



CA FOUNDATION SEP 2025

The banner features a dark background with green and blue light streaks. At the top, silhouettes of runners are visible. Two men are featured: on the left, a man with a beard in a black polo shirt with a 'PW' logo; on the right, a man with a beard in a dark jacket, making a fist. The central text is on a red background, and the word 'MARATHON' is in large yellow 3D letters at the bottom, flanked by white runner icons.

QUANTITATIVE
APTITUDE

MARATHON

→ Notebook (Q.)

→ Calculator

→ Pen

→ Brain (गोण)

→ Water

Mathematics of Finance

SI

$$\begin{aligned} \rightarrow SI &= P \cdot r \cdot t \\ \rightarrow A &= P + SI \\ &= P[1 + rt] \end{aligned}$$

Parisa Double

$$t = \frac{1}{8}$$

Parisa Triple

$$t = \frac{2}{8}$$

CI

$$\# A = P \left[1 + \frac{r}{m} \right]^{t \times m}$$

$$\# CI = A - P$$

$$CI = P \left\{ \left(1 + \frac{r}{m} \right)^{t \times m} - 1 \right\}$$

$$\# CI - SI = Pr^2$$

(2 years)

$$\# CI - SI \text{ (3 years)} = Pr^2(r+3)$$

Value of Asset
after t years
of use

$$= \text{Cost} \{ 1 - \text{Rate} \}^{\text{Time}}$$

$$\# r_e = \left[1 + \frac{r}{m} \right]^m - 1$$



PV of single cash flow = $\frac{F.V.}{\left(1 + \frac{r}{m}\right)^{t \times m}}$

Annuity

→ Same payment

→ Same interval

Ordinary Annuity
(Regular)

⇓

Payment ⇒ Ending

Immediate Annuity
(Due)

⇓

Payment ⇒ Beginning

Regular

$$FV = R \left\{ \frac{(1+i)^n - 1}{i} \right\}$$

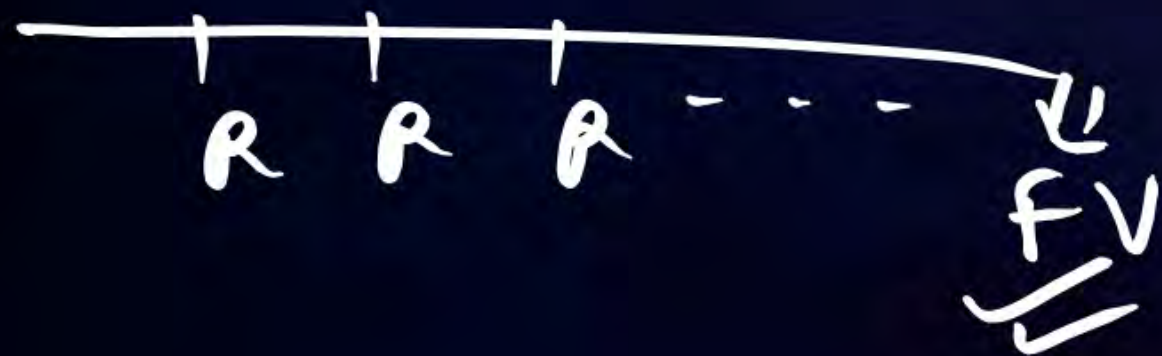
$$PV = R \left\{ \frac{1 - (1+i)^{-n}}{i} \right\}$$

Immediate

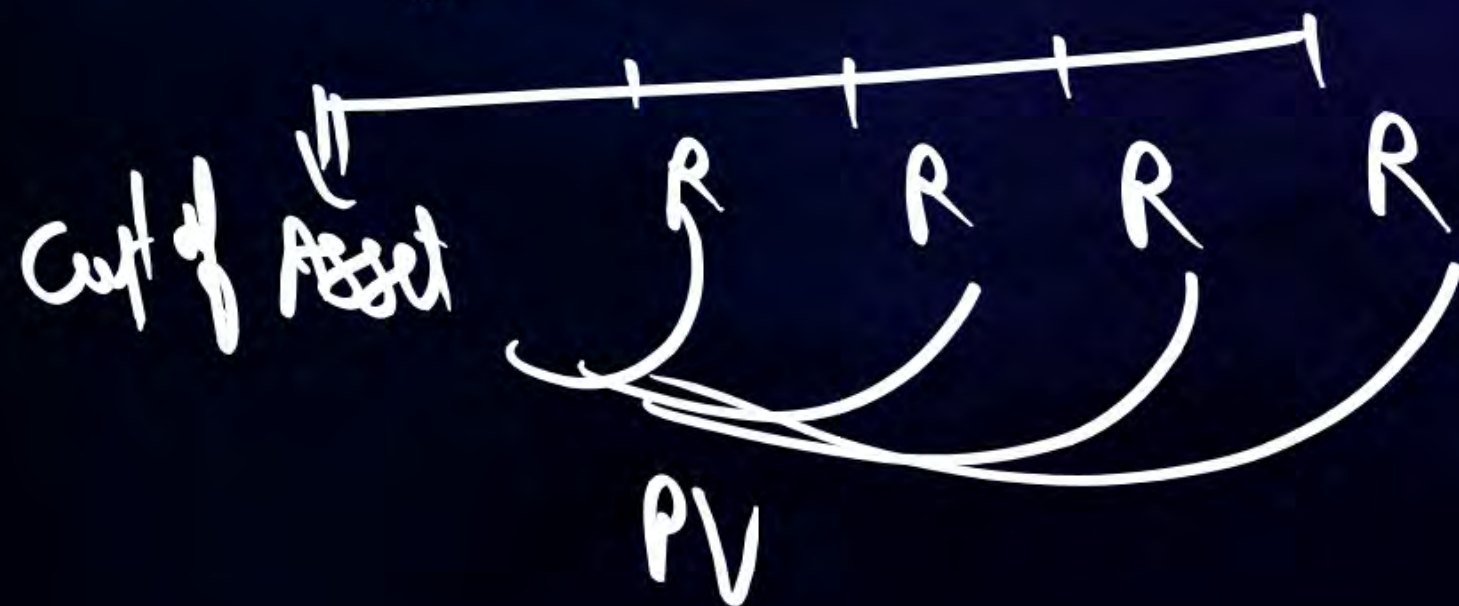
$$FV = R \left\{ \frac{(1+i)^n - 1}{i} \right\} (1+i)$$

$$PV = R \left\{ \frac{1 - (1+i)^{-n}}{i} \right\} (1+i)$$

Sinking fund



Leasing



NPV



PV of inflow - PV of outflow

Perpetuity (∞)

Regular

$$PV = \frac{R}{i}$$

Immediate

$$PV = \frac{R}{i}(1+i)$$

Growing Perpetuity

g = growth

i = Rate of int.

R = first payment

$$PV = \frac{R}{i - g}$$

CAGR

$\downarrow$

$$\left[\frac{CY}{BY} \right]^{\frac{1}{t}} - 1$$

Question

If a sum triples in 20 years at simple rate of interest, the rate of interest per annum will be:

- ☒ (a) 10.0%
- (b) 11.3%
- (c) 12.5%
- (d) None

Triple
|||

$$T = \frac{2}{r} \quad \& \quad r = \frac{2}{T}$$

$$r = \frac{2}{20} = 0.1 \quad \text{or} \quad 10\%$$

Question

A certain amount at a rate of simple interest x , doubles in 5 years. At another rate of simple interest y , it becomes three times in 8 years. Then the difference between these two interest rates is

- (a) 5%
- (b) 8%
- (c) 3%
- (d) 4%

Double 5 yrs.

$$x = \frac{1}{t} = \frac{1}{5} = 0.2 \text{ or } 20\%$$

Triple in 8 years

$$y = \frac{2}{t} = \frac{2}{8} = 0.25 \text{ or } 25\%$$

$$x - y = ?$$

$$25\% - 20\% = 5\%$$

Question

prob.

If a simple interest on a sum of money at 6% p.a. for 7 years is equal to twice the simple interest on another sum for 9 years at 5% p.a., the ratio will be:

(A) 2 : 15

(B) 7 : 15

(C) 15 : 7

(D) 1 : 7

$$S I_1 = 2 S I_2$$

$$P_1 \times \frac{6}{100} \times 7 = 2 \left[P_2 \times \frac{5}{100} \times 9 \right]$$

$$P_1 \times 42 = P_2 \times 90$$

$$\frac{P_1}{P_2} = \frac{90}{42} = \frac{30}{14} = \frac{15}{7}$$

Question

A certain sum of money was put at S.I. for 2.5 years at a certain rate of S.I. p.a. Had it been put at 4% higher rate, it would have fetched ₹500 more. Find the sum of money.

- (a) ₹4000
- (b) ₹5000
- (c) ₹6000
- (d) None of these

$$P_1 = ?$$

$$T = 2.5 \text{ yr.}$$

$$r = 4\%$$

$$SI = 500$$

$$SI = P \times r \times T$$

$$500 = P \times 0.04 \times 2.5$$

$$P = 5000$$

Question

₹850 becomes ₹1250 in 5 years at a simple rate of interest.
How much would be its amount after 4 years if rate of interest is increased by 5%?

- (a) ₹1230
- (b) ₹1320
- (c) ₹1340
- (d) None of these

$$\begin{aligned} P &= 850 \\ A &= 1250 \\ T &= 5 \text{ yr.} \end{aligned}$$

$$\begin{aligned} SI &= P \times r \times t \\ 400 &= 850(r)(5) \\ r &= 0.09411 \\ &\text{or} \\ &9.41\% \end{aligned}$$

$$\begin{aligned} \text{New Rate} &= 9.41 + 5 \\ &= 14.41\% \\ \text{New Time} &= 4 \text{ years} \end{aligned}$$

$$\begin{aligned} SI &= P \times r \times t \\ &= 850 \times 14.41\% \times 4 \\ &= 490 \end{aligned}$$

$$\begin{aligned} \text{Amount} &= P + I = 850 + 490 \\ &= 1340 \end{aligned}$$

Question

A roadside tea stall merchant borrows ₹9,000 at 2.76% Simple Interest per annum. The principal and the interest are to be paid in 10 monthly installments. If each installment is double the preceding one, find the value of the last installment.

(A) ₹1,024

☒ (B) ₹4,608

(C) ₹9,207

(D) ₹4,096

$$P = 9000$$

$$r = 2.76\%$$

$$T = 10 \text{ months}$$

$$SI = 9000 \times 2.76\% \times \frac{10}{12}$$

$$= 207$$

$$\text{Amount} = 9000 + 207 = 9207$$

$$P + 2P + 4P + 8P + 16P + 32P + 64P + 128P + 256P + 512P = 9207$$

$$1023P = 9207$$

$$P = 9$$

$$\begin{aligned} \text{Last installment} &= 512P \\ &= 512 \times 9 \\ &= 4608 \end{aligned}$$

← Last installment

Question

A sum of ₹ 725 is lent in the beginning of a year at a certain rate of simple interest. After 8 months, a sum of ₹ 362.50 more is lent but at the rate twice the former. At the end of the year, ₹ 33.50 is earned as interest from both the loans. What was the original rate of interest?

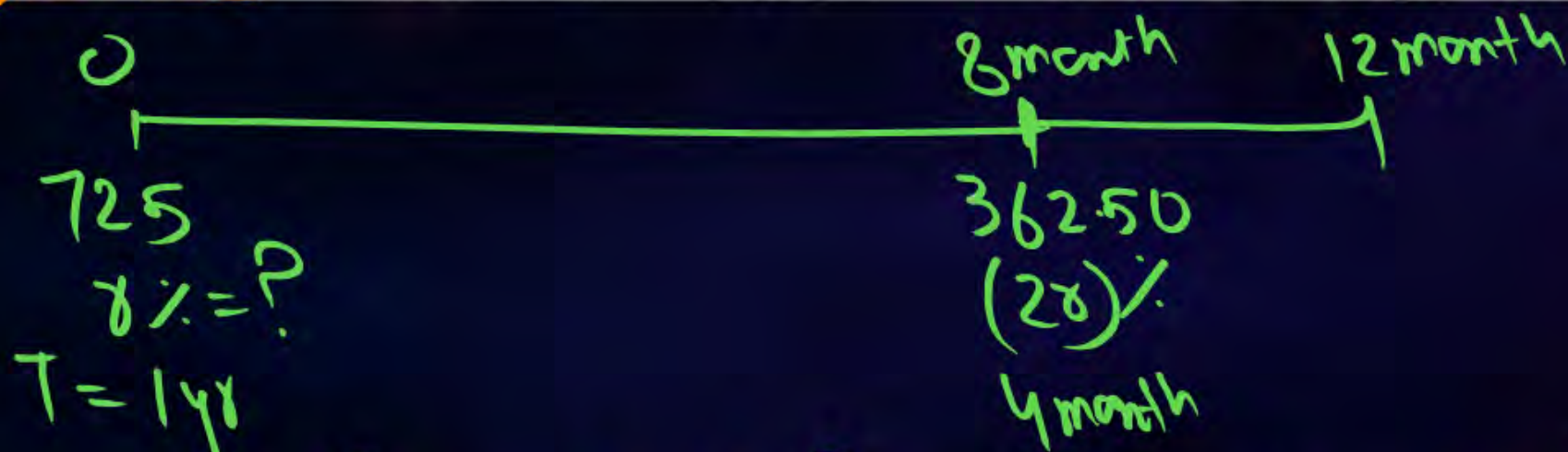
(A) 4.54%

(B) 3.6%

(C) 3.46%

(D) 4.12%

Total int = 33.50



$$\left[725(3.46\%) \times 1 \right] + \left[362.50 \times \frac{4}{12} \times 6.92\% \right]$$

$$= 25.085 + 8.36 = 33.44$$

$$725(1)(r) + 362.50 \times \frac{4}{12} \times (2r) = 33.50$$

Question

There is 60% increase in amount in 6 years at simple interest. What will be the compound interest of ₹ 12,000 after three years at the same rate?

(A) ₹ 3,120

(B) ₹ 2,160

(C) ₹ 3,972

(D) ₹ 6,240

$$T = 6 \text{ yr.}$$

$$P = 100$$

$$A = 160$$

$$SI = 160 - 100 = 60$$

$$SI = P \times r \times t$$

$$60 = 100(r)(6)$$

$$r = \frac{60}{600} = 0.1$$

or
10%

$$\begin{aligned} \text{Now } CI &= P \left\{ \left(1 + \frac{r}{n} \right)^{nt} - 1 \right\} \\ &= 12000 \left\{ (1 + 0.10)^3 - 1 \right\} \\ &= 3972 \end{aligned}$$

Question

If the compound interest on a certain sum for 2 years at 5% per annum is ₹246, then the simple interest on the same sum for double the time and double the rate per annum is:

- (a) ₹900
- (b) ₹960
- (c) ₹1,000
- (d) ₹1,100

$$CI = 246$$
$$P \left\{ \left(1 + \frac{r}{m} \right)^{tm} - 1 \right\} = 246$$
$$P \left\{ (1 + 0.05)^2 - 1 \right\} = 246$$

$$P = 2400$$

$$SI = P \times r \times t$$
$$= 2400 \times (10\%) \times (4)$$
$$= 960$$

Question

In how many years a sum of money triples at 5% p.a. compound interest payable on a half-yearly basis?

- (a) 15 years 7 months
- (b) 18 years 6 months
- (c) 18 years 8 months
- (d) 22 years 3 months

$$P = 100$$

$$A = 300$$

$$A = P \left(1 + \frac{r}{m} \right)^{t \times m}$$

$$300 = 100 \left\{ 1 + \frac{0.05}{2} \right\}^{t \times 2}$$

$$3 = (1.025)^{2t}$$

$$\log 3 = \log (1.025)^{2t}$$

$$\log 3 = 2t \log (1.025)$$

$$0.4771 = 2t (0.0107)$$

$\log(x)$

$\rightarrow 5$ 19 times

$\rightarrow -1$

$\rightarrow \times 227695$

$$t = 22.29 \text{ yr.}$$

$$= 22 \text{ yr}$$

$$+ (0.29 \times 12) \text{ months}$$

$$= 22 \text{ yr} + 3 \text{ months}$$

Question

If ₹64 amounts to ₹83.20 in 2 years, what will ₹95 amount to in 8 years at the same rate percent per annum?

Compound

(a) ₹227.60

(b) ₹247.60

(c) ₹345.34

(d) ₹271.32

$$83.20 = 64[1 + r]^2$$

$$\frac{83.20}{64} = (1 + r)^2$$

$$1.30 = (1 + r)^2$$

$$\sqrt{1.30} = 1 + r$$

$$1.1401 = 1 + r$$

$$0.1401 = r$$

Now

$$\begin{aligned} A &= 95[1 + r]^8 \\ &= 95[1.1401]^8 \\ &= 271.32 \end{aligned}$$

Question

The difference between the simple and compound interest on a certain sum for 2 years at 4% p.a. is ₹600. The sum is:

(a) ₹3,50,000

(b) ₹3,75,000

(c) ₹3,27,500

(d) ₹2,97,550

$$C.I. - S.I. = 600$$

$$A r^2 = 600$$

$$P = \frac{600}{r^2}$$

$$= \frac{600}{(0.04)^2} = 3,75,000$$

$$P = ?$$

Question

The effective rate of interest corresponding to a nominal rate of 8% per annum payable quarterly

- (a) 6.24%
- (b) 5.38%
- (c) 8.24%
- (d) 82.4%

$$\begin{aligned} r_e &= \left(1 + \frac{r}{m}\right)^m - 1 \\ &= \left[1 + \frac{0.08}{4}\right]^4 - 1 \\ &= (1.02)^4 - 1 \\ &= 0.0824 \end{aligned}$$

Question

The annual birth and death rates per 1,000 are 30 and 10 respectively. The number of years in which the population will be doubled assuming there is no immigration or emigration

- (a) 35 years
- (b) 30 years
- (c) 25 years
- (d) none of these

$$\text{Birth Rate} = \frac{30}{1000} \times 100 = 3\%$$

$$\text{Death Rate} = \frac{10}{1000} \times 100 = 1\%$$

$$\text{Growth Rate} = 3\% - 1\% = 2\%$$

$$P = 100$$

$$A = 200$$

$$A = P(1 + r)^t$$

$$200 = 100[1 + 0.02]^t$$

$$2 = (1.02)^t$$

$$\log 2 = t \log(1.02)$$

$$t = \frac{\log 2}{\log(1.02)} = 35.$$

Question

The difference between Compound Interest (C.I.) and Simple Interest (S.I.) on a certain sum of money invested for 3 years at 6% p.a. is ₹110.16. Find the Principal.

Options:

(a) ₹3,000

(b) ₹3,700

(c) ₹12,000

(d) ₹10,000

$$C.I. - S.I. = 110.16$$

$$P r^2 (r + 3) = 110.16$$

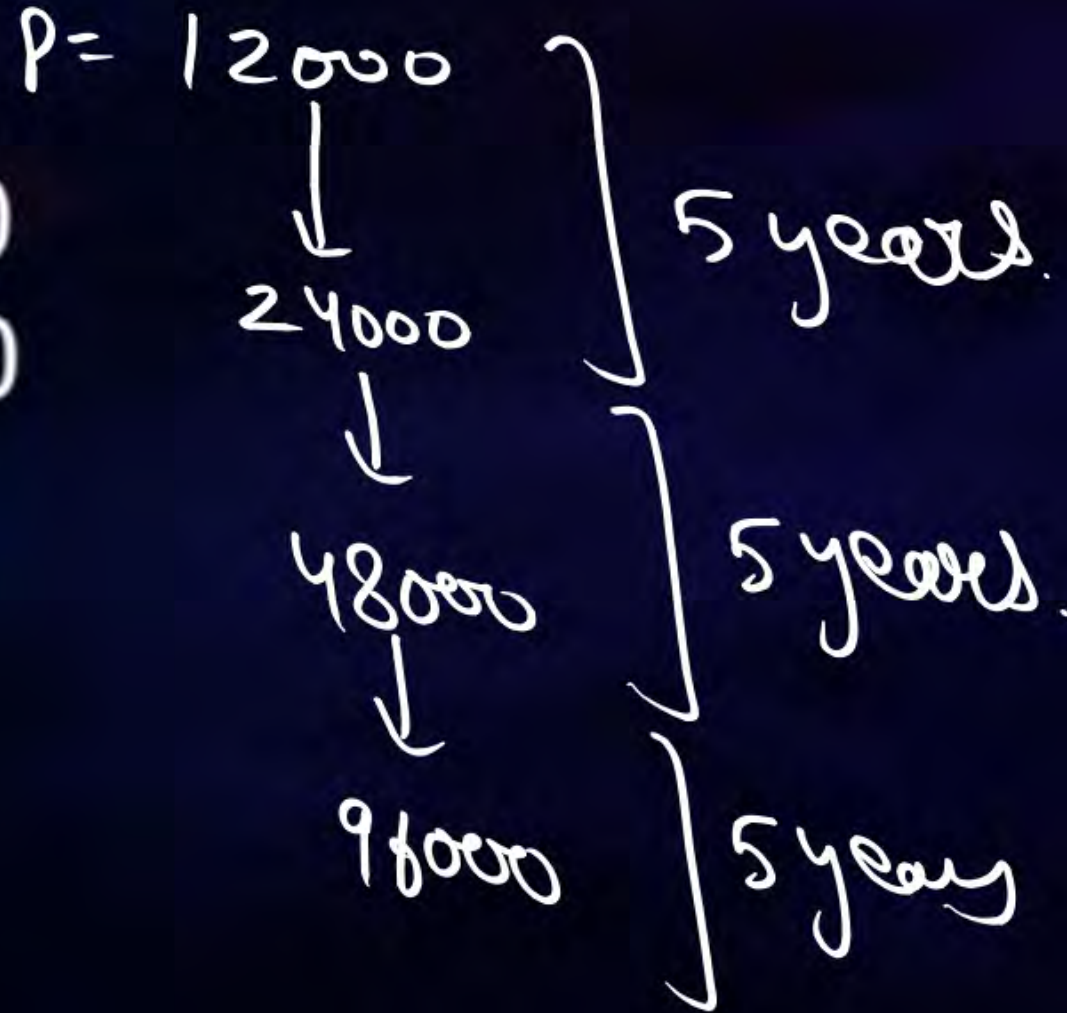
$$P = \frac{110.16}{r^2 (r + 3)}$$

$$= \frac{110.16}{(0.06)^2 [0.06 + 3]} = 10,000$$

Question

Mr. X makes a deposit of ₹12,000 in a bank where the amount doubles at compound interest in 5 years. Then what will be the total amount he will have after 15 years?

- (A) ☒ ₹96,000
- (B) ₹1,20,000
- (C) ₹1,24,000
- (D) None



Question

If the nominal rate of growth is 17% and inflation is 9% for five years. Let 10000 be the Gross Domestic Product (GDP) amount at the present year, then the projected real GDP after 6 years is:

- a) 15870
- b) 19210
- c) 14030
- d) 25100

$$\text{Real rate} = \text{nominal rate} - \text{Inflation}$$

$$= 17\% - 9\%$$

$$\text{Real rate} = 8\%$$

$$P = 10,000$$

$$\begin{aligned} A &= 10,000 [1 + 0.08]^6 \\ &= 15868 \end{aligned}$$

Question

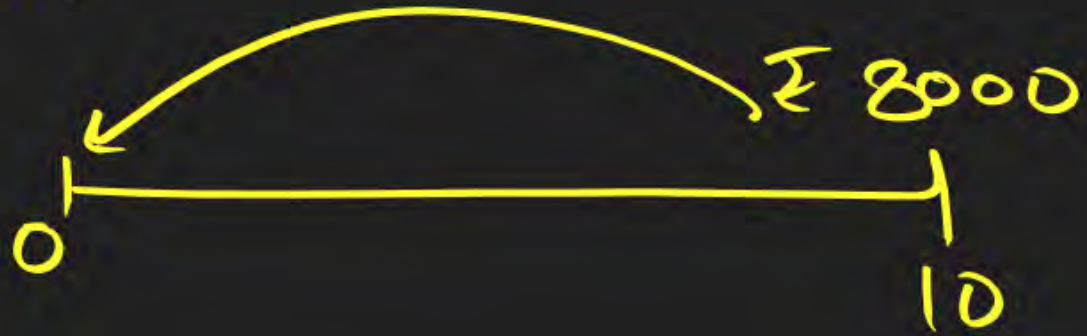
What is the present value of ₹8,000 to be required after 10 years if the interest rate is 6%? (Given that $(1.06)^{10} = 1.7908$)

(A) ₹6,499.87

(B) ₹4,467.28 ✓

(C) ₹5,867.32

(D) ₹1,790.86

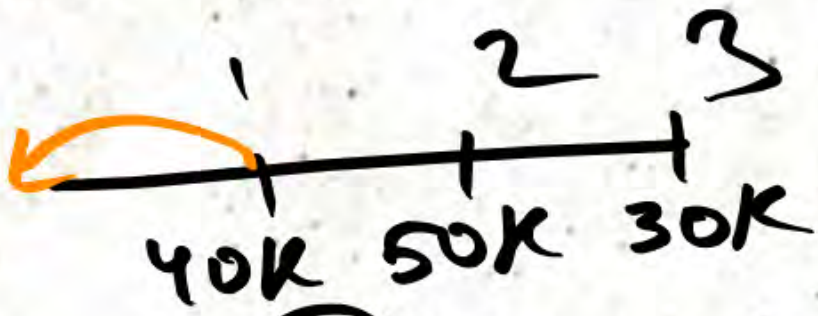


$$PV = \frac{FV}{\left(1 + \frac{r}{m}\right)^{n \cdot m}}$$
$$= \frac{8000}{(1 + 0.06)^{10}} = \frac{8000}{1.7908} = 4467$$

Question

A project is expected to provide cash inflows as follows for 3 years :

Year	:	1	2	3
Cash Inflows (₹)	:	40,000	50,000	30,000



The company's cost of capital or required rate of return is 15%. What is the present value of cash inflows of the company ?

