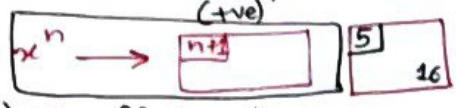
CALCULATOR TRICKS

1) (+/-) Used to convert positive number to Negative

2) To find square ($\sqrt{x}$) Eg: $\sqrt{9} = 3$ (9, $\sqrt{}$)

3) To calculate square (x^2) Eg: $131^2 = 17161$ (131 X =) (No. X =)

4) To find n^{th} power (x^n) Eg: $3^7 = 2187$ (3 X press (=) 6 times (7-1) time)



Eg: $2^4 = 16$. (No X press (=) (n-1) times)

5) To find n^{th} power (x^{-n}) Eg: $3^{-4} = 0.01234$ (3 ÷ press (=) 4 times)
if n is (-ve) negative

(No. ÷ press (=) n times)

6) To find n^{th} power ($x^{7.2}$ @ any other no.) if n is in points

Eg: $(1.03)^{7.2}$ = 1.2371

* Type 1.03
* $\sqrt{}\sqrt{}\sqrt{}$ .... 12 times
* −1
* x 7.2
* +1
* X =, X =, X = ... 12 times

- Type the given number.
- $\sqrt{}\sqrt{}\sqrt{}\sqrt{}$ ..... 12 times
- −1
- X Given power
- +1
- X =, X =, X = , ... 12 times

7) To find nth power if n is a fraction $(x^{1/n})$

- Type the number.
- √√√..... 12 times
- −1
- ÷n
- +1
- X =, X =, X = ... 12 times

8) To find nth power if n is a fraction $(x^{a/b})$

- Type the number.
- √√√..... 12 times
- −1
- x a, ÷b
- +1
- X =, X =, X = ... 12 times

$(1.03)^{1/3} = 1.0099$

- Type (1.03)
- √√√... 12 times
- −1
- ÷3
- +1
- X =, X =, X = ... 12 times

$(1.05)^{7/4} = 1.0891$

- Type 1.05
- √√√√... 12 times
- −1
- x7, ÷4
- +1
- X =, X =, X = ... 12 times

9) Use of (M+ Memory+), (M− Memory−), (MRC Memory Recall)

Eg: $(8 \times 5) + (7 \times 3) + (6 \times 5) + (9 \times 3)$

8 x 5 = 40 M+
7 x 3 = 21 M+
6 x 5 = 30 M+
9 x 3 = 27 M+
MRC = 118

To clear Memory press MRC 2 times

Eg: $(7 \times 2) + (6 \times 2) + (7 \times 2) - (3 \times 2)$

7 x 2 = 14 M+
6 x 2 = 12 M+
7 x 2 = 14 M+
3 x 2 = 6 M−
MRC = 34

10) Trick for ratio

~~Eg: Divide 17455 in 8:7:3.~~

Eg: 15000 should be divided among 3 persons in 2:3:5

- Total Ratio = 2+3+5 = 10.
- $\frac{15000}{10} = 1500$
- $1500 \times 2 = 3000$

(No need to press any button)

$3 = 4500$

$5 = 7500$

15000

11) Trick for finding %

Eg: 17240 ~~Should~~ be divided in 10%, 25%, 30%, 12%.

- $17240 \times 10\% = 1724$

(No need to press any button)

25% 4310

30% 5172

12% 2068.8

SEQUENCES AND SERIES

To find $T_n = a+(n-1)d$ (A.P)

Calcᵘ ⟹ $(a+d) = = \ldots$ (n+1)

Eg: 2, 5, 8, ... T_{21}

2+3 = = ... 21

$T_{21} = 62$

n+1

Sum of A.P series

Eg: $S_3 = T_1 + T_2 + T_3$

$S_n = \frac{n}{2}[2a+(n-1)d]$ $\quad S_n = \frac{n}{2}(a+l)$

Calcᵘ ⟹ $a+d = = \ldots$ (n+1) GT a

Eg: 2, 4, 6, 8 ..... S_{10}

If a is -ve, +ve
GT−a GT+a

$S_{10} = 2+2 = =$ (11) GT+2

$= 110$

Eg: −2, −4, −6, −8, ... S_{10}

$S_{10} = -2-2 = =$ (11) GT−2

A·M

A·M $\frac{a+b}{2}$

Q: 55 & 43

$\frac{55+43}{2}$

$= 49$

Insert $\frac{b-a}{n+1}$

Q: 3 terms b/w 2 & 8

$\frac{8-2}{2+1} = \frac{6}{3} = 2$

1st term = 2

$T_2 = 2+2 = 4$

$T_3 = 4+2 = 6$

$T_4 = 8$

To find $T_n = ar^{n-1}$ (G.P)

Calci → r × a = = . . . [n+1]

Eg: 2, 4, 8, 16, ... T_{10}

2 × 2 = = . . . [11]

