline \end{array}$$

1% of 6.04 =

~~(a) 0.0604~~

(b) 0.604

(c) 6.04

(d) 60.4

50% of 6.04 =

(a) 60.4

(b) 0.302

 (c) 3.02

(d) 30.2

200% of 6.04 =

(a) 18.12

(b) 9.06

 **(c) 12.08**

(d) 24.16

150% of 529 =

(a) 634.8

 **(b) 793.5**

(c) 740.6

(d) 1322.5

10% of 0.04 =

(a) 0.04

 **(b) 0.004**

(c) 0.0004

(d) 0.4

150% of 0.04 =

(a) 0.00006

 **(b) 0.06**

(c) 0.08

(d) 0.006

10% of 0.78 =

(a) 0.0078

(b) 0.078

(c) 7.8

(d) 0.78

150% of 0.78 =

(a) 0.117

 **(b) 1.17**

(c) 11.7

(d) 1.56

50% of 27.54 =

- ☒ **(a) 13.77**
- ☐ **(b) 11.016**
- ☐ **(c) 2.754**
- ☐ **(d) 1.377**

50% of 89.6 =

 **(a) 44.8**

(b) 43.3

(c) 40.32

(d) 134.4

1% of 2032 =

(a) 203.2

 **(b) 20.32**

(c) 2.032

(d) 0.2032

150% of 830 =

(a) 1328

 **(b) 1245**

(c) 1162

(d) 996

150% of 960 =

(a) 2400

(b) 1152

(c) 1536

 **(d) 1440**

Type-2

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

$$\frac{2}{5} \rightarrow 40\%$$

$$\frac{3}{5} \rightarrow 60\%$$

$$\frac{4}{5} \rightarrow 80\%$$

$$\frac{1}{7} \rightarrow 14\frac{2}{7}\%$$

$$\frac{2}{7} \rightarrow 28\frac{4}{7}\%$$

$$\frac{3}{7} \rightarrow 42\frac{6}{7}\%$$

$$\frac{4}{7} \rightarrow 57\frac{1}{7}\%$$

$$2 / 3 =$$

☒ (a) 66.66

(b) 33.33

(c) 63.33

(d) 36.66

$$3 / 4 =$$

(a) 25

(b) 50

(c) 65

 **(d) 75**

$$4 / 5 =$$

(a) 60

(b) 40

(c) 75

 (d) 80

$$9 / 5 =$$

(a) 90

(b) 190

☒ (c) 180

(d) 145

$$\textcircled{1} \frac{1}{6}$$

$$100\% + 16.66$$

$$7 / 6 =$$

✓ (a) 116.66

(b) 166.66

(c) 136.66

(d) 126.66

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

$$4/7 =$$

☒ (a) 57.14

☐ (b) 71.42

☐ (c) 64.28

☐ (d) 42.85

$$8 / 7 =$$

(a) 121.42

(b) 107.14

(c) 112.24

 **(d) 114.28**

$$3 / 8 =$$

(a) 35.7

 **(b) 37.5**

(c) 38.5

(d) 36.5

$$7/8 =$$

(a) 82.5

(b) 85

(c) 92

~~(d) 87.5~~

$$\frac{100}{9} \rightarrow 11\frac{1}{9}$$

11.11

$$1/9 =$$

(a) 22.22

☒ (b) 11.11

(c) 11.22

(d) 18.18

$$4 / 9 =$$

(a) 33.33

(b) 22.22

~~(c) 44.44~~

(d) 36.36

$$11 / 9 =$$

 (a) 122.22

(b) 111.11

(c) 133.33

(d) 101.01

$$7 / 10 =$$

(a) 50

(b) 35

(c) 7

~~(d) 70~~

$$13 / 10 =$$

(a) 133

 **(b) 130**

(c) 13

(d) 133.33

$$17 / 10 =$$

 (a) 170

(b) 17

(c) 185

(d) 175

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