(A) ₹ 1,02,840

(B) ₹ 99,240

(C) ₹ 1,12,640

(D) ₹ 92,315

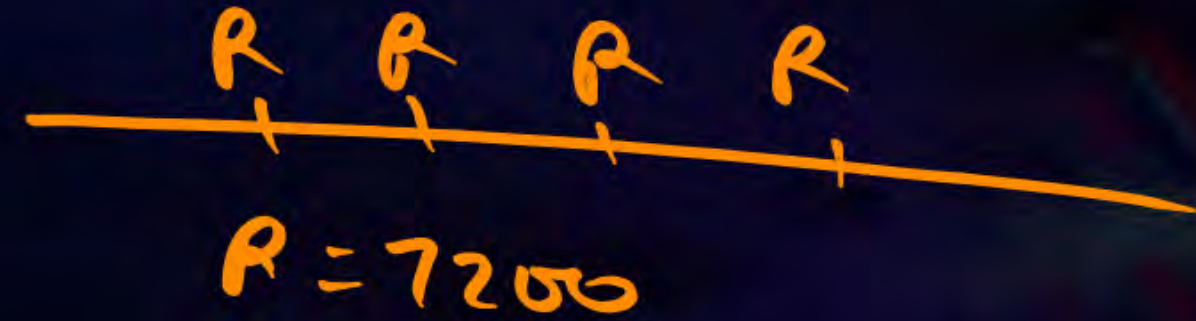
Sol.

$$\begin{aligned} PV &= \frac{40,000}{(1+0.15)^1} + \frac{50,000}{(1+0.15)^2} + \frac{30,000}{(1+0.15)^3} \\ &= 34782 + 37807 + 19725 \\ &= 92314 \end{aligned}$$

Question

The future value of an annuity of ₹7,200 made annually for 5 years at the rate of 12% compounded annually is

- (a) ₹45,740.40
- (b) ₹4,574.50
- (c) ₹54,740.50
- (d) ₹2,400.50



$$\begin{aligned} FV &= R \left\{ \frac{(1+i)^n - 1}{i} \right\} \\ &= 7200 \left\{ \frac{(1.12)^5 - 1}{.12} \right\} \\ &= 45740 \end{aligned}$$

Question

Rakesh borrows a loan of ₹10,000 from the bank and he agreed to pay back in 24 equal instalments at the rate of 10% compound interest per annum. Then each instalment amount is [Given that $(1.1)^{24} = 9.84973$]

- (a) ₹1,200.35
- ☒ (b) ₹1,112.99
- (c) ₹1,211.99
- (d) ₹1,321.56

Handwritten solution:

Timeline diagram showing a loan of 10,000 at time 0 and 24 equal instalments of R from time 1 to time 24.

$$PV = R \left\{ \frac{1 - (1+i)^{-n}}{i} \right\}$$
$$10,000 = R \left\{ \frac{1 - (1.10)^{-24}}{0.10} \right\}$$
$$10,000 = R(8.947) \Rightarrow R = 1,113$$

Question

Deferred Annuity

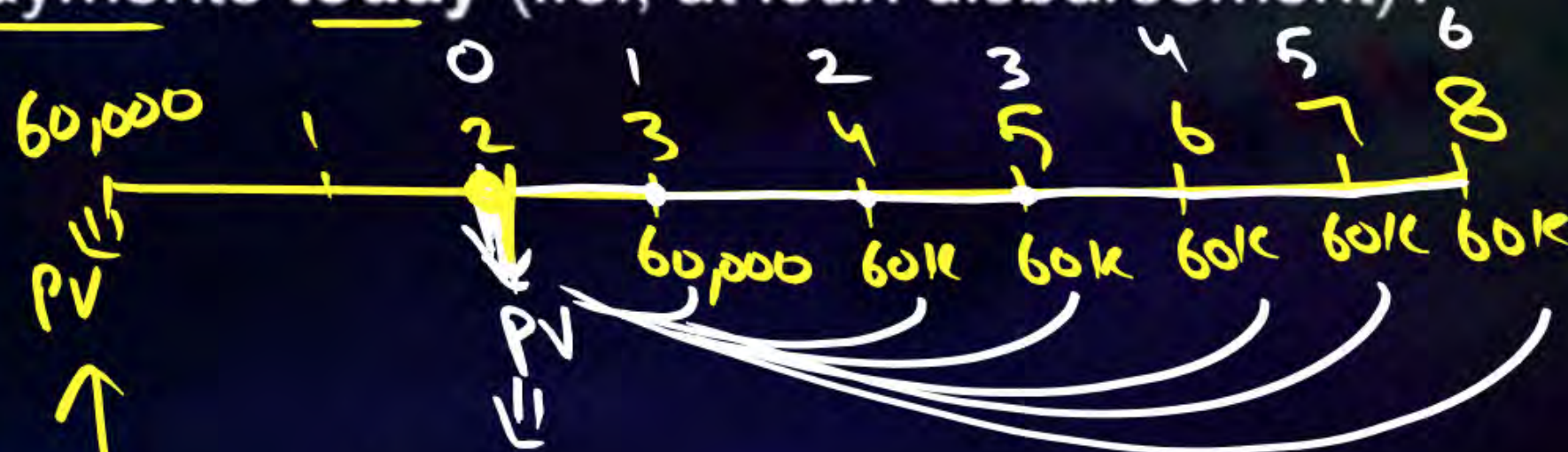
A student has taken an education loan from a bank and agreed to terms that He will start repaying ₹60,000 annually for 6 years,

First payment was made at the end of 3 years

If the interest rate on the loan is 10% per annum, what is the present value of his repayments today (i.e., at loan disbursement)?

Options:

- (a) ₹2,40,000
- (b) ₹3,10,128
- (c) ₹2,96,950
- (d) ₹2,15,900



$$\begin{aligned} \text{PV at the end of 2 years} &= \frac{60,000 \{1 - (1.10)^{-6}\}}{0.10} \\ &= 2,61,315 \end{aligned}$$

$$\text{PV} = \frac{2,61,315}{(1 + 0.10)^2}$$

$$\begin{aligned} \text{PV} &= \frac{2,61,315}{(1 + 0.10)^2} \\ &= 2,15,962 \end{aligned}$$

Question

Dinesh received a cash bonus of ₹ 1,00,000 which he deposited in a bank which pays 10 percent interest compounded annually. How much approximate equal amount can Dinesh withdraw annually for a period of 10 years?

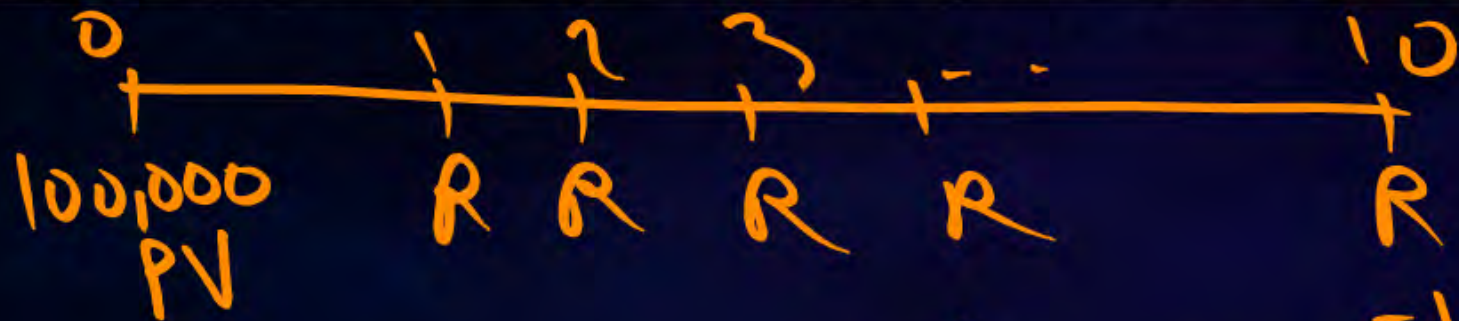
[Given that $(1.1)^{10} = 2.59374$]

(A) ₹ 38,554

(C) ₹ 62,745

☒ (B) ₹ 16,273

(D) ₹ 32,474



$$100000 = R \left\{ \frac{1 - (1.10)^{-10}}{0.10} \right\}$$
$$= R (6.1445)$$

$$R = 16,274$$

Question

Mr X wants to lease out an asset costing ₹3,60,000 for a five-year period to Mr Y. It has fixed a rental of ₹1,05,000 per annum payable annually starting from the end of the first year. Suppose the rate of interest is 14% per annum compounded annually on which money can be invested by the company. To whom this agreement is favorable ?

- A) MR X
- B) MR Y
- C) For both favorable
- D) Not favorable for any

Handwritten diagram and calculation:

X Cost

Timeline: 1 2 3 4 5

360,000 1,05,000 1,05,000 1,05,000 1,05,000 1,05,000

Cost Recovered (using Rent) = $1,05,000 \left\{ \frac{1 - (1.14)^{-5}}{0.14} \right\}$

= 3,60,473

Question

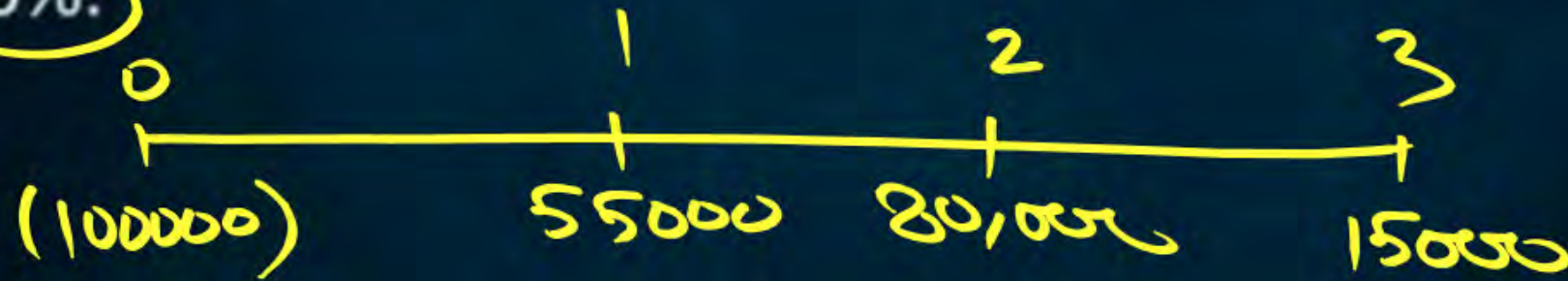
Compute the net present value for a project with a net investment of ₹1,00,000 and net cash flows for year one is ₹55,000; for year two is ₹80,000; and for year three is ₹15,000. Further, the company's cost of capital is 10%.

a) 27340

b) 28250

c) 26052

d) 29000



$$NPV = \frac{55000}{(1.10)^1} + \frac{80,000}{(1.10)^2} + \frac{15000}{(1.10)^3} - 100000$$

$$= 1,27,385 - 100,000$$

$$= 27385$$

Question

The present value of a perpetuity that pays ₹5,000 annually at a discount rate of 10% p.a. is:

- (a) ₹50,000
- (b) ₹45,000
- (c) ₹55,000
- (d) ₹60,000

$$\begin{aligned} PV &= \frac{P}{i} \\ &= \frac{5000}{0.10} \\ &= 50,000 \end{aligned}$$

Question

Assuming that the discount rate is 12% per annum, how much would you pay to receive ₹100, growing at 8% annually forever?

(a) ₹2,500

(b) ₹2,700

(c) ₹3,000

(d) ₹2,000

$$\begin{aligned} PV &= \frac{P}{i - g} \\ &= \frac{100}{0.12 - 0.08} \\ &= \frac{100}{0.04} = 2500 \end{aligned}$$

Question

10 years ago, the earnings per share (EPS) of ABC Ltd. was ₹5/share. Its EPS for this year is ₹22. Compute at what rate EPS of the company grew annually? $\Rightarrow$ CAGR
(a) 15.97% (b) 16.77% (c) 18.64% (d) 14.79%

$$\begin{aligned} & \left(\frac{22}{5} \right)^{\frac{1}{10}} - 1 \\ &= \left(\frac{22}{5} \right)^{\frac{1}{10}} - 1 \\ &= (4.4)^{\frac{1}{10}} - 1 \end{aligned}$$

Question

An investor wants to purchase a **four-year ₹2,000 par value bond** with a **12% nominal interest rate**. The bond matures at par, and the investor requires a **15% return**. At what price should the investor purchase the bond?

Options:

- (a) ₹1,890.50
- ☒ (b) ₹1,829.20
- (c) ₹2,000.00
- (d) None

Handwritten calculations and diagram:

Diagram: A timeline starting at time 0 (labeled R) and ending at time 4. There are four tick marks representing years. An arrow points down from the first tick mark to the value 240. Above the timeline, the value 2080 is written. Above the timeline, the value 240 is written and underlined.

$$\frac{240 \left[1 - (1.15)^{-4} \right]}{0.15} + \frac{2080}{(1.15)^4}$$

Labels for the formula:

- P.V of all for n years (above the first term)
- + P.V of Maturity Amount (above the second term)

$$= 685 + 1143 = 1828$$



Topic : Central Tendencies & Dispersion

Tendencies

Mean

$$\bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$$

$$\bar{x} = A + \frac{\sum f_i d_i}{\sum f_i}$$

$$\bar{x} = A + \frac{\sum f_i u_i}{\sum f_i} \times h$$

Median

$\frac{n}{2} \rightarrow$ just above cf

$$M = \left(\frac{n+1}{2} \right)^{\text{th}} \text{ obs.}$$

$$M = l + \frac{\frac{n}{2} - cf}{f} \times h$$

$$h = U.L - L.L$$

Mode

for grouped

$$\text{Mode} = l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h$$

$f_1 \rightarrow$ freq. of modal class

$f_2 \rightarrow$ " just after modal class

$f_0 \rightarrow$ " just before of modal class

GM

$$GM = (x_1 \times x_2 \times \dots \times x_n)^{\frac{1}{n}}$$

$$GM = (x_1^{f_1} \times x_2^{f_2} \times \dots \times x_n^{f_n})^{\frac{1}{\sum f}}$$

HM

$$HM = \frac{n}{\frac{1}{x_1} + \frac{1}{x_2} + \dots + \frac{1}{x_n}}$$

Properties

	Mean	Median	Mode
① change of origin ($x_i \pm k$)	$\bar{x} \pm k$	$M \pm k$	$M_0 \pm k$
② change of scale ($x_i k$)	$k\bar{x}$	Mk	kM_0
③ all ops. are same (k)	k	k	k
④ Linear relationship ($y = ax + b$)	$\bar{y} = a\bar{x} + b$	$y_M = ax_M + b$	$y_{M_0} = ax_{M_0} + b$

#Q. The number of tendencies is

→ Mean
Median
Mode
GM
HM

A 2

B 3

C 4

☒ D 5

QUESTION



#Q. If frequencies of all observed values are equal then.... Can not be determined.

1 Mode

2 Median

3 Mean

4 None

#Q. The mean of 100 students was 45. Later on, it was discovered that the marks of two students were misread as 85 and 54 instead of 58 and 45. Find correct mean.

A 68

B 36

☒ C 44.64

D 52

Incorrect	Correct
85	58
54	45

$$\sum x = n \bar{x} = 100 \times 45 = 4500$$

$$\text{Correct } \sum x = 4500 - 85 - 54 + 58 + 45 = 4464$$

$$\bar{x} = \frac{4464}{100} = 44.64$$

Question



$$\bar{X} = \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2}$$

#Q. The mean of a group X is 70 and the mean of group Y is 85. If the number of observations in group Y is five times that of group X, then the combined mean of both the groups is:

$$\begin{aligned} C.M &= \frac{n_x \times 70 + 5n_x \times 85}{6n_x} \\ &= \frac{n_x (70 + 85 \times 5)}{6n_x} \\ &= 82.5 \end{aligned}$$

$$\begin{aligned} \bar{X} &= 70, \bar{Y} = 85 \\ n_x & \quad n_y = 5n_x \end{aligned}$$

A 75

B 80

C 77.5

☒ D 82.5

#Q. The Median of the following frequency distribution is:

x	0-10	10-20	20-30	30-40	40-50
f(x)	8	30	40	12	10

A 33

B 22.5

C 23

D 24

#Q. A company's past 10 years average earnings is ₹ 40 crores. To have the same average earning for 11 years including these 10 years, how much earning must be made by the company in the eleventh year ?

☒ **A** ₹ 40 crores

☐ **B** ₹ 40 $\times \frac{10}{11}$ crores

☐ **C** More than ₹ 40 crores

☐ **D** None

$$\begin{array}{l} n=10, \bar{x}=40 \\ +1 \quad \downarrow \\ n=11 \quad \bar{x}=40 \\ \textcircled{x_{11} = \bar{x} = 40} \end{array}$$

#Q. In a class of 11 students, 3 students were failed in a test. 8 students who passed secured 10, 11, 20, 15, 12, 14, 26 and 24 marks respectively. What will be the median marks of the students

A 12

B 15

C 13

D 13.5

Ascending $\rightarrow x_1, x_2, x_3, 10, 11, 12, 14, 15, 20, 24, 26$

$$n=11$$

$$M = \left(\frac{11+1}{2} \right)^{\text{th}} \text{ obs} = 6^{\text{th}} \text{ obs} = 12$$

#Q. The mean salary of a group of 50 persons is ₹ 5850. Later on it is discovered that the salary of one has been wrongly taken as ₹ 8000 instead of ₹ 7800. The corrected mean salary is

- A** 5854
- B** 5846
- C** 5640
- D** None

#Q. The algebraic sum of the deviations of set of values from their arithmetic mean is

A > 0

B < 0

C $= 0$

D None

① $\sum (x - \bar{x}) = 0$

② $\sum (x - \bar{x})^2 \Rightarrow \text{Minimum}$

③ $\sum (x - m) \rightarrow \text{Minimum}$

Dispersion

Absolute

- ① Range
- ② Mean Dev.
- ③ Standard dev.
- ④ Quartile dev.

Relative

- Coeff. of Range
- C.O.M.D
- C.O.V
- C.O.Q.D

$$\text{Range} = L - S$$

$$\text{C.O.R} = \frac{L - S}{L + S} \times 100$$

$$\text{S.D} \rightarrow \sigma$$

$$\text{Variance} = \sigma^2 = \frac{\sum (x_i - \bar{x})^2}{n} \quad \text{or} \quad \frac{\sum f_i (x_i - \bar{x})^2}{\sum f_i}$$

$$\sigma^2 = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n} \right)^2$$

M.D

A $\rightarrow$ Central Tendency

$$\text{M.D} = \frac{\sum |x_i - A|}{n}$$

$$\text{or} \quad \frac{\sum f_i |x_i - A|}{\sum f_i}$$

$$\text{C.O.MD} = \frac{\text{M.D}(A)}{A} \times 100$$

Properties

	R	MD	SD	QD
① change of origin	No	No	No	No
② change of scale	KR	KMD	KSD	KQD
③ All obs. are same	0	0	0	0
④ $y = ax + b$	$R_y = a R_x$	$MD_y = a MD_x$	$SD_y = a SD_x$	$QD_y = a QD_x$

$$C.O.V = \frac{\sigma}{\bar{x}} \times 100$$

$$QD = \frac{Q_3 - Q_1}{2}$$

$$C.O.QD = \frac{Q_3 - Q_1}{Q_3 + Q_1} \times 100$$

QUESTION



#Q. If two variables x and y are related by $2X + 3Y - 7 = 0$ and the mean and mean deviation about mean of X are 1 and 0.3 respectively, then the co-efficient of mean deviation of Y about mean is

1 -5

2 4

3 12

4 50

$$|-\frac{a}{b}|$$

$$ax+by+c=0$$

$$y = -\frac{2x}{3} + \frac{7}{3}$$

$$2x+3y-7=0$$

$$2\bar{x} + 3\bar{y} = 7$$

$$2 \times 1 + 3\bar{y} = 7$$

$$\bar{y} = 1.67$$

$$\bar{x} = 1, M.D = 0.3$$

$$M.D(Y) = |-\frac{2}{3}| \times 0.3$$

$$= \frac{2}{3} \times 0.3 = 0.2$$

$$C.O.M.D(Y) = \frac{M.D(Y)}{\bar{y}} \times 100$$

$$= \frac{0.2}{1.67} \times 100$$

$$= 11.9$$

QUESTION



#Q. If X and Y are related as $3X - 4Y = 20$ and the quartile deviation of X is 12, then the quartile deviation of Y is :

$$\begin{aligned} QD(Y) &= \left| \frac{-3}{-4} \right| QD_X \\ &= \frac{3}{4} \times 12 \\ &= 9 \end{aligned}$$

1 14

2 15

3 16

4 9

QUESTION



#Q. Suppose a population A has 75 observations 26, 27, 28, ..., 100 and another population B has 75 observations 61, 62, 63, 135. If V_A and V_B represents the variance of the two populations respectively, then $V_A / V_B = :$

1 $9/4$

2 1

3 $4/9$

4 None

$$X \rightarrow 26, 27, 28, \dots, 100$$

$$+35 \quad +35 \quad +35 \quad \dots$$

$$Y \rightarrow 61, 62, 63, \dots, 135$$

$$Y = X + 35$$

$$V_A = V_B \quad \frac{V_A}{V_B} = 1$$

QUESTION

#Q. If variance of x is 5, then find the variance of $(2 - 3x)$

$$y = 2 - 3x$$

$$\sigma_x^2 = 5$$

$$\begin{aligned} \sigma_y^2 &= ? = |-3|^2 \times 5 \\ &= 9 \times 5 \\ &= \boxed{45} \end{aligned}$$

1 10

2 45

3 5

4 -13

QUESTION

#Q. All items are taken under consideration in the calculation of ...

- 1 Mode ✗
- 2 Median ✗
- ~~3 Mean~~
- 4 None

QUESTION



#Q. GM is defined only with

$$GM = (x_1 \times x_2 \times x_3 \dots \times x_n)^{\frac{1}{n}}$$

- 1 All observations have the different sign and none is zero
- 2 All observations have the same sign and ~~one~~ is zero
- 3 All observations have ~~the~~ different sign and one is zero
- 4 All observations have the same sign and none is zero

QUESTION



#Q. Extremes items of the data do not influence the average in case of

1 Median

2 AM

3 GM

4 None

QUESTION



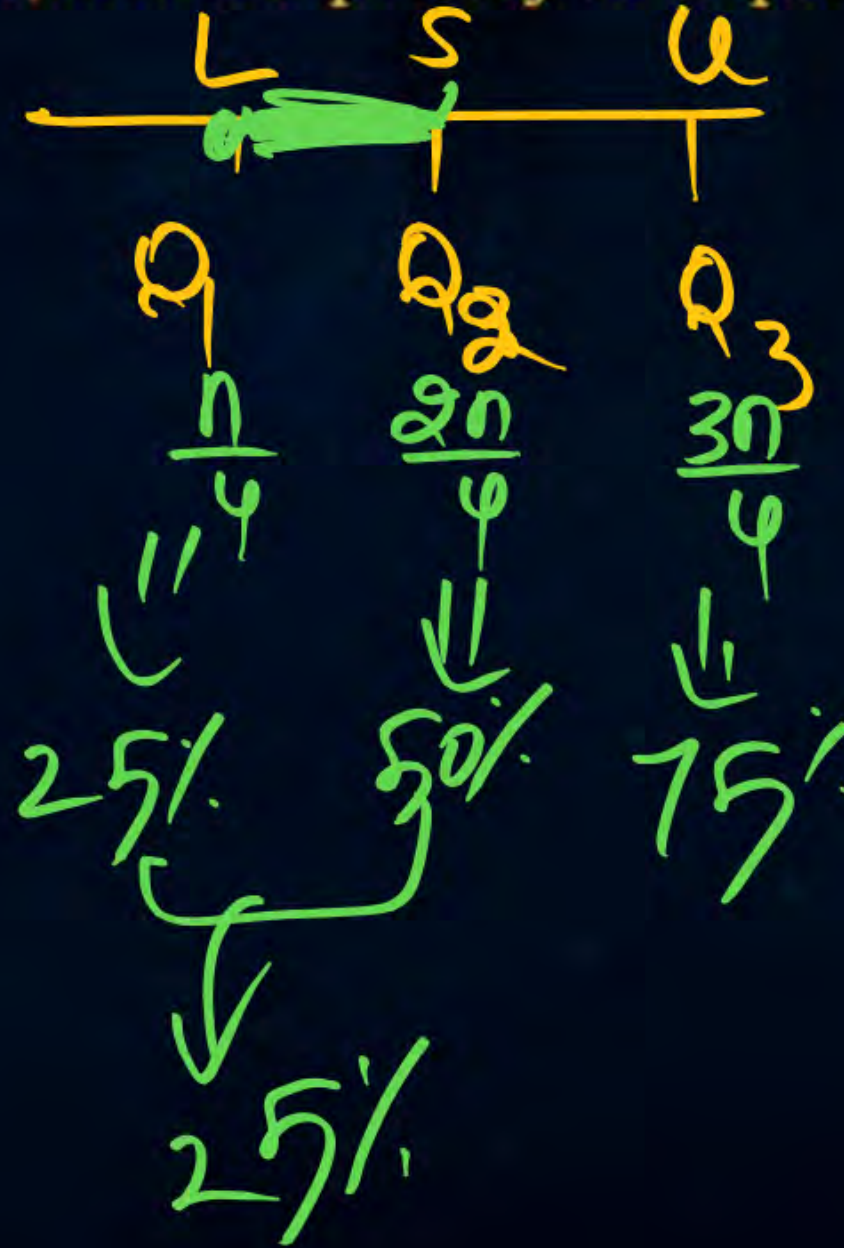
#Q. Between lower and second quartile, the frequency is equal to :

1 $2N/4$

2 $N/4$

3 $3N/2$

4 None



QUESTION



#Q. Which of the following is correct in positively skewed distribution?

Symm. $\rightarrow$ Mean = Med = Mode

Asymm.

+vely skewed

Mean > med > mode

-vely skewed

Mode > Med > Mean

1 Mean = Median = Mode

2 Mean < Median < Mode

3 Mean > Median > Mode

4 None

QUESTION



#Q. If $\sum_1^{10}(X - 50) = 10$, then value of sample mean is :

$$n=10$$

$$\sum(x-50)=10$$

$$\sum x - 50n = 10$$

$$\sum x - 500 = 10$$

$$\sum x = 510$$

$$\bar{x} = \frac{510}{10}$$

$$= 51$$

1 10

2 50

3 51

4 100

QUESTION

#Q. For a certain distribution, if $\sum(X - 20) = 25$; $\sum(X - 25) = 0$; $\sum(X - 30) = -5$, then mean is

$$\sum(x - \bar{x}) = 0$$

1 20

2 25

3 -25

4 35

QUESTION

#Q. Arithmetic mean of first n odd natural numbers is

- 1 $N - 1/2$
- 2 N
- 3 $2N + 1$
- 4 None

QUESTION



#Q. For what value of n , the AM of first n natural numbers is $(n + 7)/3$

$$\text{sum} = \frac{n(n+1)}{2}$$

$$\bar{x} = \frac{\frac{n(n+1)}{2}}{n} = \frac{n+1}{2} = \frac{n+7}{3}$$

$$3n+3 = 2n+14$$

$$\underline{n=11}$$

1 11

2 8

3 13

4 None

QUESTION



#Q. The sum of the squares of deviations of a set of observations has the smallest value, when the deviations are taken from their

☒ 1 AM

☐ 2 HM

☐ 3 GM

☐ 4 None

QUESTION



#Q. For a moderately skewed distribution, which of the following relationship holds?

1 Mean - Median = 3 (Median - Mode)

2 Median - Mode = 3 (Mean - Median)

3 Mean - Mode = 3 (Mean - Median)

4 Mean - Median = 3 (Mean - Mode)

* $\text{Mode} = 3 \text{ Median} - 2 \text{ mean}$

$\text{Mean} - \text{mode} = 3(\text{mean} - \text{med})$

$\text{Diff b/w mean \& mode} = 3(\text{Diff b/w mean \& med})$

QUESTION



#Q. The mean salary for a group of 40 female workers is ₹ 5200 per month and that for a group of 60 male workers is ₹ 6800 per month. What is the combined salary ?