$T_{11} = 1024$

Eg: 3, 6, 12 . . . . T_{14}

r = 2 a = 3

2 × 3 = = = = [15]

$T_{14} = 24576$

Sum of G.P series

$$S_n = \frac{a(1-r^n)}{1-r}, \quad r<1$$

$$= \frac{a(r^n-1)}{r-1}, \quad r>1$$

Calci ⇒ r × a = = . . . [n+1] GT $\pm$ a

Eg: 2, 4, 8, 16 . . . . S_8

S_8 - 2 × 2 = = [9] GT +2

$S_8 = 510$

$$S_\infty = \frac{a}{1-r}$$

Calci ⇒ r × a = = . . . [0] GT $\pm$ a

TIME VALUE OF MONEY

Simple Interest

- It is always calculated on Principal.
- Interest in S.I are always equal. (Int in 1st year = Int in 2nd year = ...)

$$S.I = \frac{PTR}{100}$$

$$A = P + I$$
$$= P + Pit$$
$$= P(1+it)$$

$$P = A - I$$
$$I = A - P$$

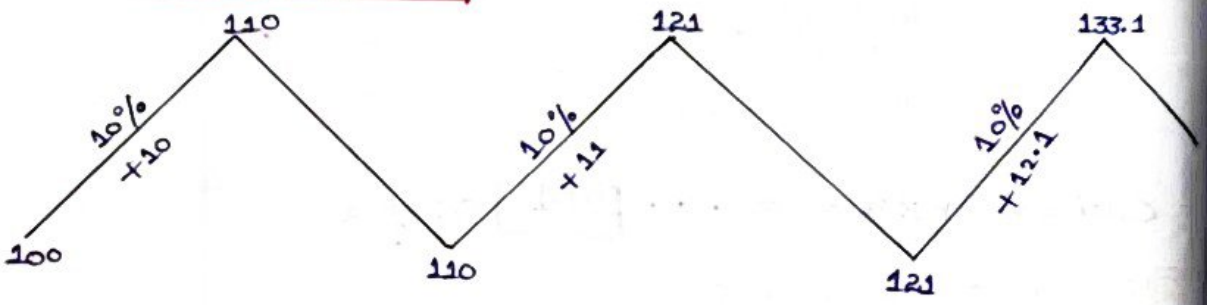
1 yr 3 months

$1 + \frac{3}{12} = 1.25$

1 yr 7 months

$1 + \frac{7}{12} = 1.6$

Compound Interest



- It is always calculated on Amount.
- In C.I we receive interest on interest i.e.,

Interest will always increase year by year.

$$A_n = P(1+i)^n$$
$$C.I = P\left[(1+i)^n - 1\right]$$

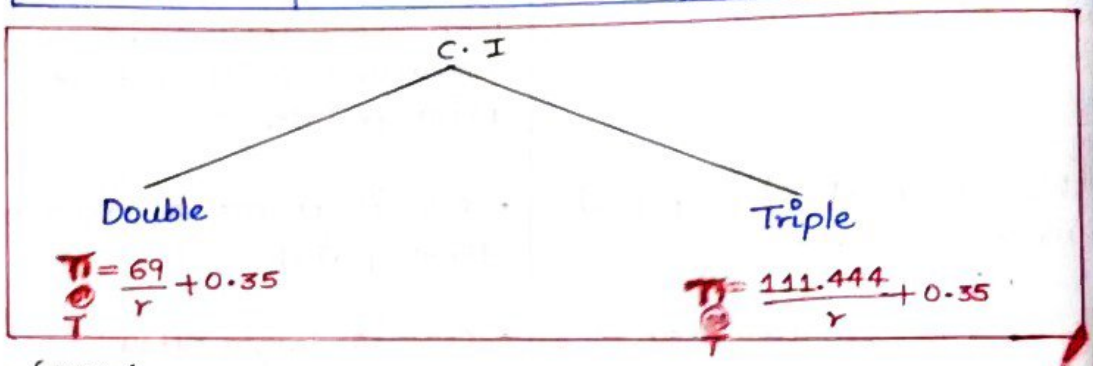
- If same P, T, R for both S.I & C.I then Interest for 1st year is equal i.e, S.I = C.I

Calci Trick

$$C.I = P + (r\% + r\% + \ldots T \text{ times (years)} - P)$$

C.I at different conversion Periods (or) (Types of compounding)

	Rate	Time
Yearly / Annually	R ÷ 1	T x 1
Half Yearly / Semi Annually	R ÷ 2	T x 2
Quarterly	R ÷ 4	T x 4
Monthly	R ÷ 12	T x 12
Daily	R ÷ 365	T x 365



Case:-1

S.I

Eg: The sum of money doubles itself in 4 years, what would be (R)?

Ans: $A = 2P$

W.K.T $A - P = S.I$

$2P - P = S.I$

$I = \frac{PTR}{100}$

$R = \frac{100}{4}$

$R = 25\%$

Calci Trick

$R = \frac{n-1}{T} \times 100$ (R = Rate, T = Time, n = No. of times i.e doubles or triples.)