$$\frac{4}{11} \rightarrow 36.36$$

$$4 / 11 =$$

~~(a) 36.36~~

(b) 44.44

(c) 36

(d) 33.33

$$7 / 11 =$$

 (a) 63.63

(b) 77.77

(c) 72.72

(d) 66.66

$$10 / 11 =$$

(a) 99.99

 (b) 90.90

(c) 89.89

(d) 110.10

$$14 / 11 =$$

- ☒ (a) 127.27
- (b) 136.36
- (c) 145.45
- (d) 144.44

$$\frac{1}{12} = \left(8\frac{1}{3}\right)\% \approx 8.33\%$$

41.66

$$5 / 12 =$$

(a) 42.5

(b) 45

☒ (c) 41.66

(d) 46.66

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

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

$$3/14 =$$

(a) 24.48

(b) 28.56

(c) 27.54

~~(d) 21.42~~

$$6 \frac{2}{3} \sim 6.66$$

$$26.66$$

$$4 / 15 =$$

☒ (a) 26.66

(b) 26.5

(c) 23.33

(d) 27.5

$$6\frac{2}{3}$$

$$73.33$$

$$11 / 15 =$$

(a) 72.5

(b) 76.66

☒ (c) 73.33

(d) 67.5

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

$$3 / 16 =$$

~~(a) 18.75~~

(b) 18.25

(c) 27.5

(d) 24

$$9 / 16 =$$

~~(a) 56.25~~

(b) 57.5

(c) 56

(d) 54.75

$$11 / 20 =$$

(a) 66

(b) 44

 (c) 55

(d) 33

$$16 / 7 =$$

(a) 214.28

~~(b) 228.57~~

(c) 207.14

(d) 225.28

200
28.56

$$\frac{24-1}{12} \frac{1}{12}$$

$$200\% - 8.33\%$$

$$23 / 12 =$$

☒ (a) 191.66

(b) 191.76

(c) 192.68

(d) 192.76

$$\begin{array}{r} 33. \dots \\ 66. \dots \\ \hline 1 \end{array}$$

$$1 / 30 =$$

~~(a) 3.33~~

(b) 33.33

(c) 3

(d) 3.5

$\frac{1}{30} = 3\overline{33}$

$$\frac{39}{13} - \frac{1}{13}$$

300% — 7.7%

$$38 / 13 =$$

(a) 293.3

(b) 295

✓ (c) 292.3

(d) 285

©

$$\frac{100}{19}$$

$$1 / 19 =$$

(a) 5.25

(b) 5.75

✓ (c) 5.26

(d) 5.5

5.26



$$600 - 16.66$$
$$583.33$$

$$35 / 6 =$$

 (a) 583.33

(b) 586.66

(c) 583

(d) 586

$$71 / 12 =$$

(a) 593.33

 **(b) 591.66**

(c) 591.33

(d) 593.66

$$1 / 60 =$$

(a) 1.36

 (b) 1.66

(c) 1.63

(d) 1.33

$$1 / 120 =$$

 (a) 0.833

(b) 0.866

(c) 0.875

(d) 0.825

$$\frac{50}{11}$$

$$1 / 22 =$$

(a) 5.45

~~(b) 4.54~~

(c) 4.63

(d) 5.54

Type-3

**Convert the following
percentage into fractions:**

15% =

 **(a) 3/20**

(b) 4/25

(c) 7/40

(d) 3/10

30% =

(a) 6/10

(b) 3/10

(c) 2/5

(d) 1/3

70% =

(a) $2/5$

~~(b) $7/10$~~

(c) $3/5$

(d) $7/5$

55% =

~~(a) 11/20~~

(b) 5/11

(c) 11/25

(d) 5/9

75% =

(a) $3/5$

~~(b) $3/4$~~

(c) $4/5$

(d) $4/3$

85% =

(a) 17/10