1 6160

2 6280

3 6890

4 6920

QUESTION

#Q. The mean weight of 15 students is 110 kg. The mean weight of 5 of them is 100 kg. and that of another five students is 125 kg., then the mean weight of the remaining students is

1 120

2 105

3 115

4 None

QUESTION



#Q. If the difference between mean and mode is 72, then the difference between Mean and Median will be

- Mean - Mode = 72
- 3 (Mean - Med) = 72
- Mean - Med = $\frac{72}{3} = 24$
- 1 63
 - 2 24
 - 3 23
 - 4 None

QUESTION

#Q. A train covered the first 5 km of its journey at a speed of 30km/hr and next 15 km at a speed of 45 km/hr. The average speed of the train was :

1 38

2 40

3 36

4 42

QUESTION

#Q. For any frequency distribution, the following relation holds :

- 1 $QD = 2/3 SD$
- 2 $MD = 4/5 SD$
- 3 $SD = 5/4 M = 3/2 QD$
- 4 All of the above

QUESTION

#Q. Which measure of dispersion can be computed in case of open – end classes ?

- 1 Standard Deviation
- 2 Range
- 3 Quartile Deviation
- 4 Coefficient of Variation

QUESTION

#Q. What is standard deviation of the following series :

Measurements :	0 – 10	10 – 20	20 – 30	30 – 40
Frequency :	1	3	4	2

1 81

2 7.6

3 9

4 2.26

QUESTION



#Q. Root mean square deviation from means is :

$$S.D = \frac{\sqrt{\sum (x_i - \bar{x})^2}}{n}$$

☒ 1 Standard deviation

☐ 2 Quartile deviation

☐ 3 A and B

☐ 4 None

QUESTION



#Q. If all observations in a distribution are increased by 6, then the variance of the series will be

1 Increased

2 Decreased

3 ~~Unchanged~~

4 None

QUESTION



#Q. Which measure of dispersion is based on the absolute deviation only?

$$MD = \frac{\sum |x_i - A|}{n}$$

- 1 Range
- 2 Standard Deviation
- ☒ 3 Mean Deviation
- 4 Quartile Deviation

QUESTION



#Q. Which of the following is a unit free quantity :

1

Range

$L - S$

2

Standard Deviation

$\frac{\sigma}{\bar{x}} \times 100$

3

Coefficient of Variation

4

Arithmetic Mean

QUESTION



#Q. Which measure of dispersion has some desirable mathematical properties ?

1 SD

2 QD

3 MD

4 All of these

#Q. The arithmetic mean and coefficient of variation of data set x are respectively, 10 and 30. The variance of $30-2x$ is

$$y = 30 - 2x$$

$$\sigma_y = |-2| \times 3 = 6$$

$$\sigma_y^2 = 36$$

$$\bar{x} = 10$$

$$C.V = 30$$

$$\frac{\sigma_x}{\bar{x}} \times 100 = 30$$

$$\frac{\sigma_x}{10} \times 100 = 30$$

$$\sigma_x = 3$$

A 28

B 32

C 34

D 36

#Q. The approximate ratio of SD, MD, QD is

- A** 2 : 3 : 4
- B** 3 : 4 : 5
- C** 15 : 12 : 10
- D** 5 : 6 : 7

#Q. The geometric mean of three numbers 40, 50 and x is 10, the value of x is

$$GM = 10$$
$$(40 \times 50 \times x)^{\frac{1}{3}} = 10$$

$$\cancel{2000}x = \cancel{1000}$$
$$x = \frac{1}{2}$$

A 5

B 4

C 2

D $\frac{1}{2}$

#Q. The wages of 8 workers expressed in rupees are 42, 45, 49, 38, 56, 54, 55, 47.
Find median wage?

- A** 47
- B** 48
- C** 49
- D** None

#Q. If the Standard Deviation of 10 observations is 4 and if each item is divided by -2 then Standard Deviation of new series is

- A** 2
- B** -2
- C** 4
- D** None

#Q. If the relationship between x and y is given by $4x - 6y = 13$ and if the median of x is 16. Find median of y .

- A** 7.5
- B** 8
- C** 8.5
- D** None

#Q. Find Q1 for the following observations: 7, 9, 5, 4, 10, 15, 14, 18, 6, 20

A 4.75

B 5.25

C 5.75

D 6.25

#Q. For a set of 100 observations, taking assumed mean as 4, the sum of the deviations is -11 cm, and the sum of the squares of these deviations is 257 cm². The coefficient of variation is:

A 41.13%

B 42.13%

C 40.13%

D None

$$C.V = \frac{\sigma}{\bar{x}} \times 100$$

$$\sigma^2 = \frac{\sum d^2}{n} - \left(\frac{\sum d}{n} \right)^2$$

$$= 2.57 - 0.0121$$

$$\sigma^2 = 2.5779$$

$$\sigma = 1.599 \approx 1.6$$

$$A = 4$$

$$\sum d = -11$$

$$\sum d^2 = 257$$

$$C.V = \frac{1.6}{3.89} \times 100$$

$$= 41\%$$

$$\begin{aligned} \bar{x} &= A + \frac{\sum d}{n} \\ &= 4 + \frac{-11}{100} \\ &= 4 - 0.11 \\ &= 3.89 \end{aligned}$$

#Q. Mean and S.D. of x is 10 and 5 respectively, Find mean and S.D. of $\frac{x-50}{5}$

$$\bar{x} = 10, \sigma = 5$$

$$y = \frac{x}{5} - 10$$

$$\bar{y} = \frac{10}{5} - 10 = -8$$

$$\sigma_y = \left| \frac{1}{5} \right| 5$$

$$\sigma_y = 1$$

A 1, 0

~~B -8, 1~~

C 1, -1

D None

#Q. If the arithmetic mean between two numbers is 64 and the Geometric Mean between them is 16. The Harmonic mean between them is

$$Am = 64$$

$$Gm = 16$$

$$G^2 = AH$$

$$(16)^2 = 64 \times H$$

$$\frac{256}{64} = H = 4$$

A 64

B 4

C 16

D 40

Question



$$Q.D = \frac{Q_3 - Q_1}{2}$$

$$Q_2 = ?$$

#Q. If the first Quartile is 142 and semi-inter quartile range is 18, then the value of median is:

$$\frac{Q_3 - Q_1}{2} = 18$$

$$Q_3 - 142 = 36$$

$$Q_3 = 178$$

$$\begin{aligned} Q_2 &= \frac{Q_3 + Q_1}{2} \\ &= \frac{178 + 142}{2} \\ &= \underline{\underline{160}} \end{aligned}$$

A 151

B 160

C 178

D None

#Q. If R_x and R_y denote ranges of x and y respectively where x and y are related by $5x - 3y - 10 = 0$, what would be the relation between x and y ?

$$5x - 3y = 10$$

$$R_y : \left| \begin{matrix} -5 \\ -3 \end{matrix} \right| R_x$$

$$3R_y = 5R_x$$

A $R_x = R_y$

B $3 R_x = 5 R_y$

C $5 R_x = 3 R_y$

D None

#Q. If x and y are related as $3x+4y = 20$ and the quartile deviation of x is 16, then the quartile deviation of y is

A 16

B 14

C 10

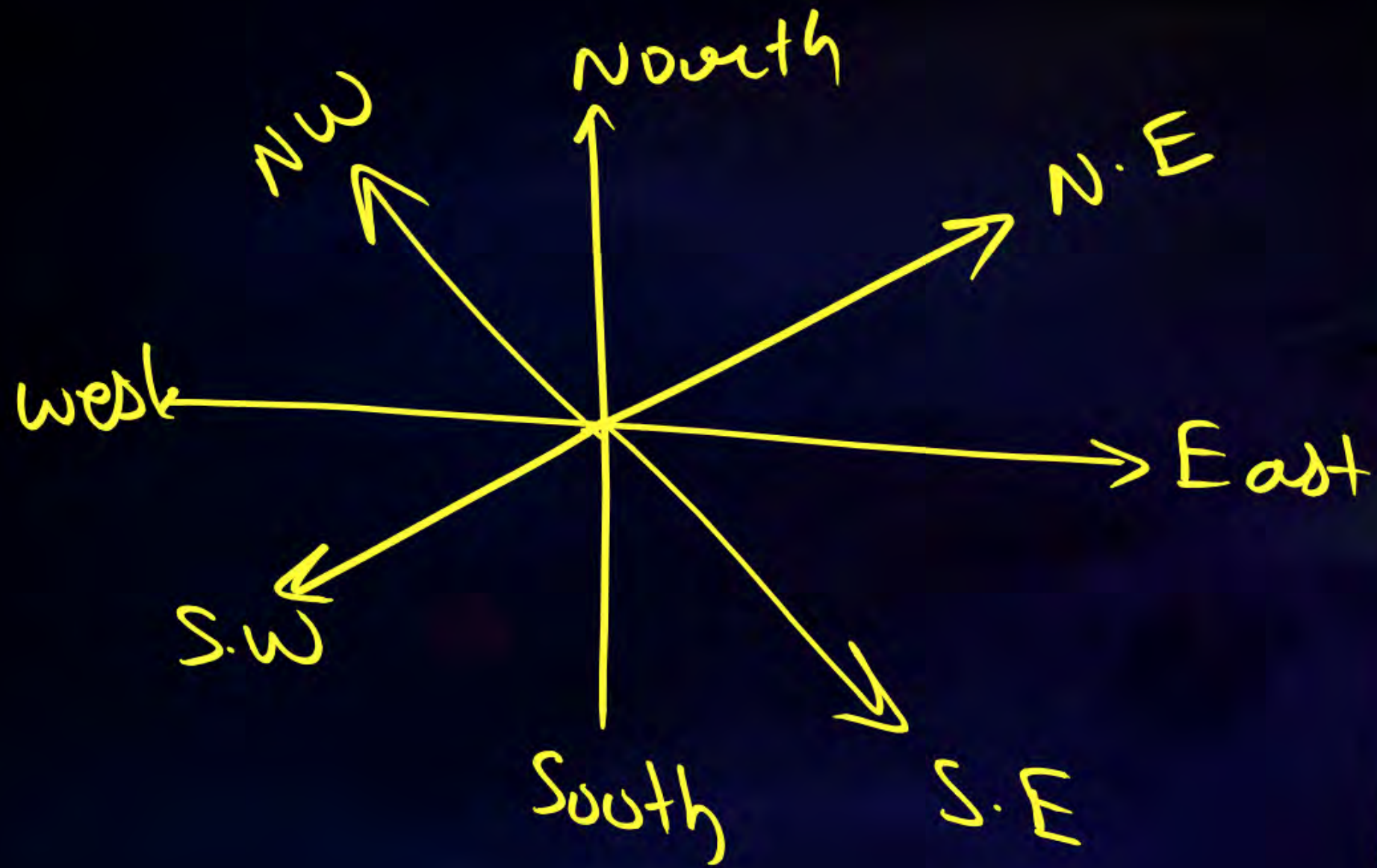
D 12

#Q. What is the coefficient of range for the observations 20, 28, 32, 41, 48, 60?

- A** 50
- B** 20
- C** 40
- D** 200



Direction Test



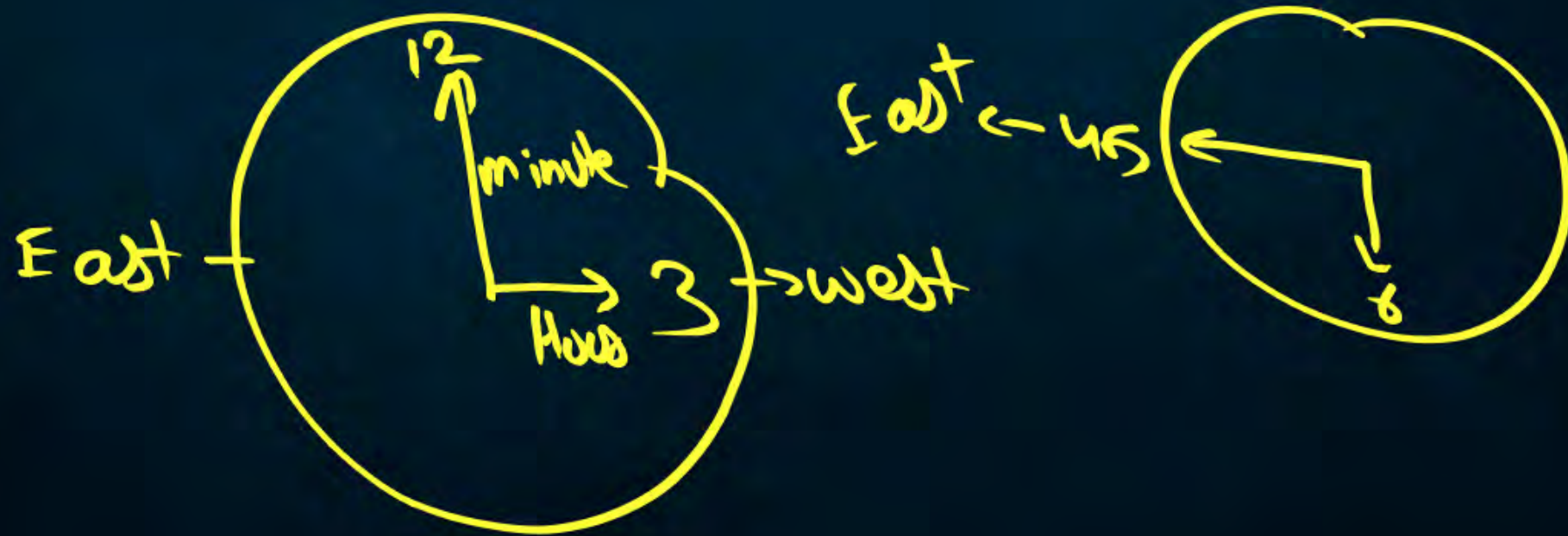


clockwise = $\rightarrow$ Angle

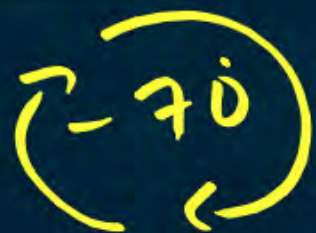
Anti clockwise = Positive Angle

The hour hand of a clock is in west direction when time is 3 o'clock. What is the direction of minutes hand when time is 6:45?

- (a) East
- (b) West
- (c) North
- (d) South

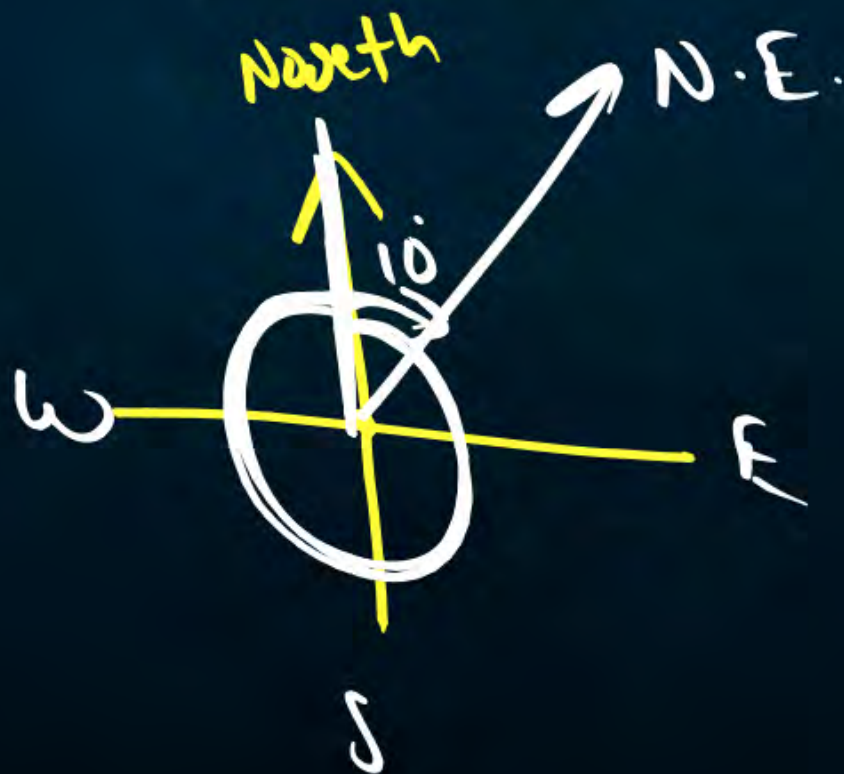


A person facing North moves 70° in clockwise direction. He again moved 300° in clockwise direction. In which direction is he facing now?



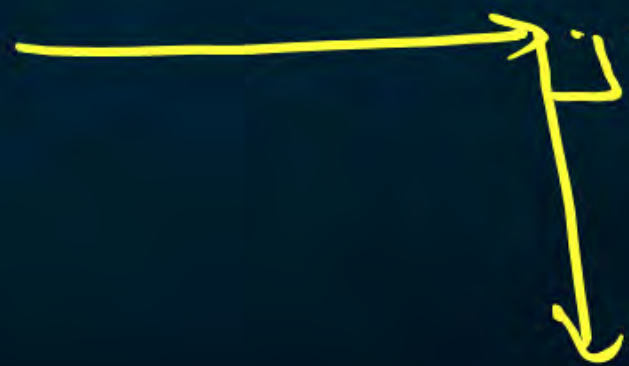
$$-70^\circ - 300^\circ = -370^\circ$$

- (a) North–West
- (b) South–East
- ☒ (c) North–East
- (d) South–West



Shivam started from his house towards West. After walking a distance of 15 km he turned to the right and walked 10 km. He again turned to the right and walked 5 km. After this he is to turn right at 135° and covered 10 km. In which direction he is going now?

- (a) South
- ☒ (b) S-W
- (c) S-E
- (d) North



Right



QUESTION



One day morning after sunrise, Vimal started to walk. During this he met Sheru who was coming from opposite direction. Vimal watch the shadow of Sheru to the right of him (Vimal) to which direction Vimal was facing?

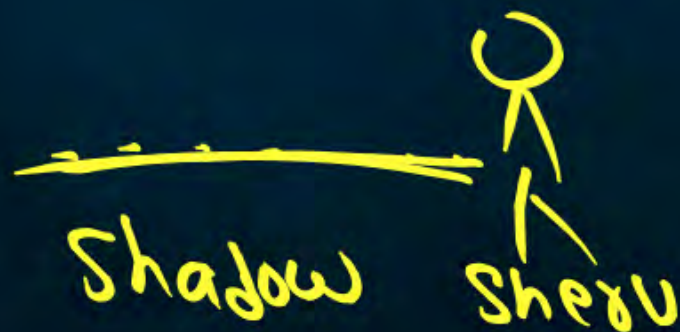


(a) South

(b) North

(c) East

(d) West



QUESTION



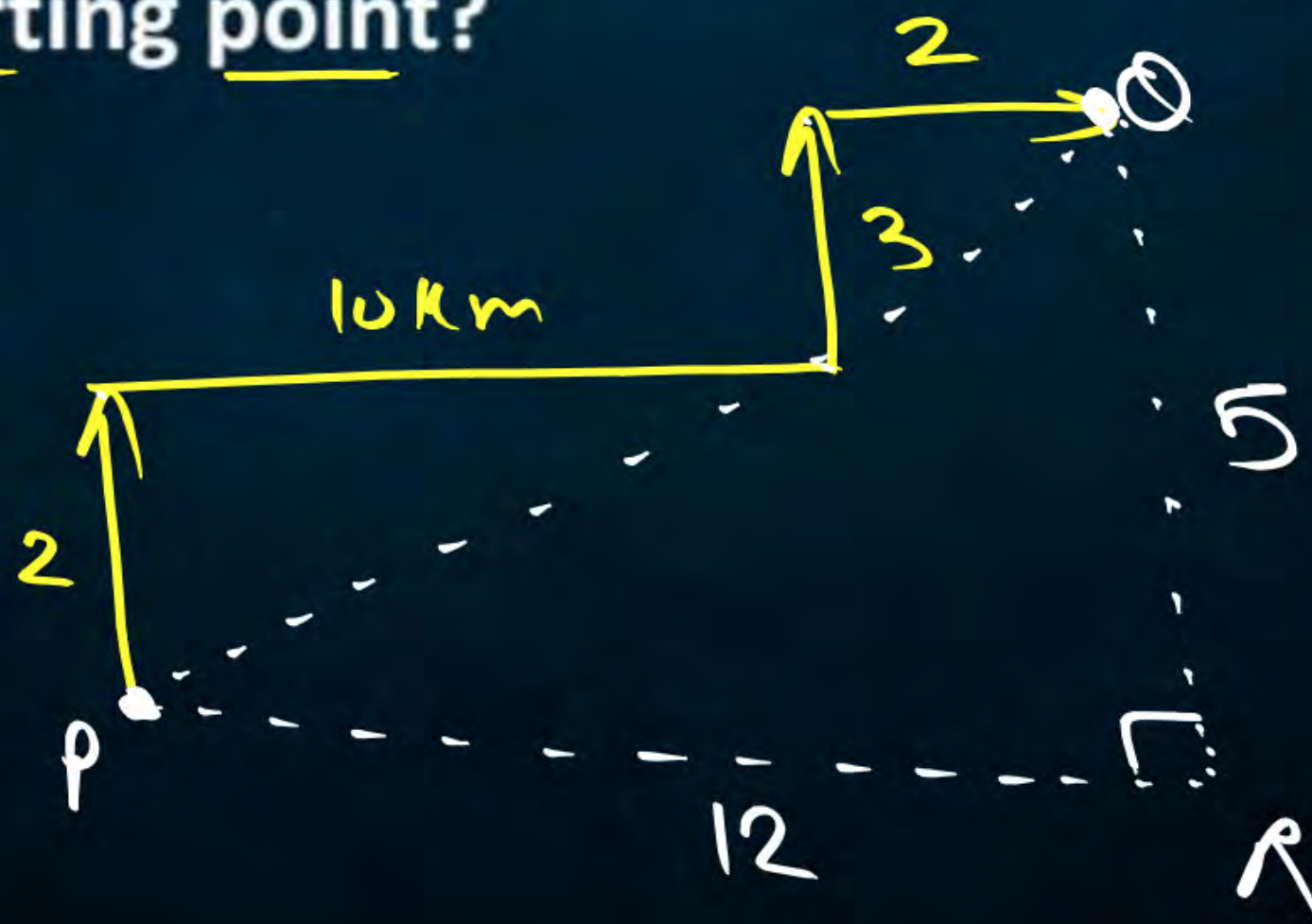
A man walks 2 km towards North. Then he turns to East and walks 10 km. After this he turns to North and walks 3 km. Again he turns towards East and walks 2 km. How far is he from the starting point?

(a) 10 km

(b) 13 km

(c) 15 km

(d) 17 km



$$PQ^2 = PR^2 + RQ^2$$

$$PQ^2 = 12^2 + 5^2$$

$$PQ^2 = 169$$

$$PQ = 13$$

A boy rode his bicycle Northward, then turned left and rode 1 km and again turned left and rode 2 km. He found himself 1 km West of his starting point. How far did he ride Northward initially?

- (a) 1 km
- (b) 2 km
- (c) 3 km
- (d) 4 km



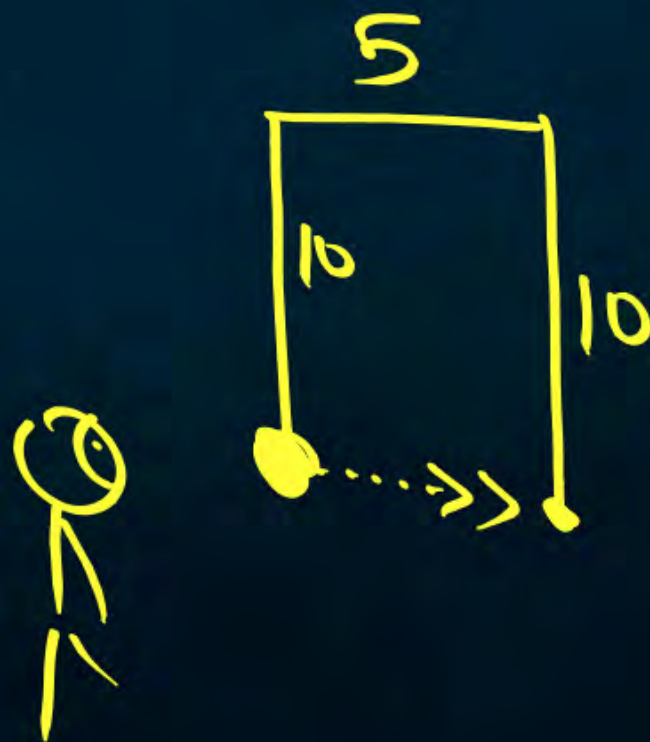
In the morning Anika started walking from a point where her shadow falls in front of her. She walked 2 kms and then turned left and walked 2 kms. Again she turned left and walked 2 kms. In which direction is she now facing?

- (A) East
- (B) West
- (C) South
- (D) North



A man starts walking 10 km to the North. He turns right and walks 5 km, then turns right again and walks 10 km. In which direction is man now from the starting point?

- (A) East
- (B) West
- (C) North
- (D) South



A started walking from his house & walked 4 km north side then turns right & walked 3 km. If he turns right again, what is the direction now?

- (A) North
- (B) West
- (C) East
- (D) South



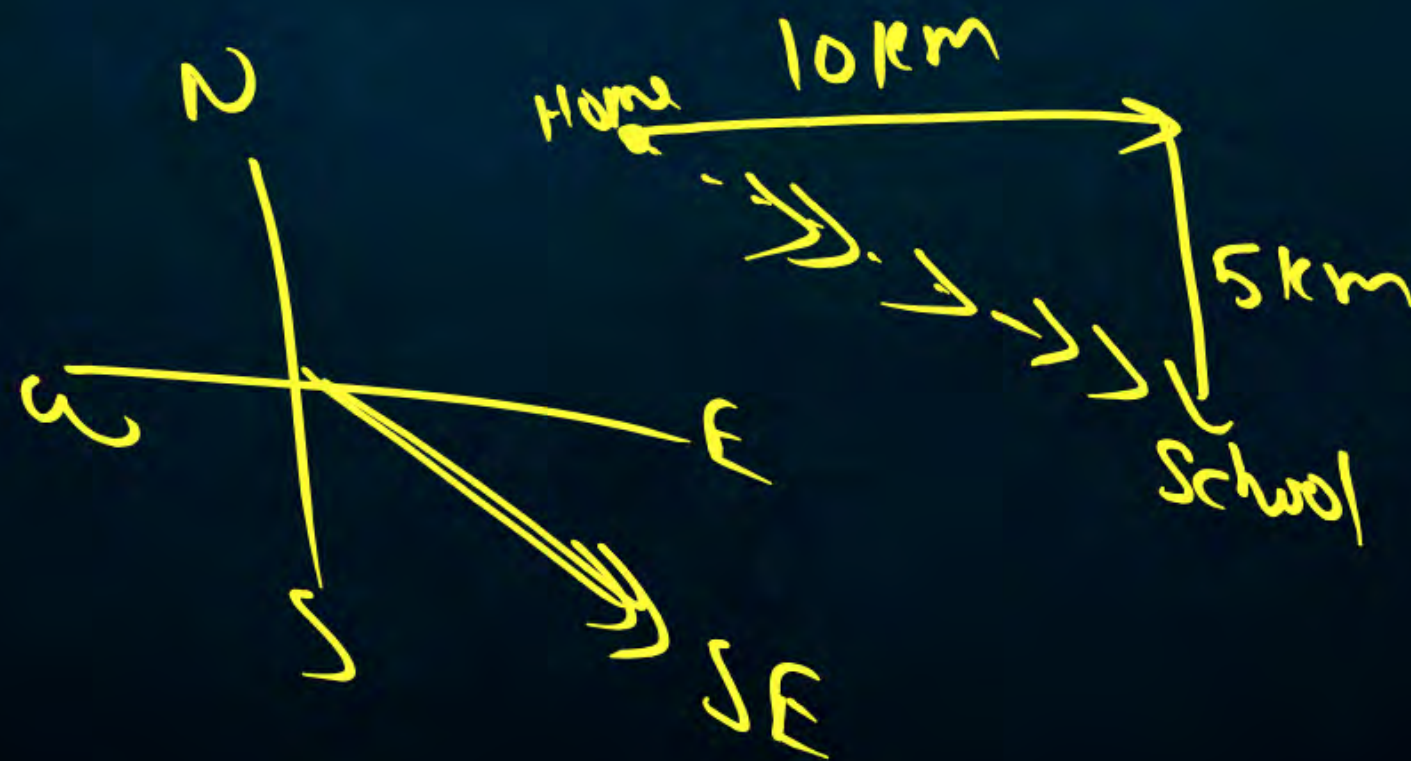
Raju started walking 10 kms towards east from his home. He turned right and walked 5 kms to the south to reach his school. In which direction is his school from his home?