$R = \frac{2-1}{4} \times 100$

$R = 25\%$

Eg: A sum of money gets 7 times in 40 years.

$R = \frac{n-1}{T} \times 100 = \frac{7-1}{40} \times 100$

Case - 2

Eg: If sum of money gets doubles in 6 years. In how many years it will get triple?

$$\frac{T_2}{T_1} = \frac{n_2 - 1}{n_1 - 1}$$

$n_1 = 2$ $\quad n_2 = 3$

$T_1 = 6$ $\quad T_2 = ?$

$$T_2 = T_1 \left(\frac{n_2 - 1}{n_1 - 1}\right)$$

$$= 6 \left(\frac{3-1}{2-1}\right) \qquad \frac{3-1}{2-1} \times 6$$

$$= 6 \times 2$$

$$= 12.$$

∴ It triples in 12 years.

Case - 2

Eg: A sum of money doubles itself at C.I in 10 years in how many years will it become 8 times?

$A = 8P$

$T = \frac{69}{r} + 0.35$

$10 = 0.35 + \frac{69}{r}$

$r = 7.15\%$

$10 - 0.35 = \frac{69}{r}$

$r = \frac{69}{9.65} = 7.15\%$

$A = P\left(1 + \frac{R}{100}\right)^T$

$8P = P\left(1 + \frac{7.15}{100}\right)^T$

$8 = \left(\frac{100 + 7.15}{100}\right)^T$

$8 = \left(\frac{107.15}{100}\right)^T$

$8 = (1.0715)^T$

Type in Calculator

$1.0715 \times \ldots\ldots$ (Till u get 8 or nearby value)

$T = 30$ yrs

Case - 4:-

Eg: If a population of a village becomes 10250 after 2 years and 11070 after 3 years, what is the rate of increase per annum.

a) 5% b) 6% c) 7% d) 8%

By O.V

$10250 + 8\% = 11070$

So Ans: 8%

When

10250 ⟶ 2 years

11070 ⟶ 3 years ($10250 + \_\_\_\_\% = 11070$)

While calculating this the Principal Amt is Amount of previous years.

Annuity (Anually) (Every Year) (Installment) (Uniform Amount) (Uniform Time)

- **Future Value** (Investment / Sinking Fund)
  - O/N/R — End (or) Silence: $FV = A\left[\frac{(1+i)^n - 1}{i}\right]$
  - Due / Immediate — Starting / Beginning: $FV = A\left[\frac{(1+i)^n - 1}{i}\right](1+i)$
- **Present Value** (Loan / Borrowing)
  - O/N/R — End (or) Silence: $PV = A\left[\frac{(1+i)^{-n} - 1}{i}\right]$ (or) $P\left[\frac{(1+i)^n - 1}{i(1+i)^n}\right]$
  - Due / Immediate — Starting / Beginning: $PV = A\left[\frac{(1+i)^{-n} - 1}{i}\right](1+i)$

CALCULATOR TRICKS

FUTURE VALUE

Annuity Regular / Ordinary / Normal → $(1+i)\ x = = \boxed{n+1} - 1 \div i \times A$

Annuity Due / Immediate → $(1+i)\ x = = \boxed{n+1} - 1 \div i \times A \times (1+i)$

PRESENT VALUE

Annuity Regular / Ordinary / Silence → $(1+i) \div = = \boxed{n+2}\ GT \times A$

Annuity Due / Immediate → $(1+i) \div = = \boxed{n+2}\ GT \times A \times (1+i)$

Note :-

1) GT is used only in PV.
2) In FV — we go upto → $\boxed{n+1}$
   In PV — we go upto → $\boxed{n+2}$

~~If P is not known~~

If A is given, P to be found.

$(1+i)\ x = = \boxed{n+1} - 1 \div i = \text{Amount} =$ → PV → O/N/R

$(1+i) \div = = \boxed{n+2}\ GT \div = \text{Amount} =$ → PV → O/N/R

$(1+i)\ x = = \boxed{n+1} \times CF$ (CF → Cash flow)	$(1+i) \div = = \boxed{n+2} \times A$
To Find Future Value	To Find Present Value

How to identify if question is of Annuity?

Use of words like

- Annuity
- Installment
- Each year / month / quarter

How to identify type of Annuity in Question?

- If question is silent about when installments are starting or use of word at end of each period
  - Annuity Regular
- Annuity Due is used when question is using words like
  * starting today
  * starting immediately
  * starting Now.

How to identify que is of future Value?

- Rs. 10,000 amounts to
- A sum of money will become
- You will receive Rs. 10,000 after 2 years
- The amount standing at your credit after

INVESTMENT
SINKING FUND

How to identify que is of Present Value?

- Mr. A borrows Rs. 10,000
- What is loan amount

BORROWING
LOAN