(b) 17/25

(c) 17/20

(d) 10/17

105% =

(a) 15/14

(b) 20/21

(c) 8/7

 **(d) 21/20**

18% =

(a) 9/20

~~(b) 9/50~~

(c) 18/25

(d) 9/25

56% =

(a) 7/10

(b) 14/20

~~(c) 14/25~~

(d) 5/7

72% =

 **(a) 18/25**

(b) 8/9

(c) 9/10

(d) 3/5

140% =

(a) $5/4$

(b) $8/5$

(c) $4/3$

 **(d) $7/5$**

$$2\frac{2}{3}$$

$$266\frac{2}{3}\% =$$

(a) $25/9$

(b) $7/3$

(c) $8/3$

(d) $26/9$

$$83\frac{1}{3}\% =$$

$$100\% - 16\frac{2}{3}\%$$

$$1 - \frac{1}{6}$$

$$\frac{5}{6}$$

✓ ~~(a)~~ 5/6

(b) 6/7

(c) 8/9

(d) 7/8

$$116\frac{2}{3}\% =$$

(a) $8/7$

(b) $10/9$

 (c) $7/6$

(d) $4/3$

$$162\frac{1}{2}\% =$$

 (a) $13/8$

(b) $11/8$

(c) $5/4$

(d) $7/4$

$$2\frac{9}{11}$$

$$281\frac{9}{11}\% =$$

- ☒ (a) $31/11$
- (b) $32/11$
- (c) $25/9$
- (d) $29/11$

$$157\frac{1}{7}\% =$$

(a) $12/7$

(b) $10/7$

(c) $13/7$

✓ (d) $11/7$

$$444\frac{4}{9}\% =$$

(a) $40/11$

☒ (b) $40/9$

(c) $50/11$

(d) $44/9$

$$4 < \frac{4}{9}$$

$$77\frac{7}{9}\% =$$

(a) $\frac{2}{3}$

(b) $\frac{8}{9}$

 (c) $\frac{7}{9}$

(d) $\frac{11}{18}$

$$9\frac{1}{11}$$

$$27\frac{3}{11}\% =$$

(a) $4/11$

☒ (b) $3/11$

(c) $2/9$

(d) $2/11$

$$107\frac{1}{7}\% =$$

(a) $17/16$

(b) $16/15$

(c) $8/7$

✓ (d) $15/14$

✓ 14

$$14\frac{2}{7} - \frac{1}{7}$$

$\times 3$

$$42\frac{6}{7}\% =$$

(a) $5/14$

(b) $4/7$

✓ (c) $3/7$

(d) $3/14$

$$46\frac{2}{3}\% =$$

(a) $\frac{8}{15}$

(b) $\frac{5}{9}$

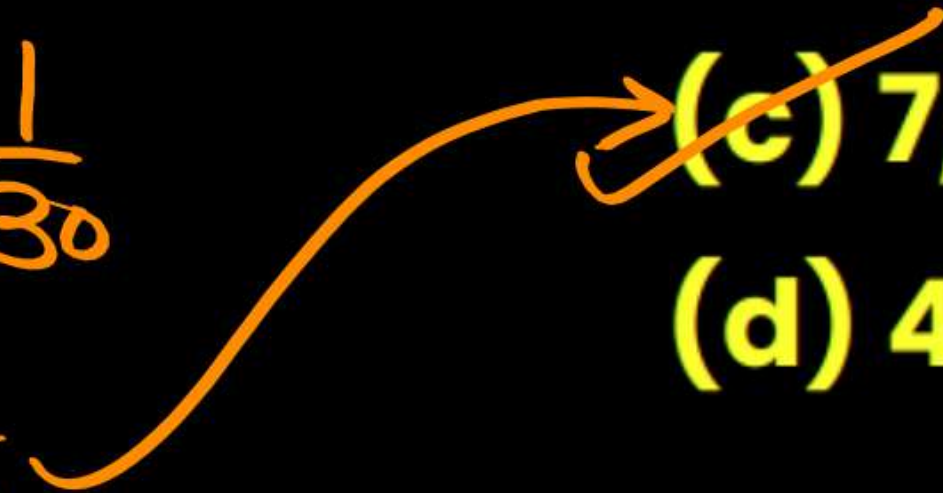
(c) $\frac{7}{15}$

(d) $\frac{4}{9}$

$$50 - 3\frac{1}{3}$$

$$\frac{1}{2} - \frac{1}{30}$$

$$\frac{14}{30}$$



$$137\frac{1}{2}\% =$$

(a) $\frac{5}{4}$

(b) $\frac{13}{8}$

(c) $\frac{7}{4}$

~~(d) $\frac{11}{8}$~~

$$1\frac{3}{8}$$

$$18\frac{2}{11}\% =$$

 (a) $\frac{2}{11}$

(b) $\frac{3}{11}$

(c) $\frac{4}{11}$

(d) $\frac{5}{11}$

$$2\frac{9}{11}$$

$$290\frac{10}{11}\% =$$

(a) $26/9$

(b) $125/44$

(c) $32/11$

✓ (d) $31/11$

$$158\frac{1}{3}\% =$$

(a) $11/6$

(b) $17/12$

(c) $13/6$

✓ (d) $19/12$

$$1 + \frac{7}{12}$$

$$1\frac{2}{15}$$

$$113\frac{1}{3}\% = \text{---} \times 2 \text{---} 6\frac{2}{3}$$

(a) $15/13$

(b) $15/14$

✓ (c) $17/15$

(d) $16/15$

$$2\frac{3}{8}$$

$$237\frac{1}{2}\% =$$

(a) $9/4$

(b) $11/4$

(c) $21/8$

(d) $19/8$

$$2\frac{5}{9}$$