(A) South-East

(B) North-East

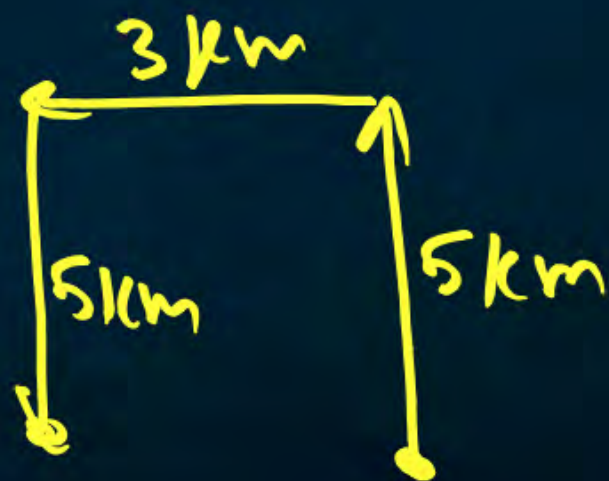
(C) South-West

(D) North-West



Anil started walking 5 kms towards north then he turned left and walked 3 kms. Again he turned left and walked 5 kms. Then the total number of kms he walked is

- (A) 13 kms
- (B) 8 kms
- (C) 3 kms
- (D) 5 kms

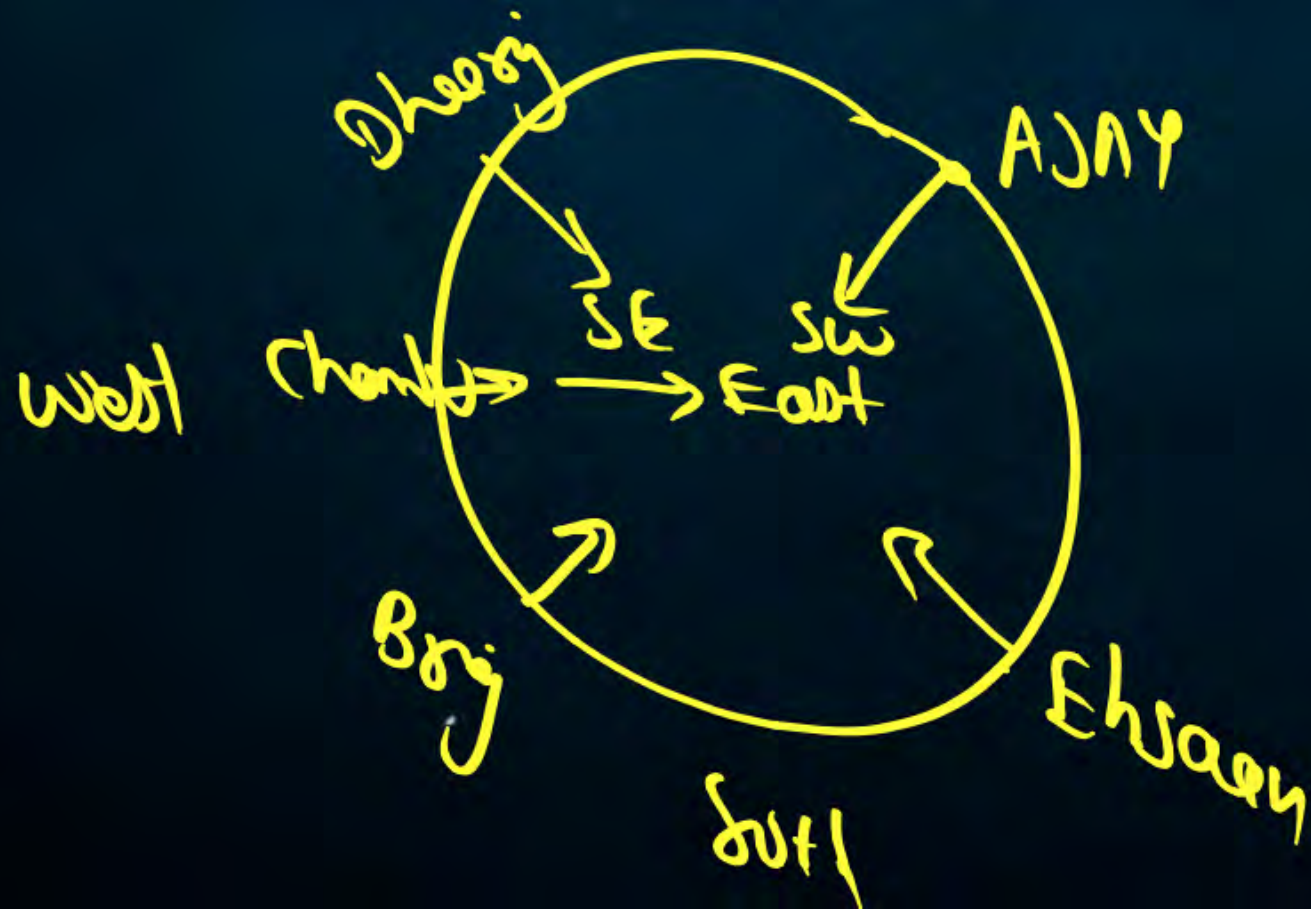


QUESTION



5 Boys Ajay, Brajmohan, Chandru, Dheeraj and Ehsaan are sitting in a part in a circle facing the center. Ajay is facing south west. Dheeraj is facing south east. Brajmohan and Ehsan are right opposite Ajay and Dheeraj respectively and Chandru is equidistant between, Dheeraj and Brajmohan. Which direction is Chandru facing?

- (a) west
- (b) south
- (c) north
- (d) east

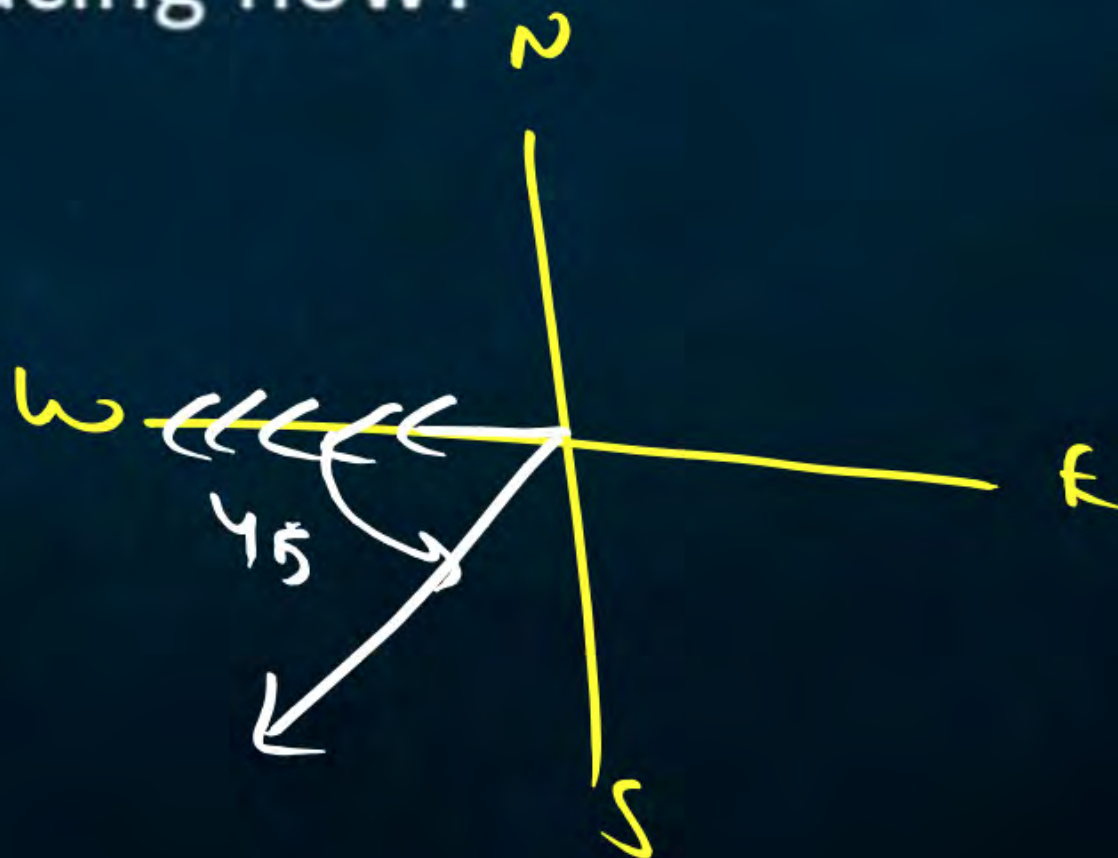


QUESTION



A man is facing West. He turns 45 degree in the clockwise direction and then another 180 degree in the same direction and then 270 degree in the anticlockwise direction. Find which direction he is facing now?

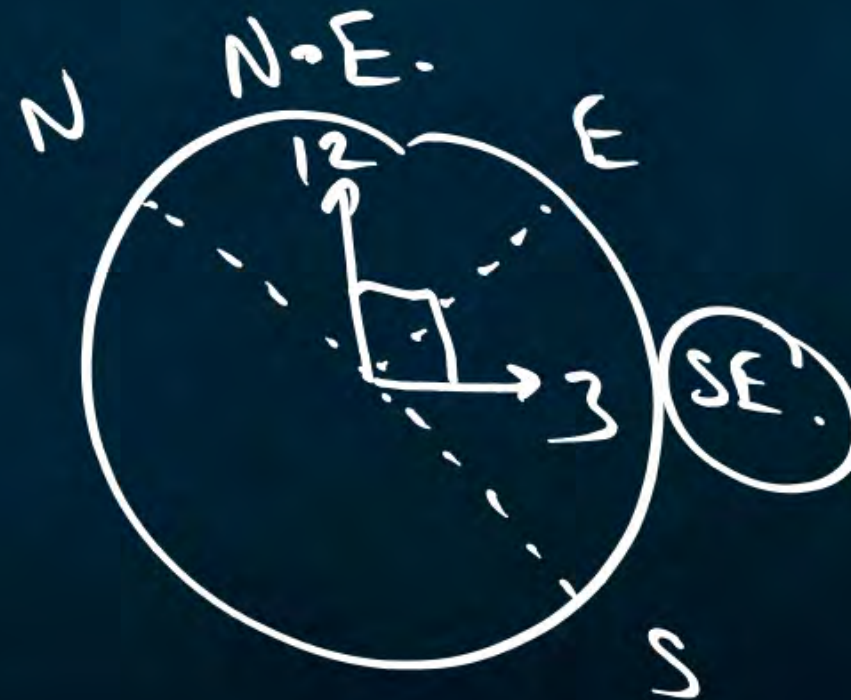
- (a) South-East
- (b) West
- (c) South
- (d) South-West



$$\begin{aligned} & \curvearrowright 45^\circ \\ & -45^\circ - 180^\circ + 270^\circ \\ & = +45^\circ \end{aligned}$$

It is 3 o'clock in a watch. If the minute hand points towards the North-East then the hour hand will point towards the:

- (a) South
- (b) South – West
- (c) North – West
- ☒ (d) South – East



QUESTION



A man can walk by having long, medium and short steps. He can cover 60 meters by 100 long steps, 100 meters by 200 medium steps and 80 meters by 200 short steps, he walks taking 5000 long steps, then he turns left and walk by taking 6000 medium steps. He then turns right and walk by taking 2500 short steps. How far (in meters) is he away from his starting point?

✓ (a) 5000 m

(b) 4000 m

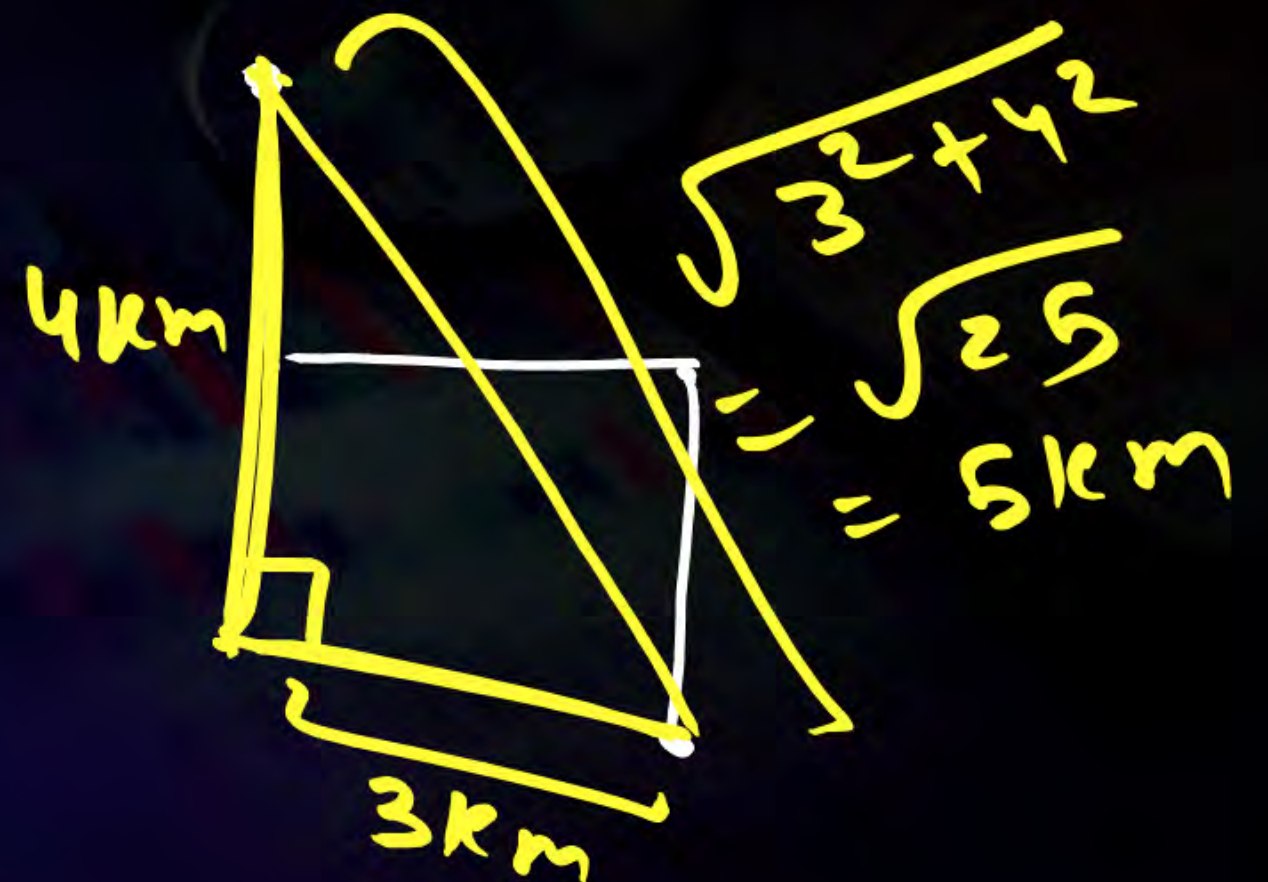
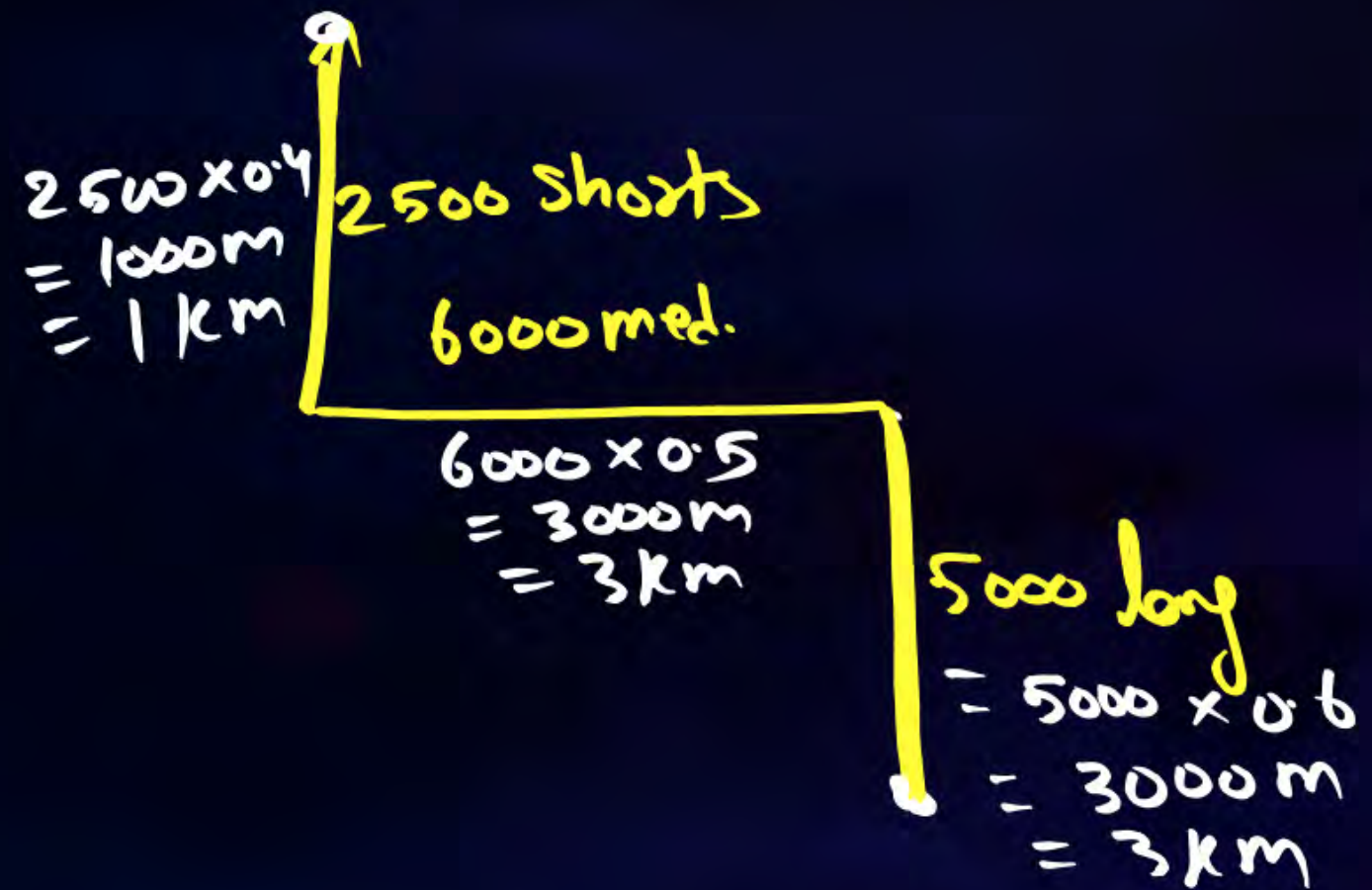
(c) 6000 m

(d) 7000 m

Long step: $100 \text{ long} = 60 \text{ m} \Rightarrow 1 \text{ long step} = 0.60 \text{ m}$

medium step: $200 \text{ medium} = 100 \text{ m} \Rightarrow 1 \text{ med step} = 0.50 \text{ m}$

Short step: $200 \text{ shorts} = 80 \text{ m} \Rightarrow 1 \text{ short step} = 0.40 \text{ m}$





Blood Relation



Immediate Family

English	Hindi
Father	पिता / पापा
Mother	माँ / मम्मी
Brother	भाई
Sister	बहन
Son	बेटा
Daughter	बेटी

Paternal Relatives (Father's Side)

English	Hindi
Grandfather (Father's father)	दादा जी
Grandmother (Father's mother)	दादी जी
Uncle (Father's brother)	चाचा (Younger) / ताऊ (Elder)
Aunt (Father's sister)	बुआ / फूफी
Uncle's wife (Father's brother's wife)	चाची / ताई
Cousin (Uncle's or aunt's child)	चचेरा/चचेरी भाई या बहन



Maternal Relatives (Mother's Side)

English	Hindi
Grandfather (Mother's father)	नाना जी
Grandmother (Mother's mother)	नानी जी
Uncle (Mother's brother)	मामा
Aunt (Mother's sister)	मौसी
Uncle's wife (Mother's brother's wife)	मामी
Cousin (Uncle's or aunt's child)	ममेरा/ममेरी भाई या बहन

In-Laws

English	Hindi
Father-in-law	ससुर
Mother-in-law	सास
Brother-in-law	देवर (Younger) / जेठ (Elder) / साला
Sister-in-law	ननद (Sister-in-law from husband's side) / साली (From wife's side)
Son-in-law	दामाद
Daughter-in-law	बहू

Hindi	English	Relation
भतीजा	Nephew	Brother's son
भतीजी	Niece	Brother's daughter
भांजा	Nephew	Sister's son
भांजी	Niece	Sister's daughter



Step Relatives

English	Hindi
Stepfather	सौतेले पिता
Stepmother	सौतेली माँ
Stepbrother	सौतेला भाई
Stepsister	सौतेली बहन
Half-brother	सौतेला भाई
Half-sister	सौतेली बहन

[male (+)
Female (-)

Husband wife

$A(+) = B(-)$

A is Brother
B is sister

$A(+)$ — $B(-)$

A is father of B

$A(+)$
↓
B

QUESTION



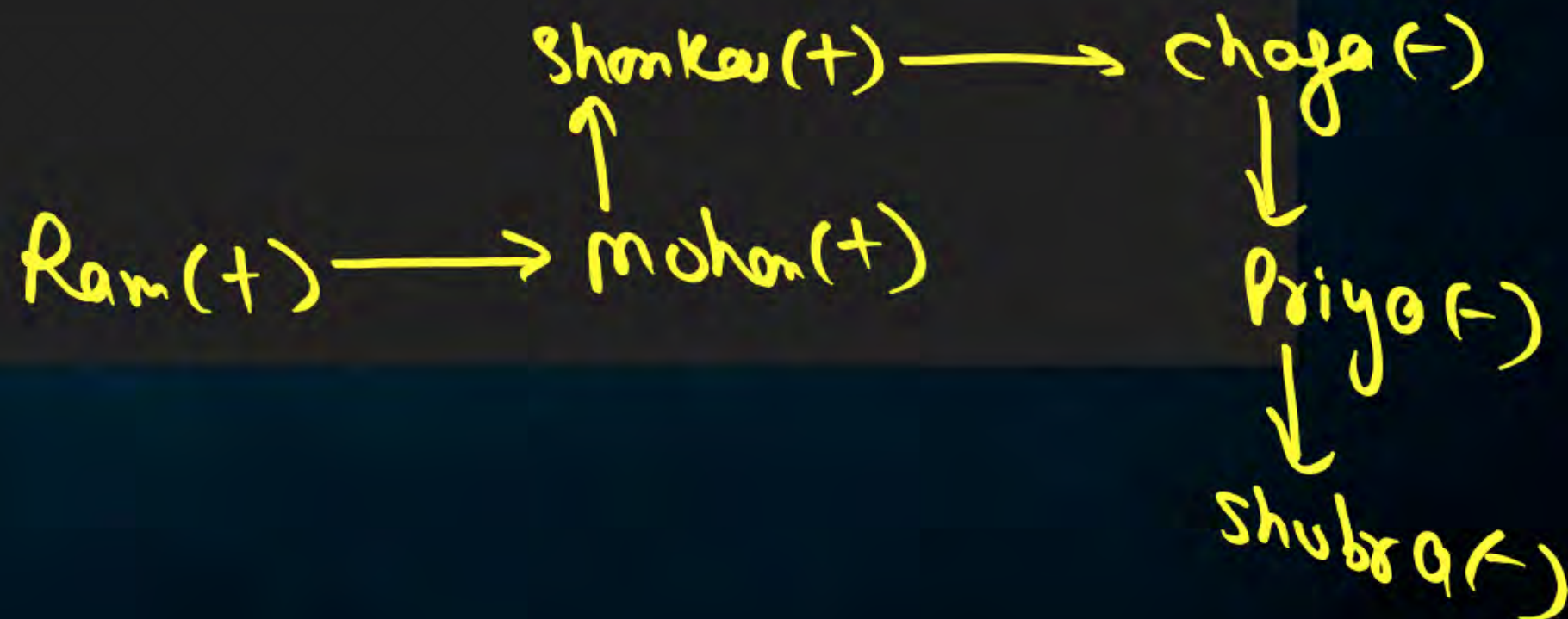
Ram and Mohan are brothers, Shankar is Mohan's father. Chhaya is Shankar's sister. Priya is Shankar's niece. Shubhra is Chhaya's granddaughter. How is Ram related to Shubhra?

(a) Brother X

(b) Uncle ✓

(c) Cousin X

(d) Nephew X



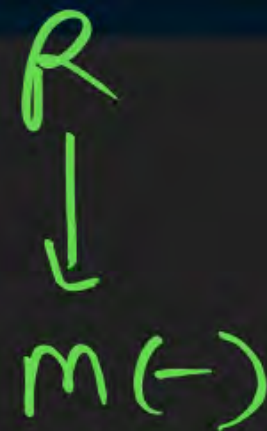
QUESTION



If $P + Q$ means P is the mother of Q;

$P \div Q$ means P is the father of Q;

$P = Q$ means P is the sister of Q;



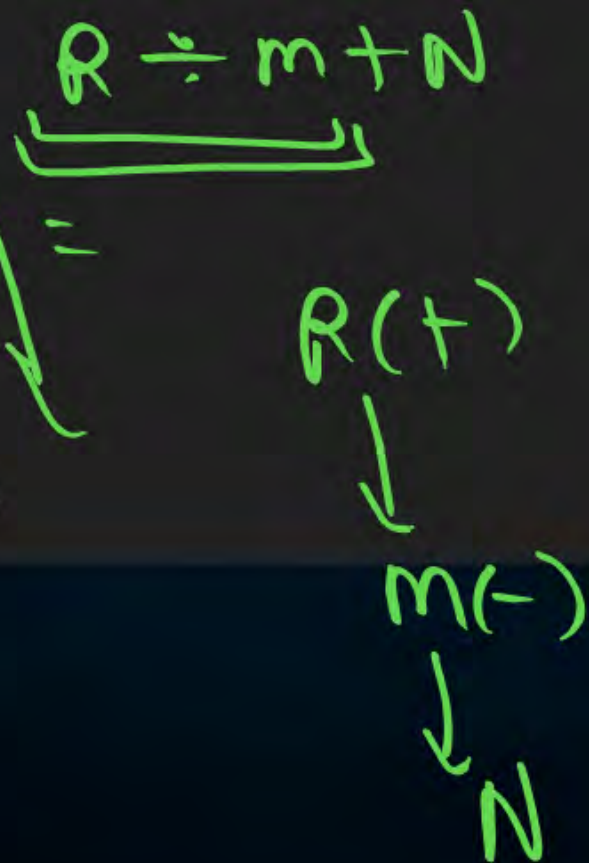
Then which of the following relationships shows that M is the daughter of R?

☒ (a) $R \div M + N$

(b) $R + N \div M$

(c) $R - M \div N$

(d) None of the above

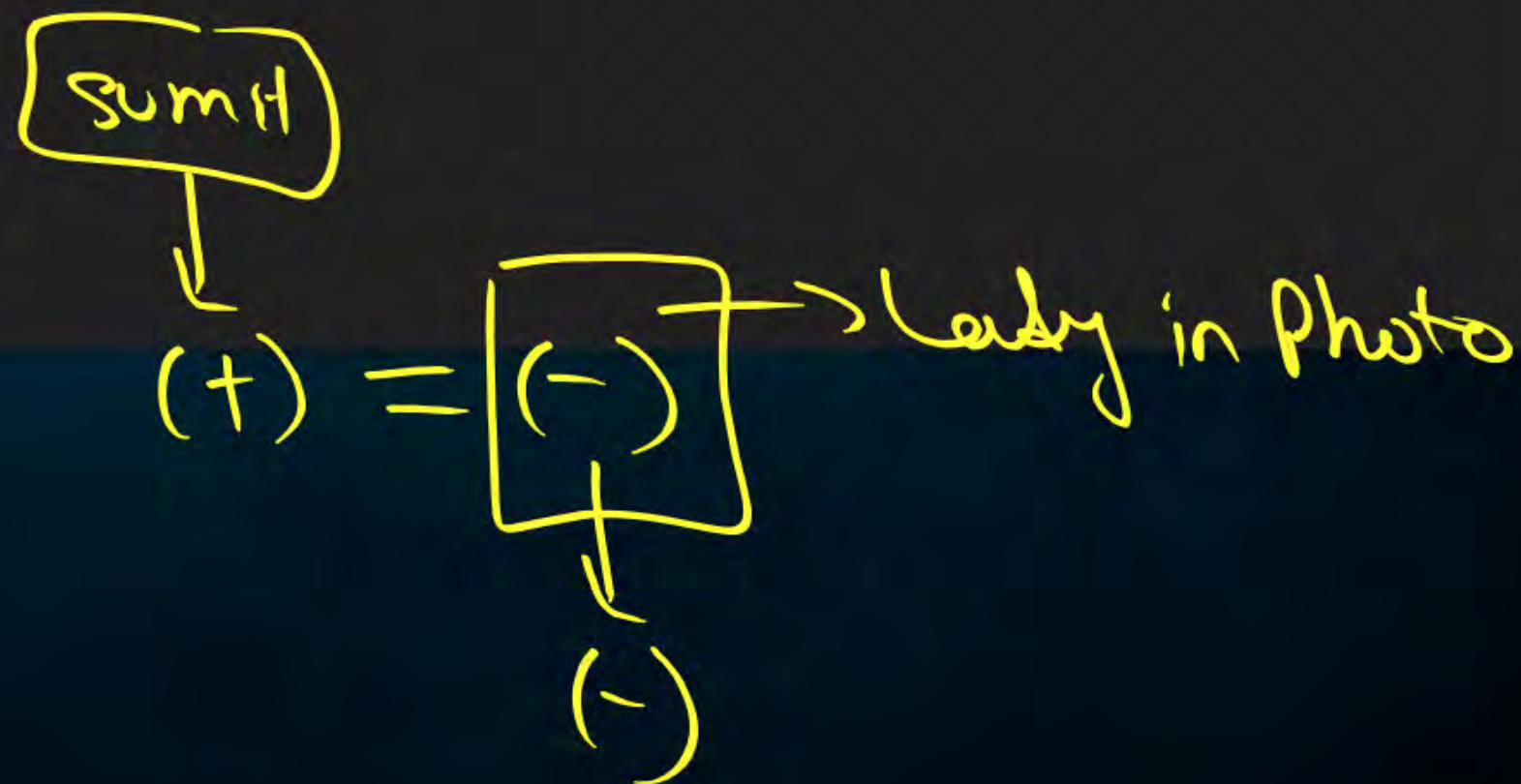


QUESTION



Pointing to a woman in a picture, Sumit said, she is the mother of my son's wife's daughter. How is the lady related to Sumit?

- (a) Uncle X
- (b) Cousin X
- (c) Daughter X
- (d) None

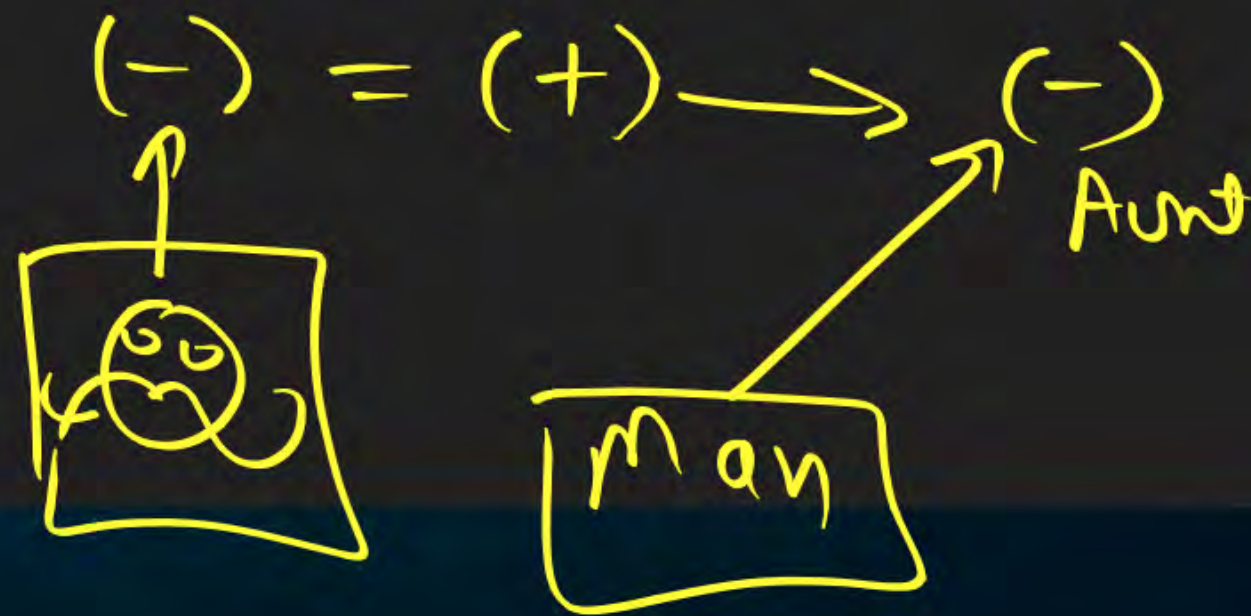


QUESTION



Pointing to a man in a photograph, a man said, "His mother's husband's sister is my aunt." Then what is the relation between that man and him?

- (a) Son
- (b) Uncle
- (c) Nephew
- ☒ (d) Brother



QUESTION



A, B, C, D, E, and F are members of a family. B is the son of A, but A is not the mother of B. A and C are a married couple. F is the brother of A. D is the sister of B. E is the son of C.

How many male members are there in the family?

(a) 1

(b) 2

(c) 3

(d) 4

A	B	C	D	E	F
(+)	(+)	(-)	(-)	(+)	(+)

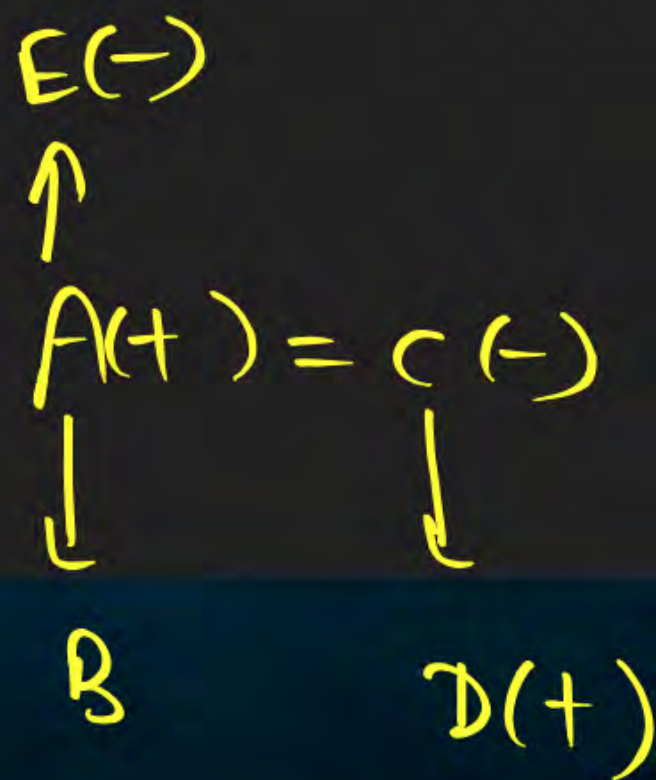
$F(+)$ ← $A(+) = C(-)$
 ↓
 $B(+) \rightarrow D(-) \rightarrow E(+)$

QUESTION



A is B's father. C is B's mother. D is C's son. E is A's mother. Then how is A related to D?

- (A) Uncle
- (B) Grandson
- (C) Granddaughter
- (D) Father

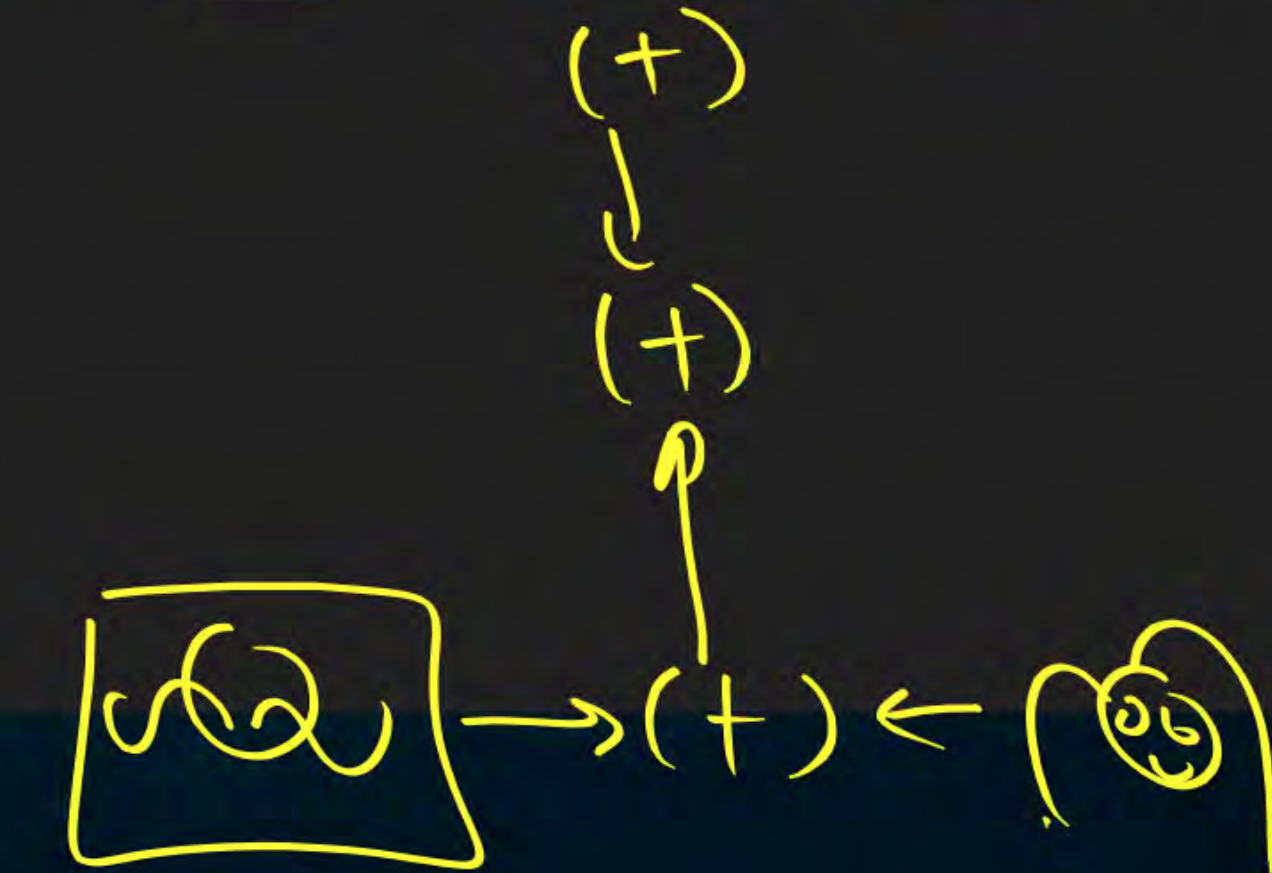


QUESTION



Pointing to a man in a photograph, a woman said, "The father of his brother is the only son of my grandfather." Then how is that woman related to the man in the photograph?

- (A) Daughter
- ☒ (B) Sister
- (C) Mother
- (D) Aunt



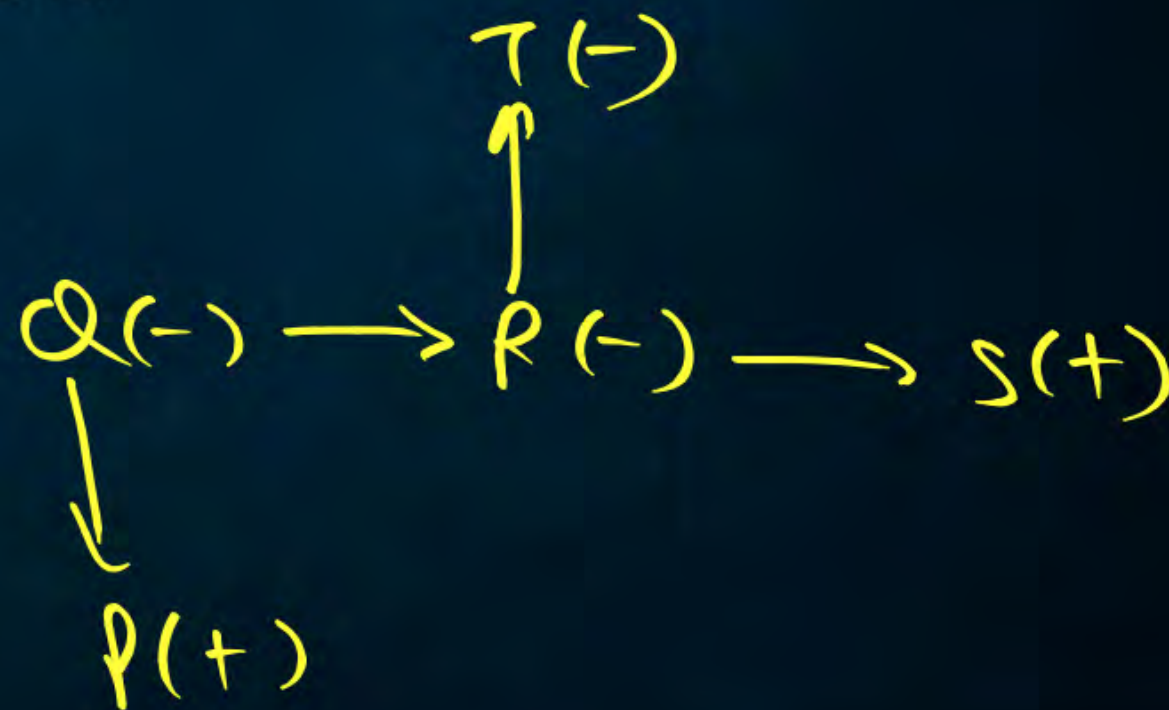
P is the son of Q, while Q and R are sisters to one another. T is the mother of R. If S is the son of T, how is S related to P?

(A) Brother

(B) Cousin

(C) Maternal uncle

(D) Nephew



QUESTION



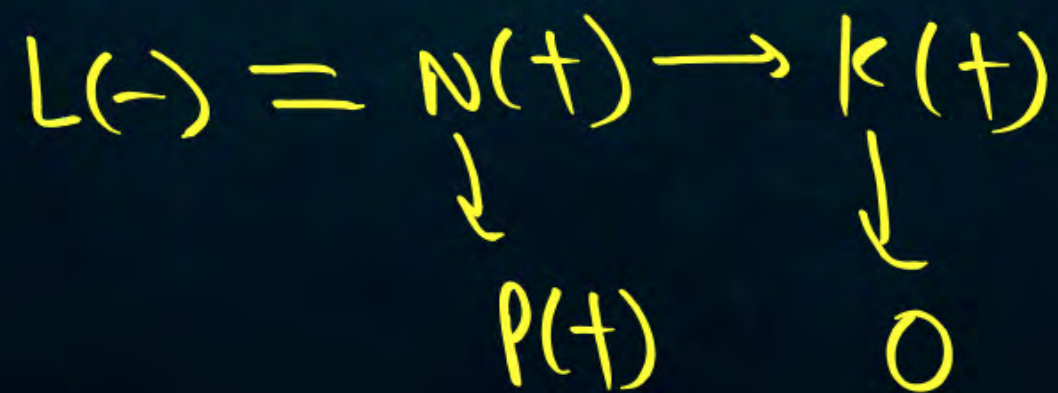
L is wife of N, P is son of N, K is brother of N and father of O. What is the relationship of P and O?

(A) Uncle

(B) Brother

(C) Cousin

(D) Nephew



QUESTION



C is sister of B. D is father of A. A is brother of B. D and E are married couple. How is C related to E?

(A) Daughter

(B) Son

(C) Mother

(D) Father

C — B

$$E(-) = D(+)$$

$$C(-) \rightarrow B \rightarrow A(+)$$

Q, W, E, R, T and Y are members of a family consisting of two children, one of whom is T is a boy. Q and R are brothers and Q is an engineer. E is a doctor married to one of the brothers. W is married to R, and Y is their only child. How T is related to Q?

- (A) Brother
- (B) Father
- (C) Nephew
- (D) Son

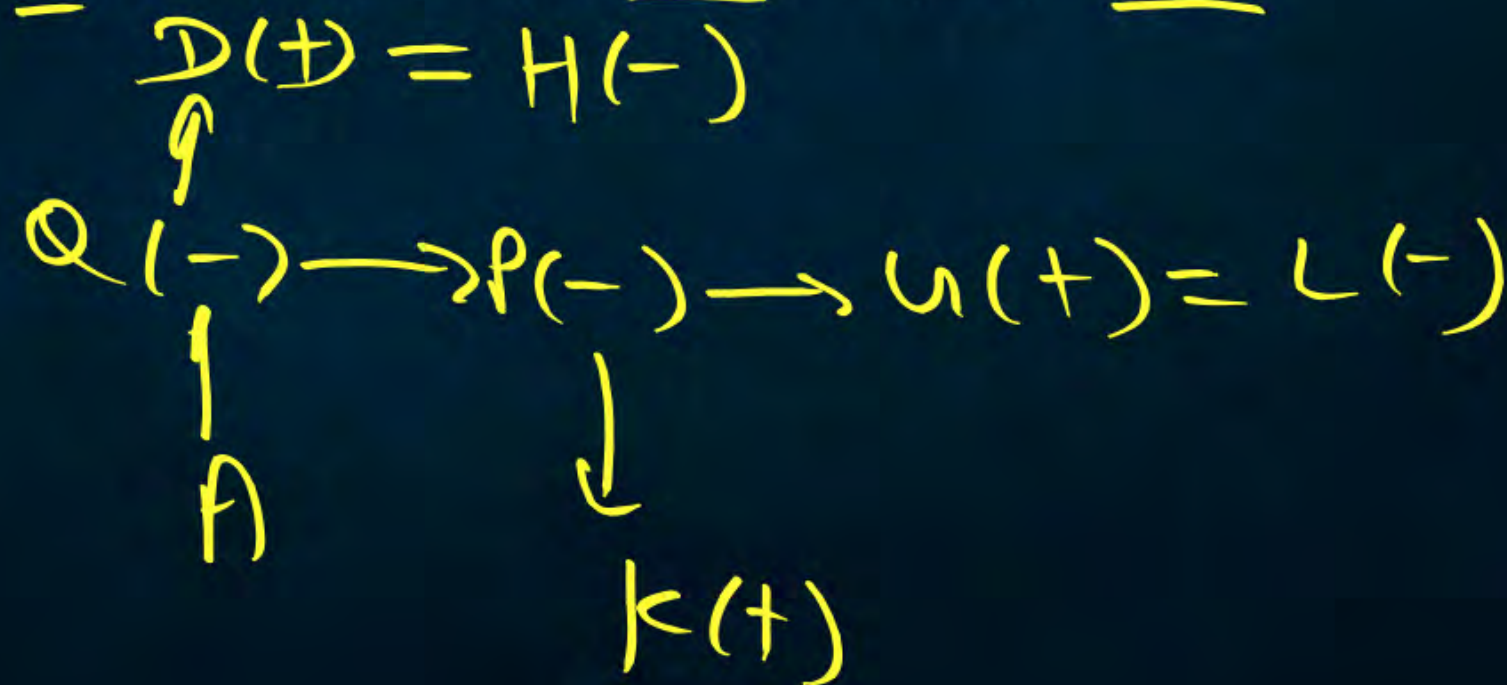
$Q(+) = \text{Engineer}$

$W(-)$
 $E \Rightarrow \text{Doctor}$
 $R(+)$
 $T(+)$

$E(-) = Q(+) \rightarrow R(+) = W(-)$
 $\downarrow$
 $T(+)$
 $\downarrow$
 Y

K is the son of A's mother's sister. Q is daughter of D, who is the father of G and grandfather of A. P is the daughter of H, who is grandmother of K. D is husband of H and G is husband of L. How is P related to Q?

- (A) Sister
- (B) Mother
- (C) Daughter
- (D) Cousin



If "A # B" means A is father of B
 "A * B" means A is brother of B
 "A @ B" means A is mother of B
 then which of the following is
 correct about G @ T # P ?

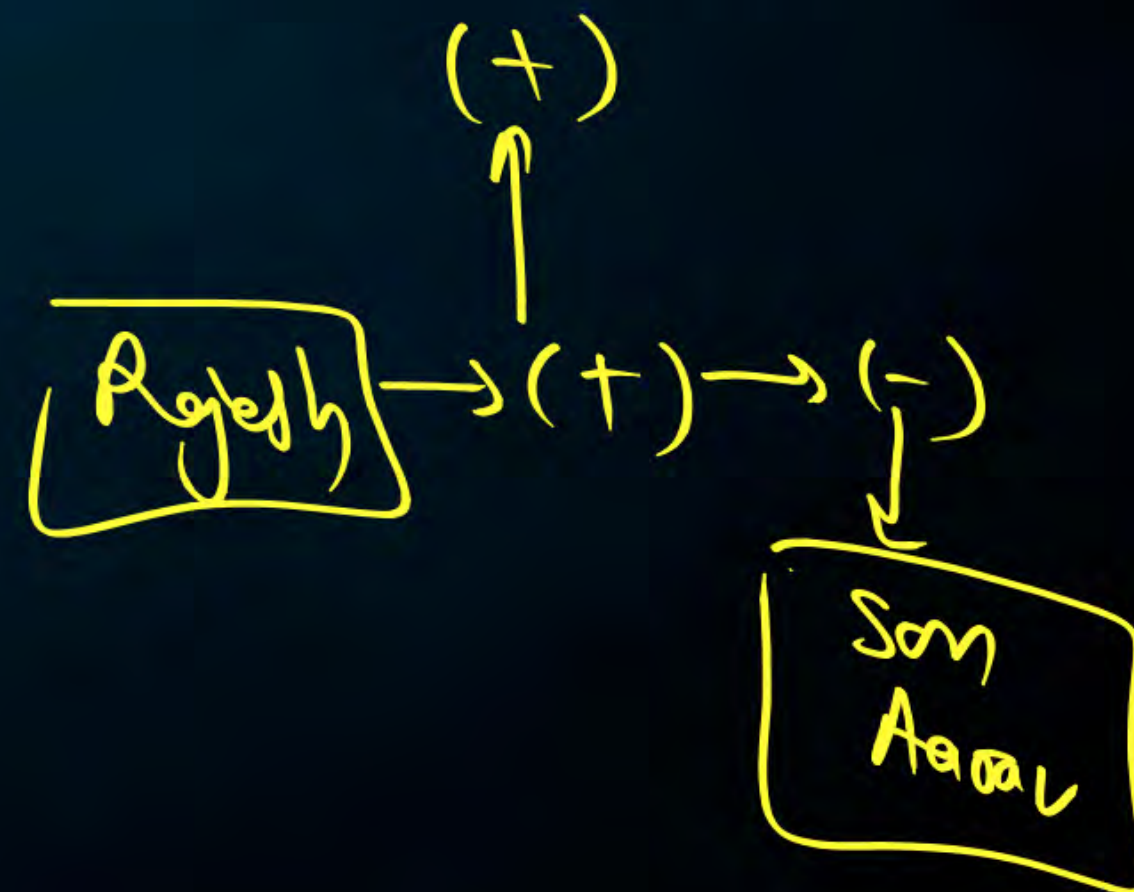
G @ T # P

- ~~(A)~~ P is father of T.
- ~~(B)~~ G is mother of P.
- (C) T is son of G.
- ~~(D)~~ P is brother of T.

G (-)
 ↓
 T (+)
 ↓
 P

Pointing to a photograph, Rajesh said, "He is Aarav and he is the son of the only daughter of the father of my brother", how Rajesh is related to the Aarav referred in the photograph ?

- (A) Brother
- (B) Nephew
- (C) Father
- (D) Maternal Uncle



QUESTION



Study the following information carefully:

- A3P means A is the mother of P.
- A4P means A is the brother of P.
- A9P means A is the husband of P.
- A5P means A is the daughter of P.

Which of the following means that K is the mother-in-law of M?