$$255\frac{5}{9}\% =$$

(a) $20/9$

(b) $22/9$

(c) $25/9$

✓ (d) $23/9$

$$172\frac{8}{11}\% =$$

(a) $20/11$

(b) $18/11$

☒ (c) $19/11$

(d) $17/11$

$$1 + \frac{8}{11}$$

$$2 + \frac{2}{15}$$

$$213\frac{1}{3}\% =$$

(a) $30/13$

✓ (b) $32/15$

(c) $20/9$

(d) $12/5$

$$6\frac{1}{4}$$

$\times 3$

$$18\frac{3}{4}\% =$$

(a) $\frac{2}{9}$

(b) $\frac{5}{21}$

(c) $\frac{3}{20}$

☒ (d) $\frac{3}{16}$

$$1 + \frac{8}{9}$$

$$188\frac{8}{9}\% =$$

(a) $16/9$

(b) $68/35$

(c) $5/3$

✓ (d) $17/9$

$$45\frac{5}{11}\% =$$

(a) $7/11$

(b) $6/11$

(c) $4/11$

 (d) $5/11$

$$1 + \frac{3}{16}$$

$$118\frac{3}{4}\% =$$

- ☒ (a) $19/16$
- (b) $13/12$
- (c) $16/19$
- (d) $25/24$

Quadratic & Cubic Equation

(द्विघात एवं घन समीकरण)

- **Basic Properties**
-

Basic equation $ax^n + bx^{n-1} + bx^{n-2} + \dots + k = 0$

⇒ **Sum of Roots** = $(-1)^{n+1} \frac{x^{n-1} \text{ का coefficient}}{x^n \text{ का coefficient}}$ ✓

⇒ **Product of Roots** = $\frac{\text{Constant term}}{x^n \text{ का coefficient}}$ ✓

$ax^2 + bx + c = 0$ $\alpha, \beta = \text{मूल (Roots)}$

⇒ मूलों का योग (Sum of Roots) = $\alpha + \beta = \frac{-b}{a}$ ✓

⇒ मूलों का गुणनफल (Product of Roots) = $\alpha\beta = \frac{c}{a}$ ✓

⇒ यदि α & β समीकरण के मूल हैं

$$x^2 - (\text{Sum of roots})x + \text{Product of roots} = 0$$

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

• याद रखने योग्य Special Properties

1. यदि $ax^2 + bx + c = 0$ के मूलों के k गुना मूल (**k times roots**) हैं, तो समीकरण

$$a\left(\frac{x}{k}\right)^2 + b\left(\frac{x}{k}\right) + c = 0 \text{ होगा।}$$

2. $ax^2 + bx + c = 0$ के α, β हैं, तो $cx^2 + bx + a = 0$ के मूल (**Roots**) $\frac{1}{\alpha}$ और $\frac{1}{\beta}$ होंगे।

3. $ax^2 + bx + c = 0$ के α, β हैं, तो $cx^2 - bx + a$ के मूल (**Roots**) $-\alpha$ और $-\beta$ होंगे।

4. **Complex Roots** हमेशा जोड़े (**Pairs**) में होते हैं।

$$\text{Ex.: } \alpha = 2 + \sqrt{5}, \beta = 2 - \sqrt{5}$$

5. किसी समीकरण (**Equation**) के सभी गुणांकों का योग (**Sum of its co-efficient**) '0' के बराबर होगा, इसके मूलों (**Roots**) में से एक मूल '1' होगा।

$$\text{Ex.: } x^2 - 5x + 4 = 0$$

$$1 - 5 + 4 = 0$$

6. यदि $ax^2 + bx + c = 0$, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

• Condition for Nature of Roots (मूल के रूप)