(A) M9N5K3J

(B) M9N3K4J

(C) K5J9M3N

(D) K3J9N4M

$m = (-)$
 $\uparrow$
 p

$m9n5k3j$
 $\downarrow$
 $m(+) = n(-) \rightarrow j$

LUNCH
BREAK

Till Now

35 marks

Resume
↓

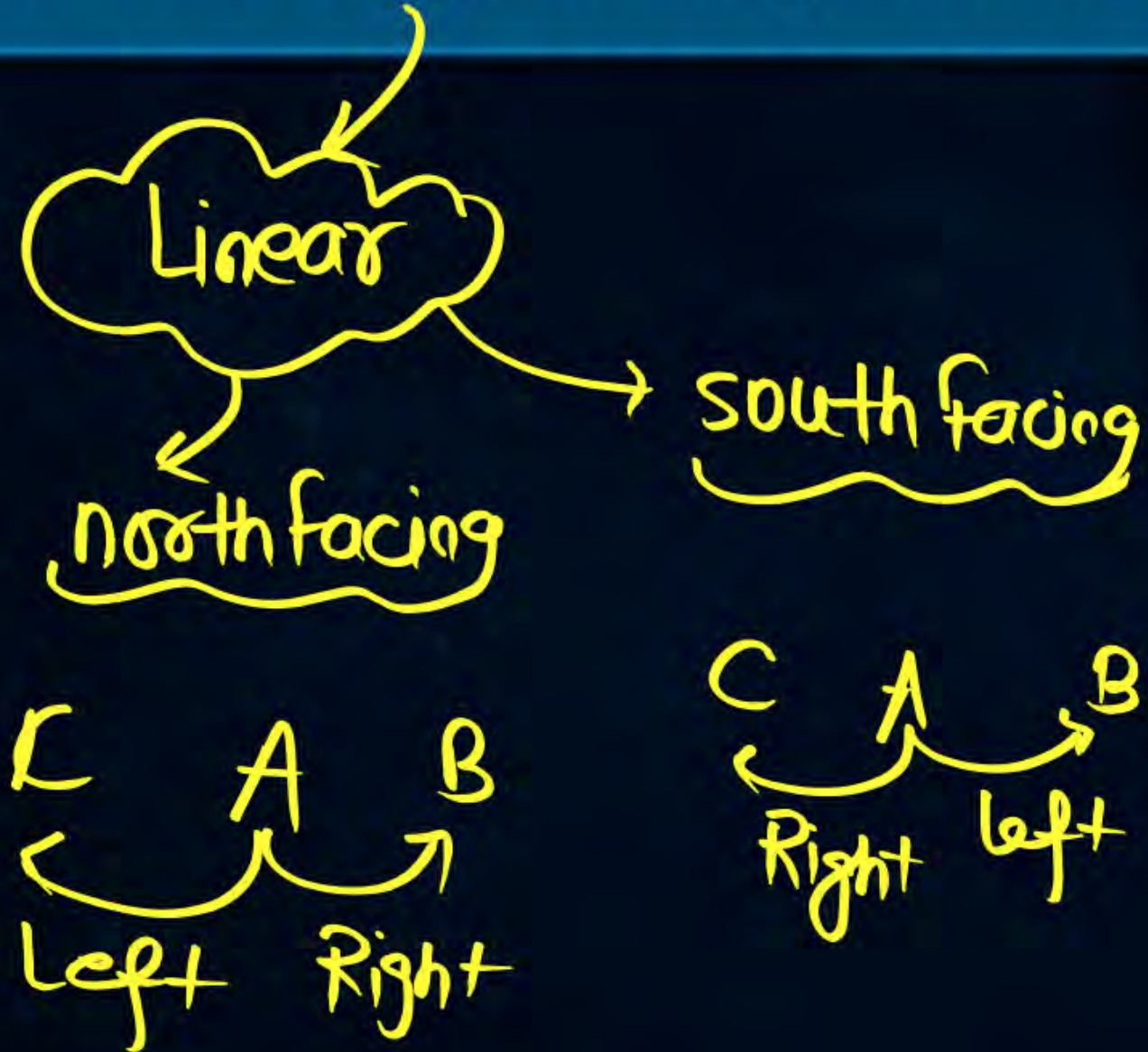
3:20 PM





Topic : Seating Arrangement

5 Marks



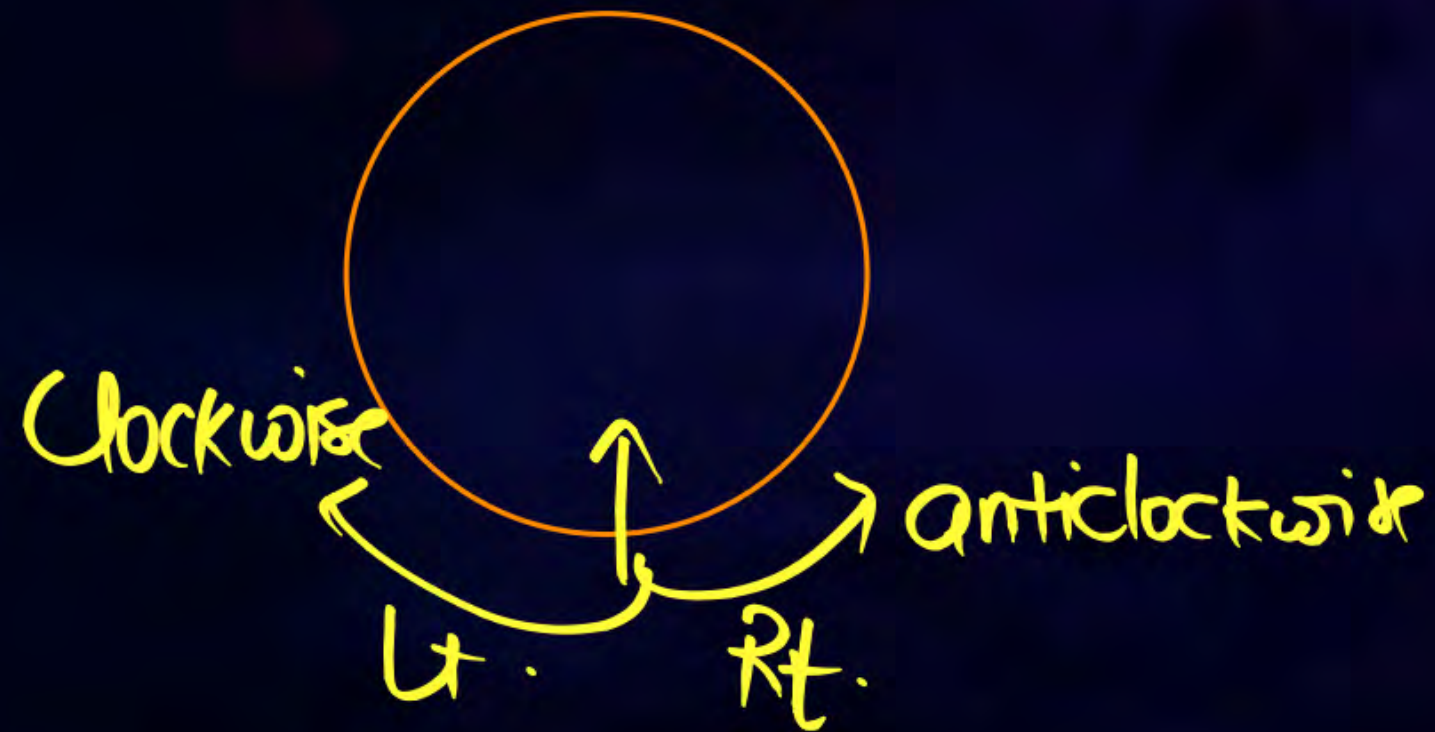
and → pehle wale ki boat

whO → Baad wale ki boat

cellular



Towards Center



QUESTION



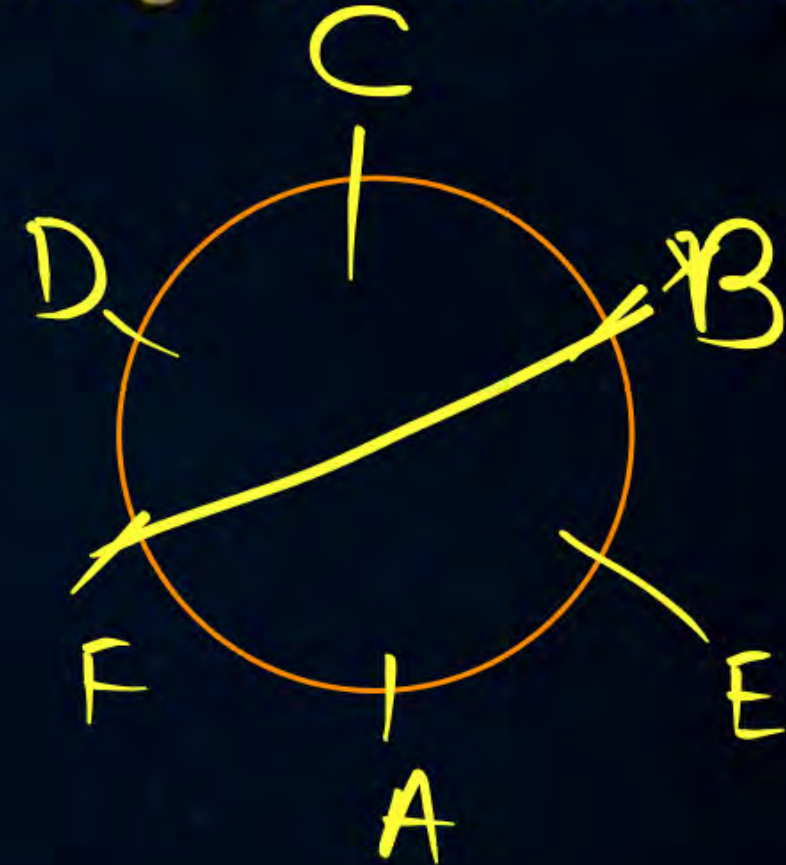
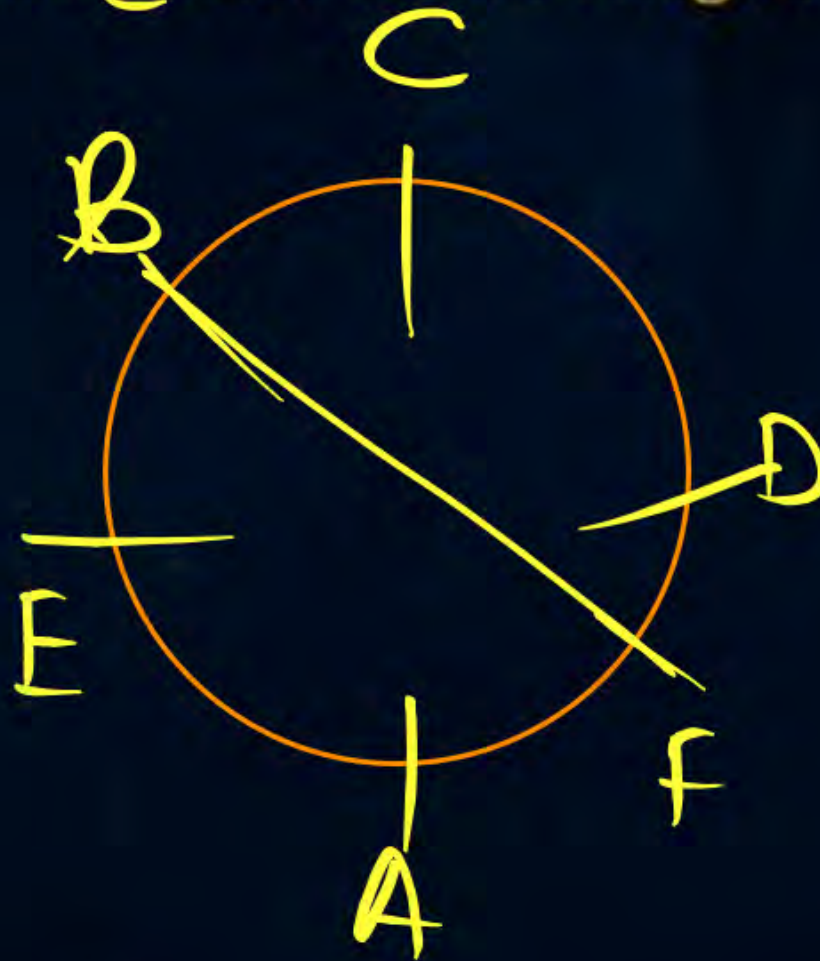
#Q. A, B, C, D, E and F are sitting around a round table. A is between E and F, E is opposite to D, and C is not in either of the neighbouring seats of E. Who is opposite to B?

1 C

2 D

3 F

4 None



#Q. There are five houses P, Q, R, S and T. P is immediate right of Q and T is immediate left of R and immediate right of P. Q is right of S. Which house is right to the middle one.

A P

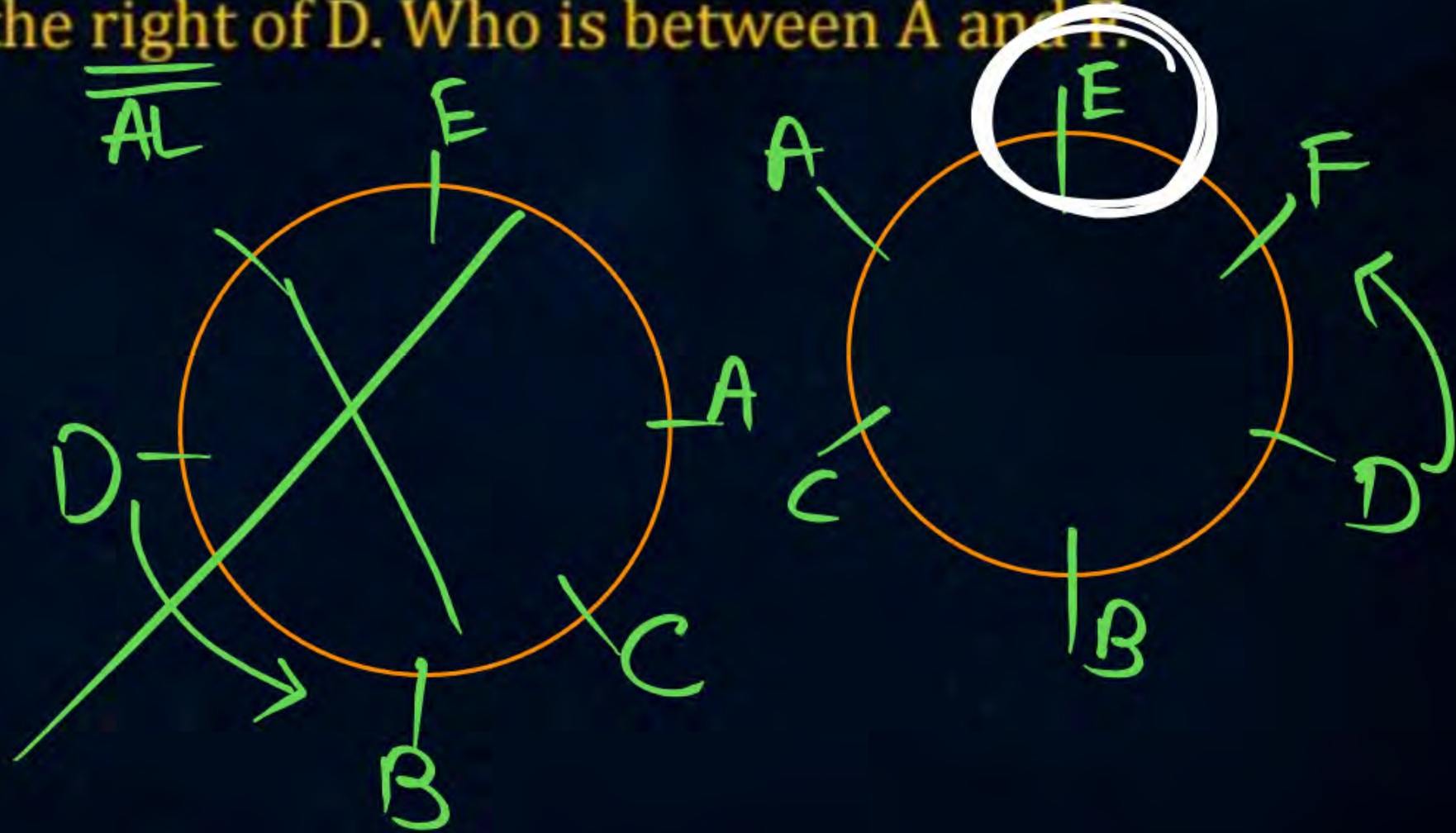
B Q

C R

☒ D None



#Q. Six persons A, B, C, D, E and F are standing in a circle. B is between D and C, A is between E and C. F is to the right of D. Who is between A and E?



A B

B C

C D

D E

#Q. Five children are sitting in a row. S is sitting next to P but not T. K is sitting next to R who is sitting on the extreme left and T is not sitting next to K. Who is/are adjacent to S.

☒ A K and P

☐ B R and P

☐ C Only P

☐ D P and T

R K S P
Tx

R P S K
Tx

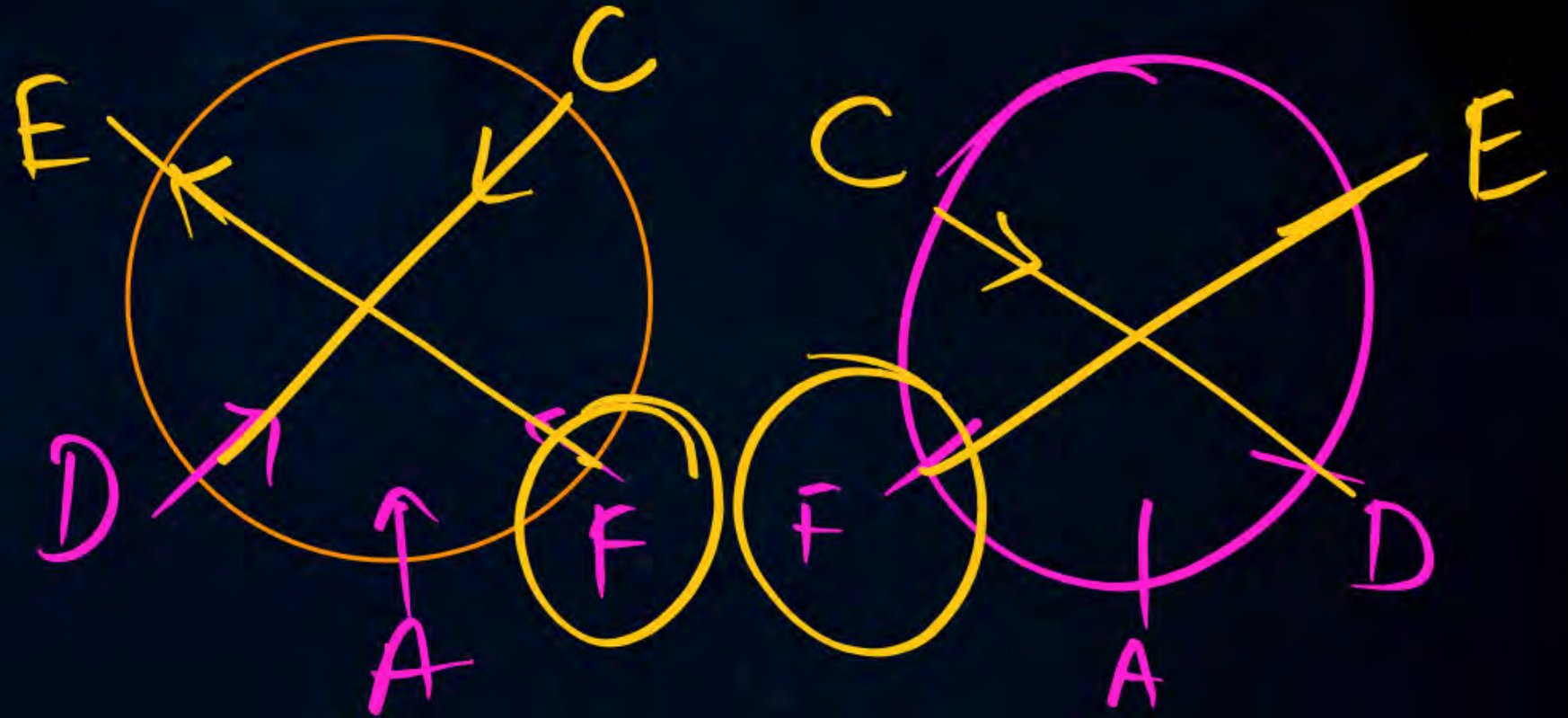
#Q. A is seated between D and F at a round table. C is seated opposite to D. E is round
adjust to D. Who sit opposite to F?

A A

B B

C C

D None



#Q. A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position A is sitting between?

A C and D

B D and E

C B and C

D B and D

~~E A B C D~~

E B A C D



Question



#Q. P, Q, R, S and T are sitting in a line facing West. P and Q are sitting together. R is sitting at south end and S is sitting at North end. T is neighbor of Q and R. Who is sitting in the middle?

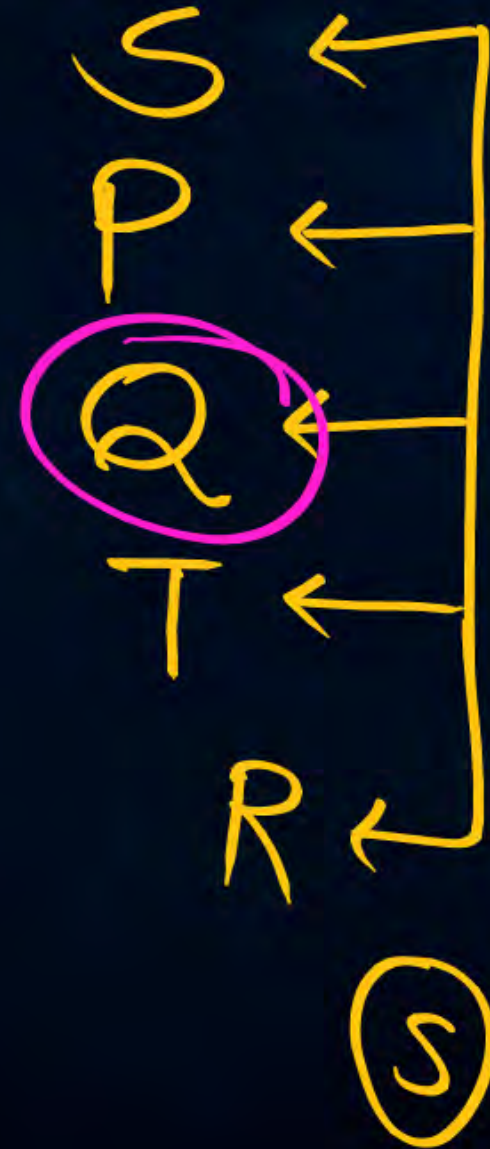
A P

B Q

C R

D S

W



E

Question



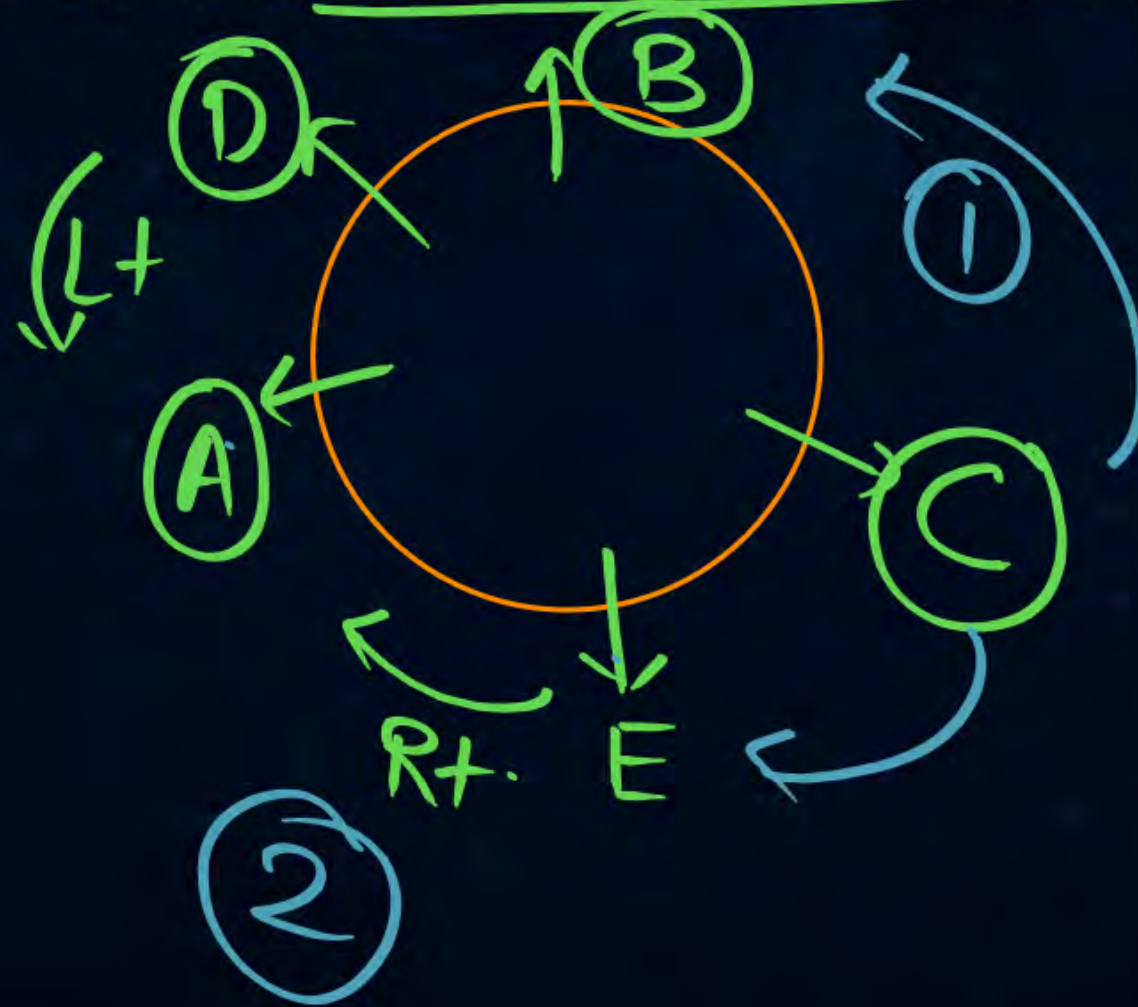
#Q. Five people A, B, C, D, E are seated about a round table facing outside the center but not necessary in the same order. A sits at immediate right of E. C sits third to the left of D, who sits at immediate right of A. How many persons are sitting between C and D? (Jan 2025)

A 1

B 2

C 3

D 4



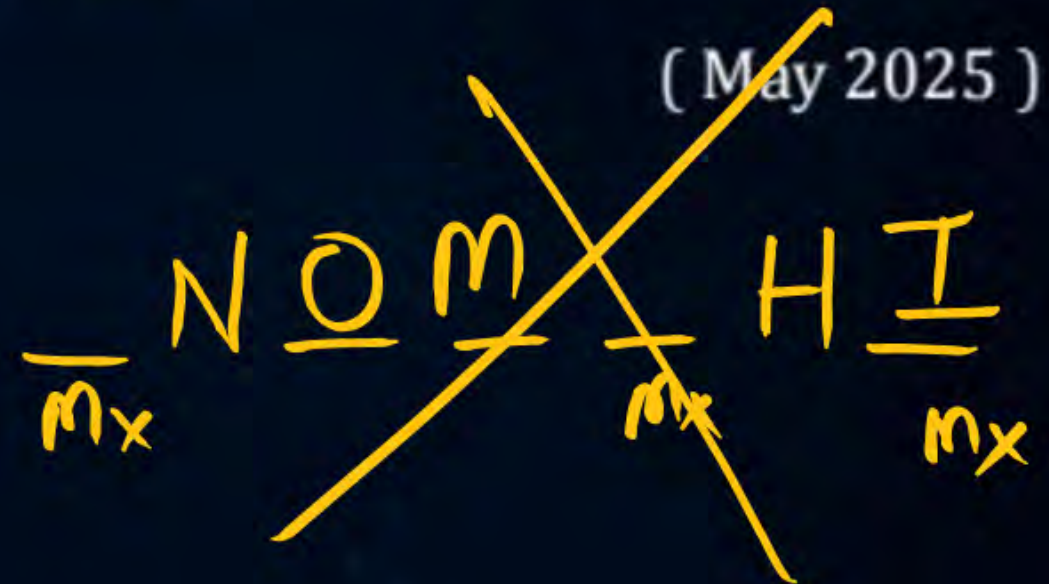
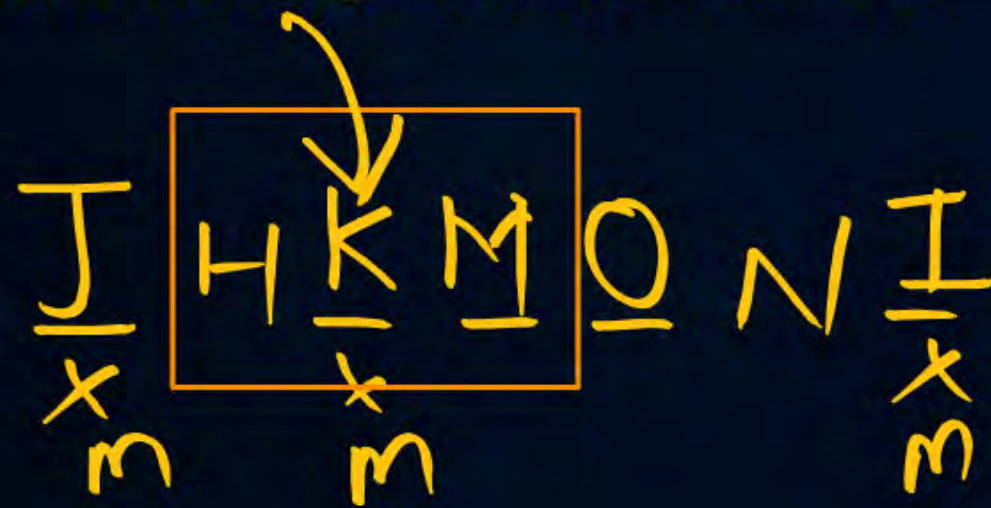
#Q. Seven persons namely H, I, J, K, M, N, O are sitting in a straight line facing north direction. Total three number of persons are sitting between H and N. Both N and H sits at extreme sides. Total two number of persons sit between H and O. M is not an immediate neighbor of H or N. I sits third to the right of M. I and H both are not an immediate neighbours. M is also not an immediate neighbor of J. Who is sitting between H and M?

A O

B J

C I

☒ D K



(May 2025)

#Q. Six friend P, Q, R, S, T, U are sitting around the hexagonal table each at one corner and are facing the centre of hexagonal. P is second to the left of U. Q is neighbor of R and S. T is second to the left of S. Which one is sitting opposite to P.

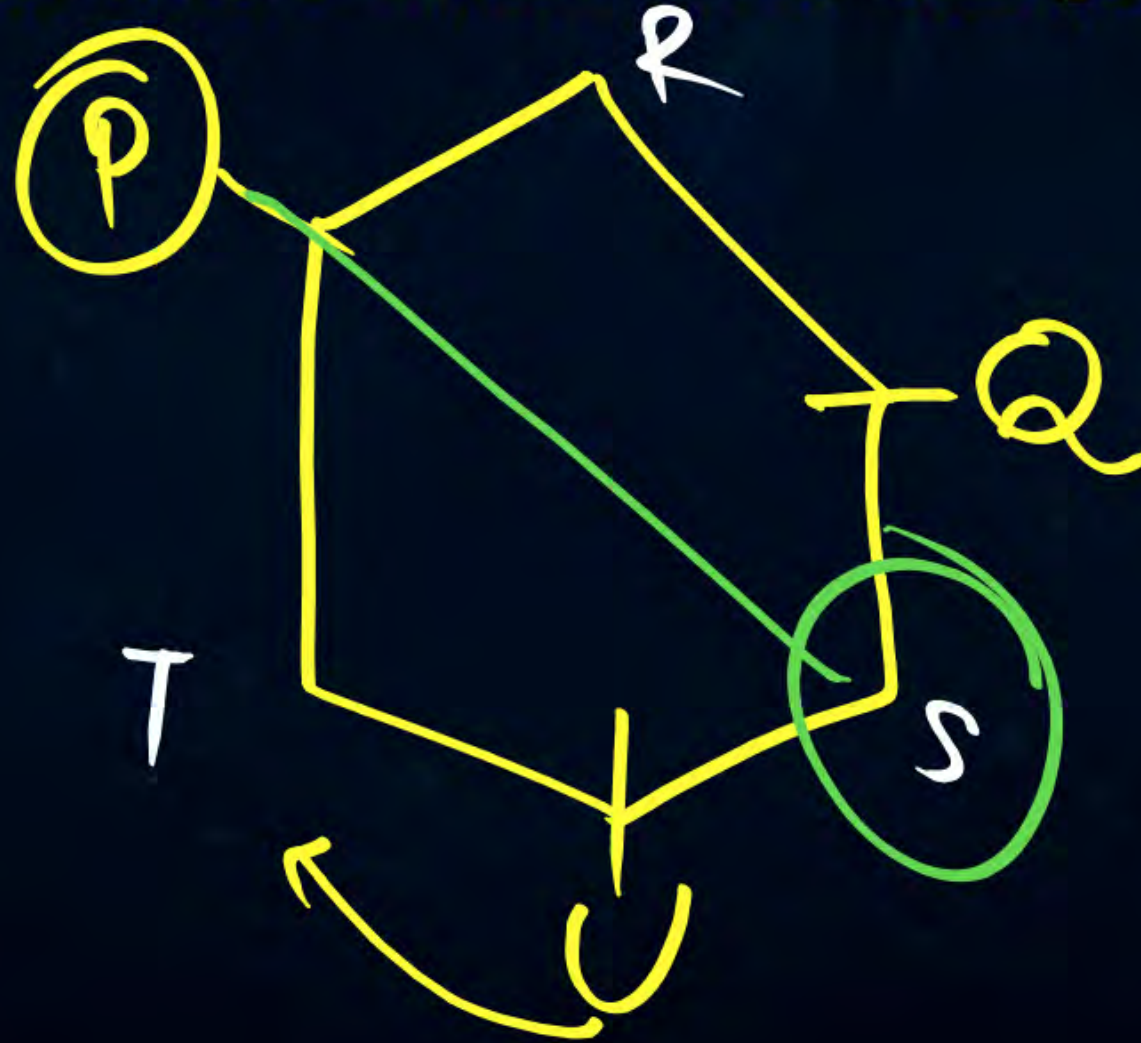
(May 2025)

A Q

B R

C T

D S



#Q. A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In what position A is sitting?

(May 2025)

A Between B and C

AB

BA

B Between B and D

C Between E and D

D Between C and E

Question Wrong.

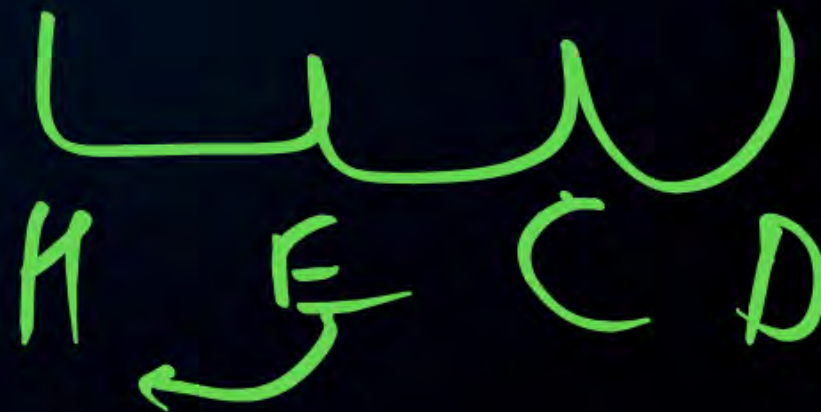
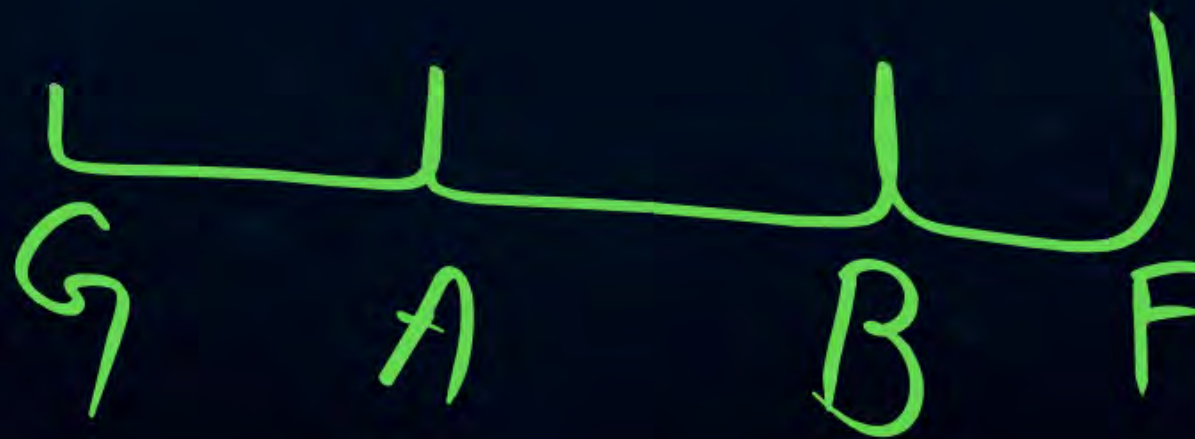
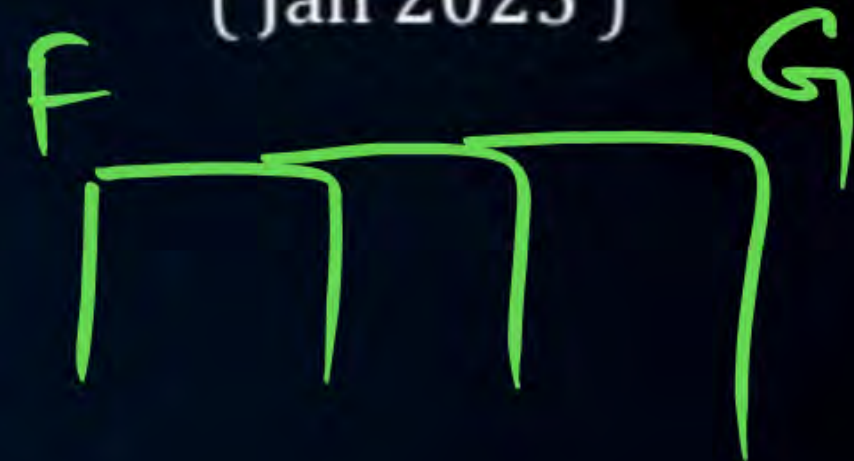
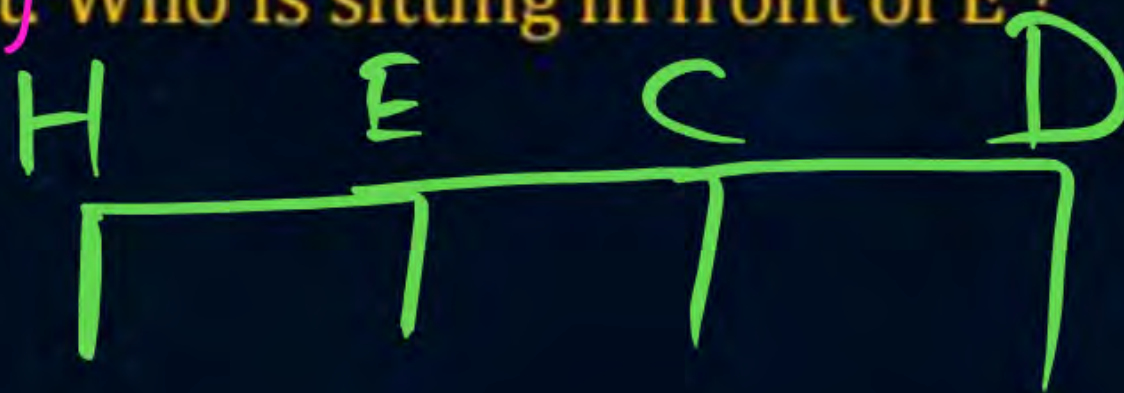
#Q. 8 persons A, B, C, D, E, F, G and H are sitting in two rows opposite to each other. Each row has 4 persons. B and C are sitting opposite side. C is sitting in between E and D. H is sitting immediate left of E. F and H are at diagonally opposite position. G is sitting extreme left. Who is sitting in front of E? (Jan 2025)

A F

B G

C B

~~D A~~



QUESTION



#Q. Laspeyers method and Paasches method do not satisfy

circular → ~~fisher~~

unit Test → All except simple Agg.

Time Reversal → Fisher

GM wale Index

Factor Reversal → ~~fisher~~

1 Circular test

2 Time reversal test

3 Factor reversal test

4 All of the above

QUESTION



#Q. The cost of living index number in year 2015 and 2018 were 97.5 and 115 respectively. The salary of a worker in 2015 was 19500. How much additional salary was required for him in 2018 to maintain the same standard of living as in 2015?

1 3000

2 4000

3 3500

4 4500

$$\Rightarrow x = \underline{\underline{23000}}$$

$$2015 \rightarrow 97.5$$

$$2018 \rightarrow 115$$

$$\frac{97.5}{115} = \frac{19,500}{x}$$

Salary

$$19,500 +$$

$x?$

$$3500$$

QUESTION



#Q. The price and quantities of 3 commodities in base and current years are given below, Find Laspyer's Index number :

P_0	P_1	Q_0	Q_1
12	14	10	20
10	8	20	30
8	10	30	10

1 118.13

2 107.14

3 120.10

4 None

$$L = \frac{\sum P_1 Q_0}{\sum P_0 Q_0} \times 100 = \frac{600}{560} \times 100 = 107.14$$

QUESTION



#Q. Which is not satisfied by Fisher's Ideal Index Number?

- ☒ 1 Circular test
- ☐ 2 Time reversal test
- ☐ 3 Factor reversal test
- ☐ 4 None

QUESTION

$$\text{Real Wage or Deflated Value} = \frac{\text{C.Y Price or Wage or Salary} \times 100}{\text{C.Y Index}}$$



#Q. The consumer price index for the year 2023 is 273 with 2010 as base year. The average monthly wages of industrial worker in year 2023 is 8,190. What is the real wage?

2023 → 273 → 8190
2010 → 100

$$RW = \frac{8190 \times 100}{273} = 3000$$

1 2800

2 3000

3 3200

4 3400

QUESTION

$$P_{01} \times P_{12} \times P_{21} = 1$$



#Q. Which one of the following test of adequacy is concerned with the measurement of price changes over a period of years, when it is desirable to shift the base?

- 1 Unit test
- 2 Time reversal test
- 3 Circular test
- 4 Factor reversal test

QUESTION



#Q. The Paasches and Fishers index numbers are 169 and 156 respectively, then Laspyre's Index number is:

1 144

2 152

3 148

4 151.5

$$F = \sqrt{L \times P}$$

$$(F)^2 = L \times P$$

$$\frac{(156)^2}{169} = L = 144$$

QUESTION



#Q. The Cost-of-Living Index (CLI) is always

$$CPI = \frac{\sum IW}{\sum W}$$

- ☒ 1 Weighted Index
- ☐ 2 Price Index
- ☐ 3 Quantity Index
- ☐ 4 None

QUESTION



#Q. Which of the following statement is true ?

- 1 Paasche's index number ~~is~~ based on ~~base~~ ^{current} quantity
- 2 Fisher's index satisfies the circular ~~test~~
- 3 ~~Arithmetic mean~~ ^{GM} is the most appropriate ~~average~~ for constructing the index number
- 4 ~~Splicing~~ means constructing one continuous series from two different indices on the basis of common base.

QUESTION

#Q. The prices of a commodity in the year 1975 and 1980 were 25 and 30 respectively taking 1980 as base year the price relative is :

1 109.78

2 110.25

3 113.25

4 83.33

$$\frac{25}{30} \times 100 = 83.33$$

QUESTION



#Q. If the prices of all commodities in the base year are twice the values of the respective commodities in the current year, then the Fisher's ideal index number is equal to:

1 200

2 50

3 400

4 25

$$f \Rightarrow 200$$

$$\begin{aligned} f &= \sqrt{L \times P} \\ &= \sqrt{2L \times 2P} \\ &= 2L \end{aligned}$$

Find the Paasche's Index number for prices from the following

Commodity	Base year		Current year	
	P_0 Price	Q_0 Commodity	P_1 Price	Q_1 Commodity
A	5	25	6	30
B	3	8	4	10
C	2	10	3	8
D	10	4	3	45

- (a) 151.21
- (b) 165.28
- (c) ~~157.26~~
- (d) 160.21

$$\frac{\sum P_1 Q_1}{\sum P_0 Q_1} \times 100 = \frac{379}{646} \times 100 = 58.6$$

#Q. If the 2005 index with base 2000 is 200 and 2000 index with base 1995 is 150, then index of 2005 with base 1995 is :

A 700

B 300

C 500

D 600

By 1995
2000
2005

100
150
100

$\frac{100}{150} \times 100$

Backward splicing = $\frac{200 \times 150}{100}$
= 300

Question

$$\text{Link Relative} = \frac{\text{C.Y Price}}{\text{Previous Price}} \times 100$$



#Q. The suitable index number for the comparison of every year is :

- ☐ A Fixed base index number
- ☐ B Fisher's ideal index number
- ☒ C Chain base index number
- ☐ D Both A or B

2000
2001
2002
2003

$$\text{CBI} = \frac{\text{LR of C.Y} \times \text{CBI of P.Y}}{100}$$

#Q. When the cost of Beverages increased by 40%, the person said that the rise had increased his cost of living by 8%. Before the change in price, the percentage of his cost of living was due to buying Beverages is :

A 15%

☒ B 20%

C 25%

D None

$$\frac{\% \text{ change in Index}}{\% \text{ change in Price}} \times 100$$

$$= \frac{8}{40} \times 100 = 20\%$$

#Q. When the cost of Tobacco was increased by 45%, a certain hardened smoker, who maintained his formal scale of consumption, said that the rise had increased his cost of living by 8%. Before the change in price, the percentage of his cost of living was due to buying Tobacco is

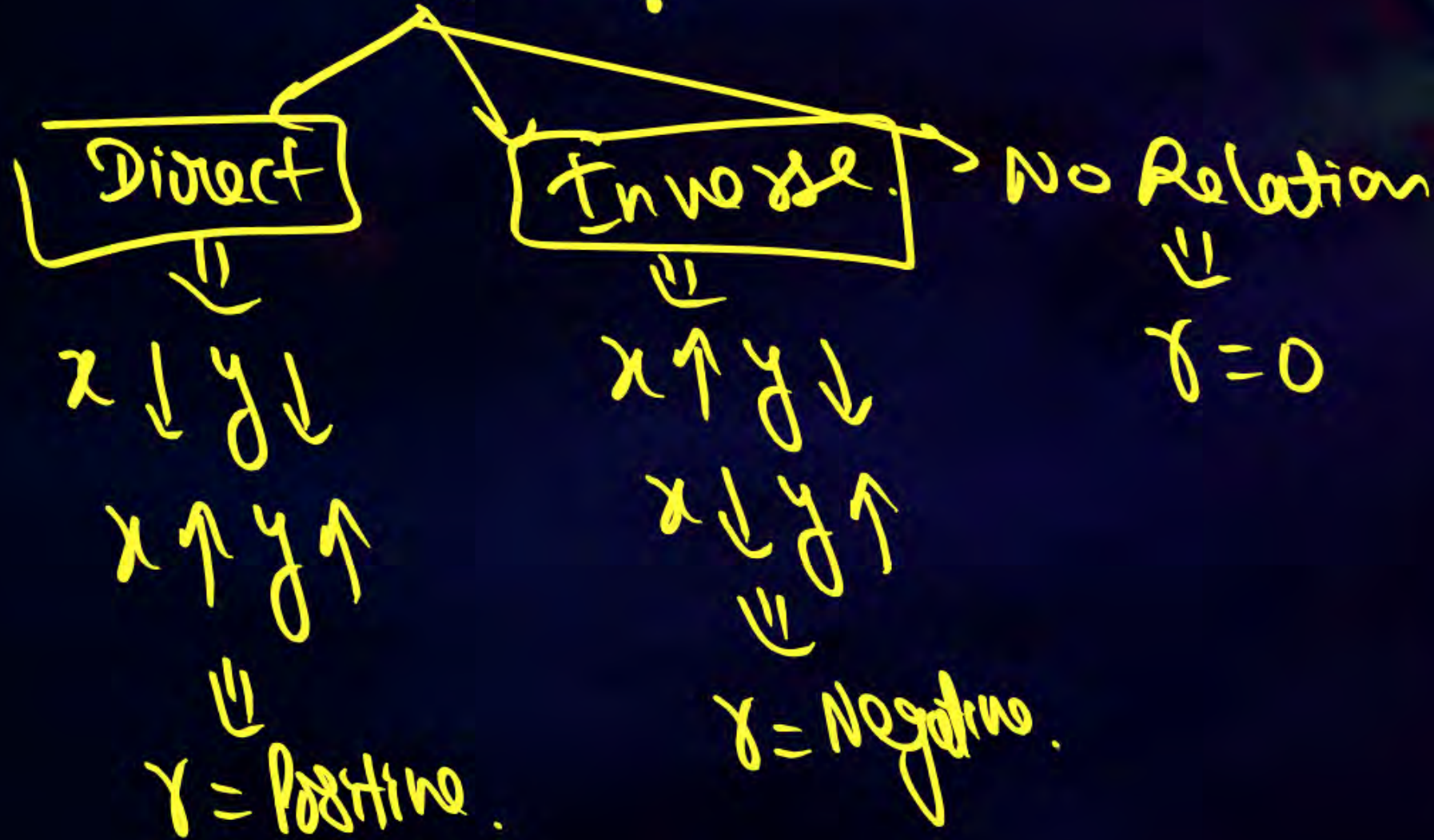
- ☐ A 15%
- ☐ B 20%
- ☒ C 17.8%
- ☐ D None

$$\frac{8}{45} \times 100 = 17.77\%$$

Correlation Regression

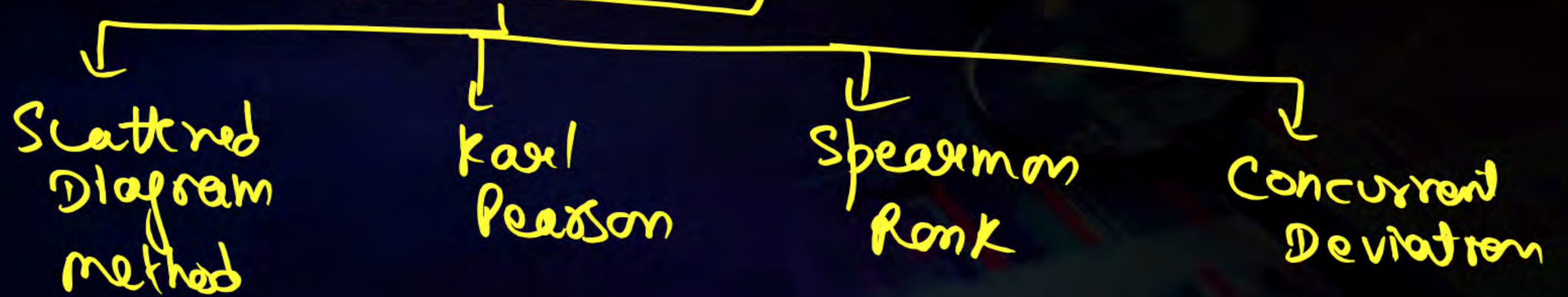
Correlation

$\Downarrow$
 $r = ?$

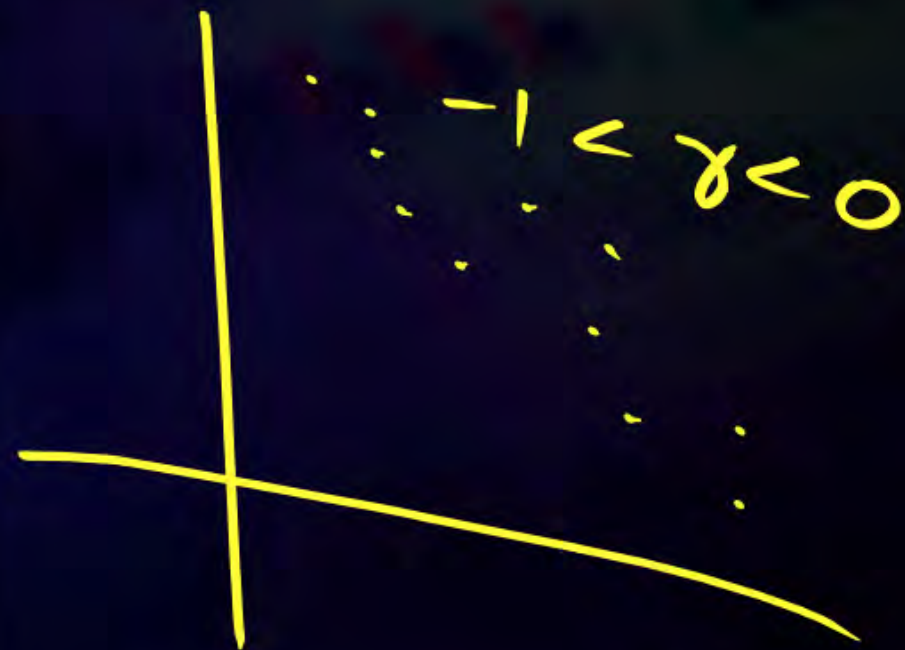
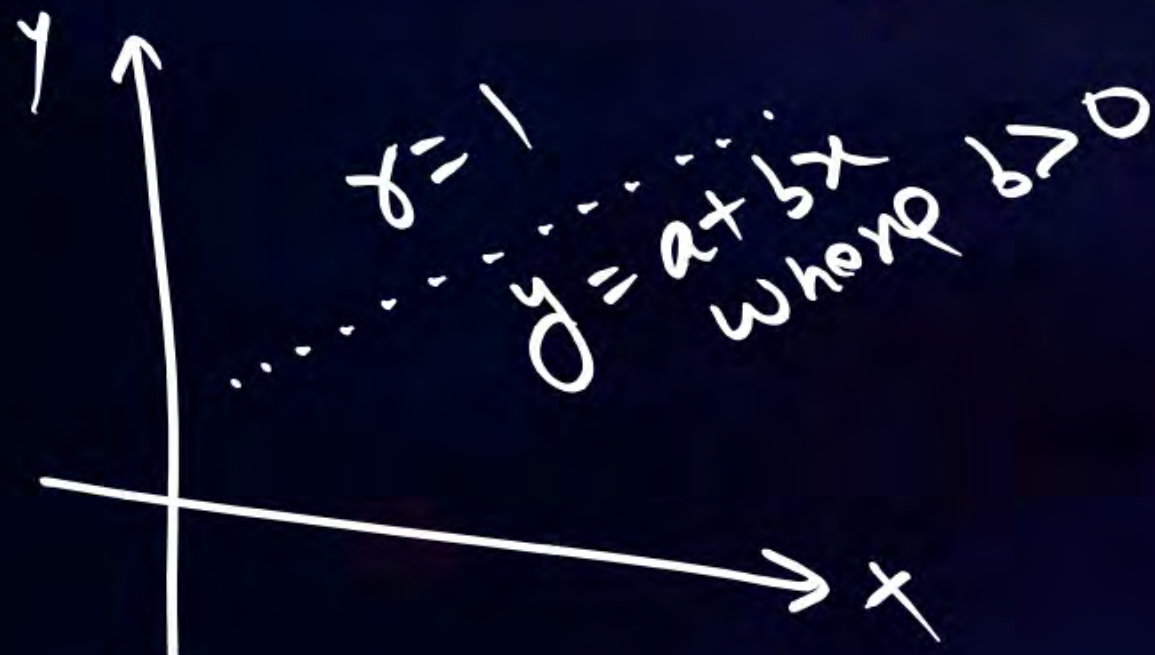