$b^2 - 4ac = \text{Discriminant (D)}$ विभेदक / विविक्तकर

(1) यदि $D = 0$, $x = \frac{-b}{2a}$ $\left(\begin{array}{l} \text{वास्तविक और समान मूल} \\ \text{Roots are real and equal} \end{array} \right)$

(2) यदि $D > 0$, $x = \frac{-b \pm \sqrt{D}}{2a}$ $\left(\begin{array}{l} \text{असमान और वास्तविक मूल} \\ \text{Distinct (Unequal) and Real roots} \end{array} \right)$

(3) यदि $D < 0$, $x = \text{imaginary}$ (काल्पनिक), **unequal roots** (असमान मूल)

Note: In second case, यदि D पूर्ण वर्ग (**Perfect square**) है, तो x परिमेय (**rational**) होगा अन्यथा अपरिमेय (**Irrational**) होगा।

- Quadratic Equation (द्विघात समीकरण) दिमाग में Solve करें

$$x^2 - 11x + 30 = 0$$

$$-6-5 \quad -6x-5$$

$$\alpha = +6$$

$$\beta = +5$$

sign change

$$\underline{x^2 + 9x + 20 = 0}$$

5 4

$$\alpha = -5$$
$$\beta = -4$$

$$3x^2 - 4x - 32 = 0$$

$$(-12)(8)$$

$$\frac{+12}{3} \quad \frac{-8}{3} \quad \alpha = +\frac{4}{3}$$
$$\beta = -\frac{8}{3}$$

- Quadratic Equation (द्विघात समीकरण) दिमाग में Solve करें

$$2x^2 + 23x + 63 = 0$$

(Handwritten orange bracket under 23x with 14+9 written below it)

(Handwritten orange factorization tree for 126)

$$\begin{array}{c} 126 \\ \swarrow \searrow \\ 14 \quad 9 \end{array}$$

$$\frac{-14}{2} \quad \frac{-9}{2}$$

$$\alpha = -7$$
$$\beta = -\frac{9}{2}$$

- Quadratic Equation (द्विघात समीकरण) दिमाग में Solve करें

$$3x^2 + 23x + 44 = 0$$

12×11

$$-\frac{12}{3} \quad -\frac{11}{3}$$

$$\alpha = -4$$
$$\beta = -\frac{11}{3}$$

• Cubic Equation (घन समीकरण) की Basic Properties

$$ax^3 + bx^2 + cx + d = 0$$

यदि α , β और γ मूल (roots) हैं।

सभी मूलों का योग (Sum of all roots) $= \alpha + \beta + \gamma = -\frac{b}{a}$ ✓

सभी मूलों का गुणनफल (Product of all roots) $\alpha\beta\gamma = -\frac{d}{a}$ ✓

दो मूलों के गुणनफल का योग (Sum of product of two roots) $= \alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a}$ ✓

Equation (समीकरण) $\left[x^3 + (\alpha + \beta + \gamma)x^2 + (\alpha\beta + \beta\gamma + \gamma\alpha)x + \alpha\beta\gamma = 0 \right]$

- Cubic Equation (घन समीकरण) के Roots उँगलियों पर

$$\overset{\text{Sum}}{x^3 + 8x^2 + 17x + 10} = 0$$

$$2 \times 5 \times 1$$

$$\alpha \quad \beta \quad \gamma$$
$$-2, -5, -1$$

- Cubic Equation (घन समीकरण) के Roots उँगलियों पर

$$x^3 - 6x^2 + 11x - 6 = 0$$

$$\downarrow$$
$$\underline{-3x - 2x - 1}$$

$$\alpha \quad \beta \quad \gamma$$
$$+3, +2, +1$$

- Cubic Equation (घन समीकरण) के Roots उँगलियों पर

$$x^3 + 7x^2 + 14x + 8 = 0$$

$$\alpha \quad \beta \quad \gamma$$
$$-2, -4, -1$$

$$\underline{2 \times 4 \times 1}$$

$$x^3 - 4x^2 + 5x - 2 = 0$$

$$\alpha \quad \beta \quad \gamma$$
$$+2, +1, +1$$

$$-2x - 1x - 1$$