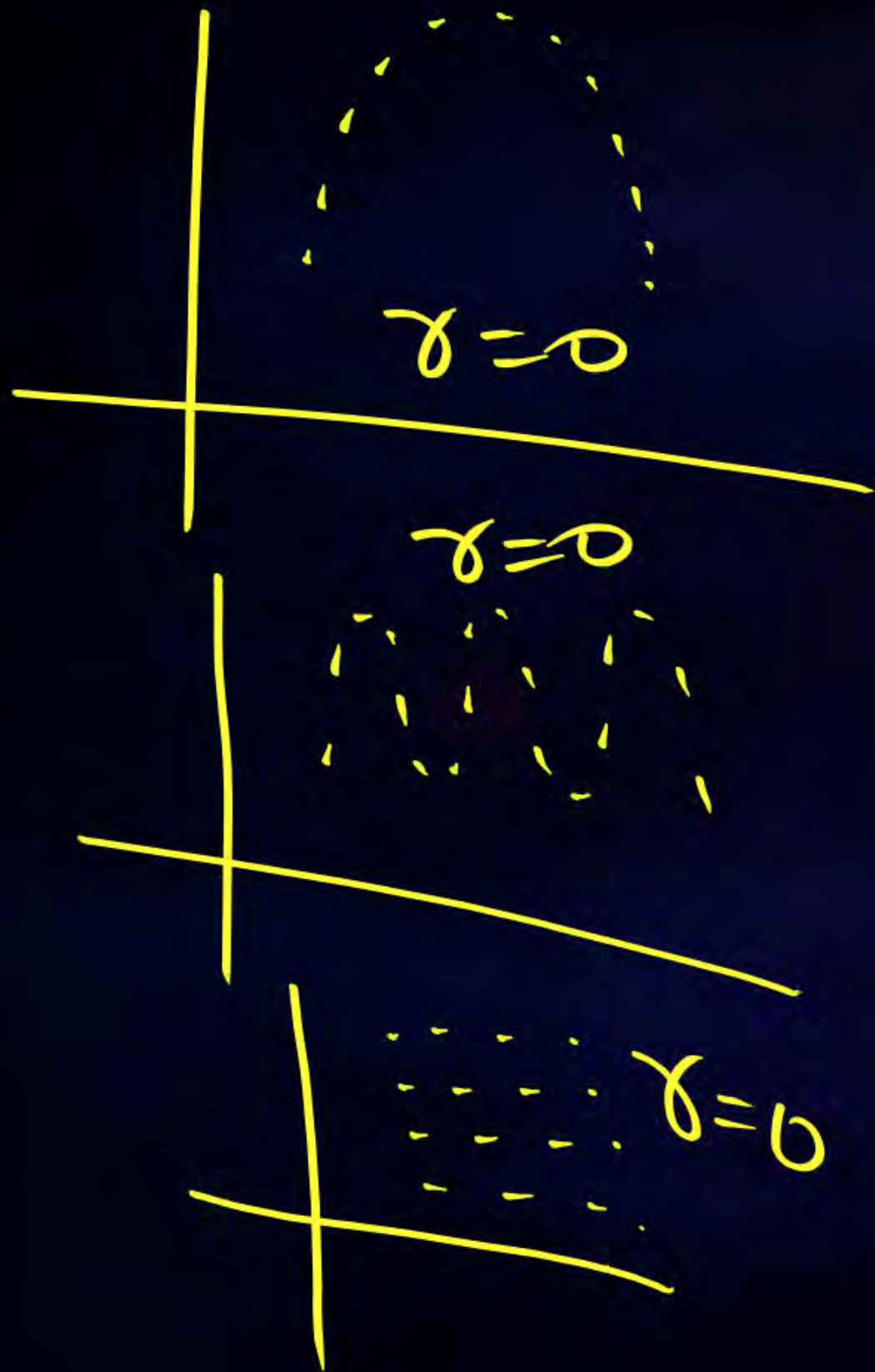
$$-1 \leq r \leq 1$$

Correlation



Scattered Diagram





Karl Pearson coefficient
of correlation

↓

$$\text{cov}(x, y) = \frac{\sum (x_i - \bar{x}) \cdot (y_i - \bar{y})}{N}$$

also

$$r = \frac{\text{cov}(x, y)}{\sigma_x \sigma_y}$$

covariance can be Any Real number

cov. does not change with origin but it changes with scale.

$$r = \frac{\text{cov}(x, y)}{\sigma_x \sigma_y}$$

$$r = \frac{\sum (x_i - \bar{x}) \cdot (y_i - \bar{y})}{N \sigma_x \sigma_y}$$

$$r = \frac{\sum (x_i - \bar{x}) \cdot (y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \cdot \sum (y_i - \bar{y})^2}}$$

$$r = \frac{\sum xy - \frac{\sum x \cdot \sum y}{N}}{\sqrt{\sum x^2 - \frac{(\sum x)^2}{N}} \sqrt{\sum y^2 - \frac{(\sum y)^2}{N}}}$$

correlation does not change because of origin or scale

But sign of correlation may change when scale is negative.

8 $\gamma(x, y) = 0.85$

i) $u = x + 5$
 $v = y - 3$
 $\gamma(u, v) = ?$

Sol. $\gamma(u, v) = 0.85$

ii) $u = 2x + 3$
 $v = 4y + 6$
 $\gamma(u, v) = ?$

Sol. $\gamma(u, v)$
 $= \gamma(x, y)$
 $= 0.85$

iii) $u = -3x + 10$
 $v = 4y - 6$
 $\gamma(u, v) = ?$

Sol. $\gamma(u, v) = (-)(+) \gamma(x, y)$
 $= (-)(+) 0.85$
 $= -0.85$

Spearman correlation

X	Y	R ₁	R ₂	D = R ₁ - R ₂	D ²
				<u>Σ D = 0</u>	<u>Σ D²</u>

$$\gamma = 1 - \frac{6 \epsilon D^2}{N^3 - N}$$

Concurrent Deviation method

$$\gamma = \frac{1}{\sigma} \sqrt{\frac{1}{\sigma} \left(\frac{2C - m}{m} \right)}$$

Where $m = n - 1$

eg

X	Y
10	20
12	30
15	28
14	15
19	22

Signs: +, +, -, -, +

Concurrent Deviation Method

concurrent deviation method
 $\gamma = ?$

Total Concurrent Deviation (C) = 3

$$n = 5$$

$$m = n - 1 = 5 - 1 = 4$$

we

$$\begin{aligned} \gamma &= \sqrt{\frac{2C - m}{m}} \\ &= \sqrt{\frac{2(3) - 4}{4}} \\ &= \sqrt{\frac{2}{4}} \\ &= +0.7071 \end{aligned}$$

Q: $n = 6$
 $C = 2$
 $\gamma = ?$

Sol: $\gamma = \sqrt{\frac{2(2) - 5}{5}}$
 $= \sqrt{\frac{-1}{5}}$
 $= 0.44$

Bivariate frequency Distribution of order $(m \times n)$

$$\text{total cells} = (m)(n) = mn$$

$$\text{total marginal Distributions} = 2$$

$$\text{total conditional Distributions} = m + n$$

~~Imp~~ # $\text{Coff of Determination} = r^2 = \frac{\text{Explained variance}}{\text{Total variance}}$

$$\# \text{ Coff of Non Determination} = 1 - r^2$$

Regression Analysis

⇓
Mathematical Relation
b/w x & y

Regression Line
 y on x

Standard
form

$$y = a + bx$$

⇓
How to find

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

$b_{yx} = \text{slope} = \text{Regression coefficient}$

Regression Line
 x on y

$$x = a + by$$

⇓
How to find

$$x - \bar{x} = b_{xy}(y - \bar{y})$$

$\text{slope} = 1/b_{xy}$



$$b_{yx} = \frac{\text{cov}(x, y)}{(\sigma_x)^2}$$

$$b_{yx} = \frac{\sum (x_i - \bar{x}) \cdot (y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$$

$$b_{yx} = \frac{\sum xy - \frac{\sum x \sum y}{N}}{\sum x^2 - \frac{(\sum x)^2}{N}}$$

$$b_{yx} = r \frac{\sigma_y}{\sigma_x}$$

$$b_{xy} = \frac{\text{cov}(x, y)}{(\sigma_y)^2}$$

$$b_{xy} = \frac{\sum (x_i - \bar{x}) \cdot (y_i - \bar{y})}{\sum (y_i - \bar{y})^2}$$

$$b_{xy} = \frac{\sum xy - \frac{\sum x \sum y}{N}}{\sum y^2 - \frac{(\sum y)^2}{N}}$$

$$b_{xy} = r \frac{\sigma_x}{\sigma_y}$$

~~imp.~~

$$r = \pm \sqrt{b_{yx} \times b_{xy}}$$

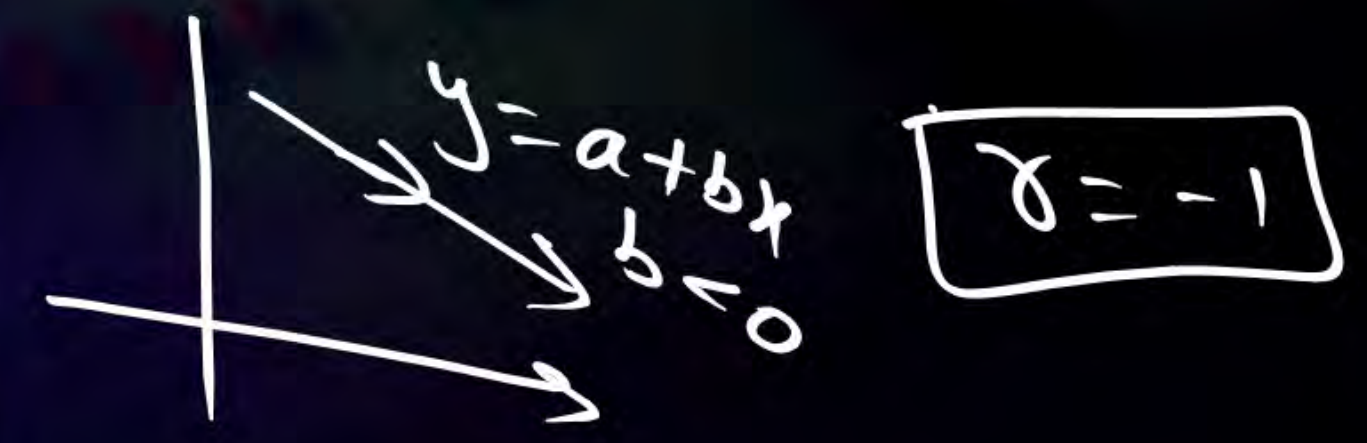
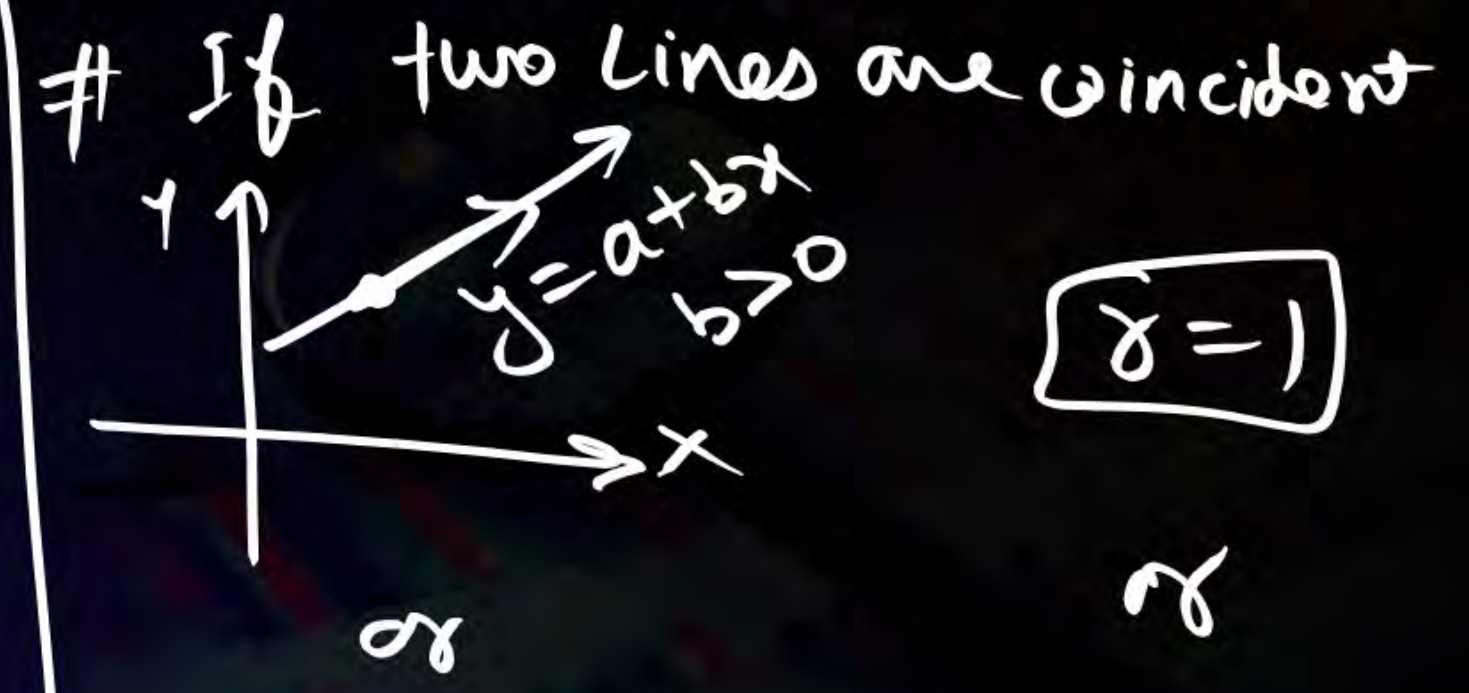
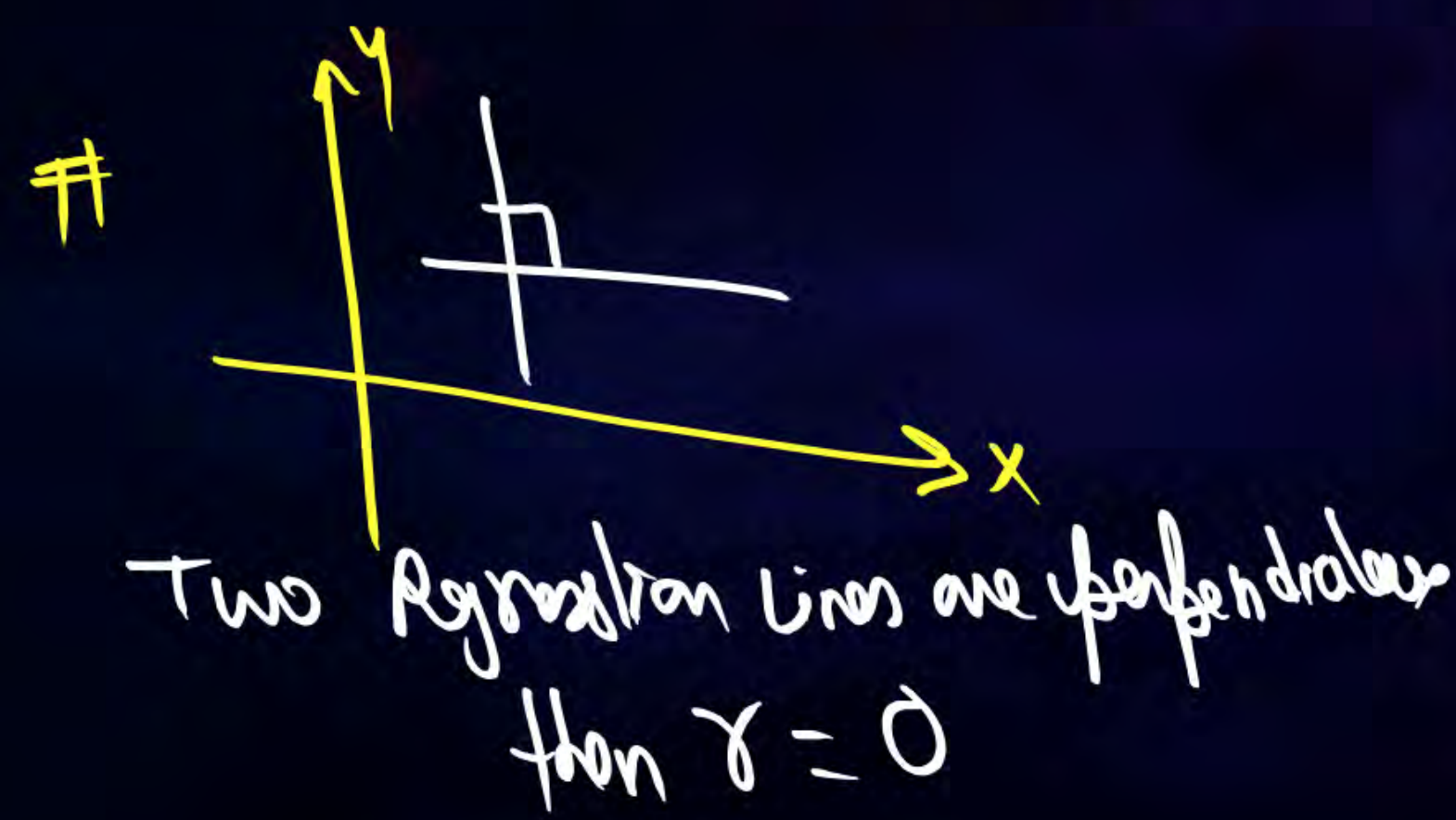
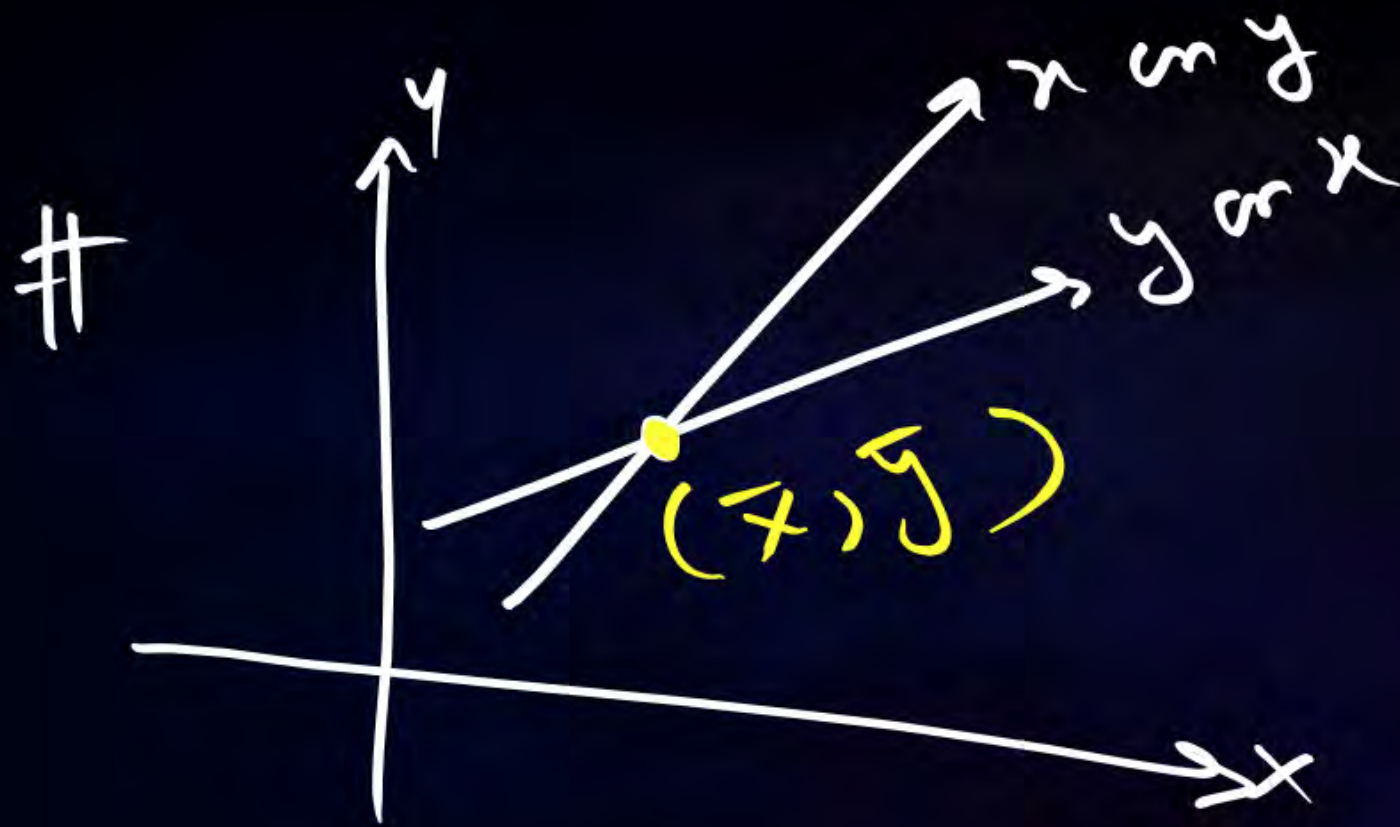
Both are either (+)
or both (-)

If Regression Line
y on x: $ax + by + c = 0$

then $b_{yx} = -\frac{a}{b}$

If Regression Line
x on y: $ax + by + c = 0$

then $b_{xy} = -\frac{b}{a}$



Regression coefficients
are independent of origin

ie. If $u = x_i + a$
& $v = y_i + b$

then $b_{vu} = b_{yx}$ & $b_{uv} = b_{xy}$

Regression coefficient changes
with change of scale

If $u_i = cx_i + A$ & $v_i = dy_i + B$

then

$$b_{vu} = \frac{d}{c} \times b_{yx}$$

$$\& b_{uv} = \frac{c}{d} \times b_{xy}$$

The correlation between shoe-size and intelligence is:

- ☒ (a) Zero
- (b) Positive
- (c) Negative
- (d) None of these.

In case of "Insurance companies' profits" and "The number of claims they have to pay," there exists a:



- (A) Positive correlation
- (B) Negative correlation
- (C) No correlation
- (D) It cannot be predicted

Question-



In case 'Amount of rainfall and yield of crop' _____

☒ (a) positive correlation

(b) negative correlation

(c) no correlation

(d) none



If the plotted points in a scatter diagram lie from upper left to lower right, then the correlation is:

- (a) Positive
- (b) Zero
- (c) **Negative**
- (d) None of these.



If all the plotted points in a scatter diagram lie on a single line, then the correlation is:

- (a) Perfect positive ✓
- (b) Perfect negative ✓
- (c) Both (a) and (b)
- (d) Either (a) or (b). ✓



or

Question-



In case the correlation coefficient between two variables is 1, the relationship between the two variables would be:

- (a) $y = a + bx$
- (b) $y = a + bx, b > 0$
- (c) $y = a + bx, b < 0$
- (d) $y = a + bx$, both a and b being positive.

$\rho = 1$

$y = a + bx$
 $b > 0$

$y = a + bx$
 $b < 0$

Question: Which of the following statements about covariance is correct?

- ☒ (a) Covariance is impacted by both the change of scale and the change of origin.
- ☐ (b) Covariance is impacted by the change of origin but not by the change of scale.
- ☒ (c) Covariance is impacted by the change of scale but not by the change of origin.
- ☐ (d) Covariance is not impacted by either the change of scale or the change of

Question-



Pearson's Correlation coefficient between x and y is:-

(a) $\frac{\text{cov}(x,y)}{S_x S_y}$

(b) $\frac{\text{cov}^2(x,y)}{S_x S_y}$

(c) $\frac{(S_x S_y)^2}{\text{cov}(x,y)}$

(d) $\frac{S_x S_y}{\text{cov}(x,y)}$

$$r = \frac{\text{Cov}(x, y)}{\sigma_x \sigma_y}$$

Question-



If for two variables x and y , the covariance, variance of x , and variance of y are 30, 25, and 100 respectively, what is the value of the correlation coefficient?

(a) 0.6

$$\text{cov}(x, y) = 30$$

(b) 0.75

$$\sigma_x^2 = 25$$

(c) 0.5

$$\sigma_y^2 = 100$$

(d) None of these

$$r = \frac{\text{cov}(x, y)}{\sigma_x \sigma_y} = \frac{30}{5 \times 10} = 0.6$$

Question-



If $y = a + bx$, then what is the coefficient of correlation between x and y ?

(a) 1

(b) -1

☒ (c) 1 or -1 according as $b > 0$ or $b < 0$

(d) none of these.

Question-



The variance of two variables 'x' and 'y' are $\overset{\sigma_x^2}{16}$ and $\overset{\sigma_y^2}{25}$ and covariance between 'x' and 'y' is 18.5. Another two variables 'u' and 'v' are defined as $u = \frac{(x-3)}{2}$ and $v = \frac{(y-2)}{3}$, then coefficient of correlation between 'u' and 'v' is:

(A) 0.85

(B) 0.875

(C) 0.90

(D) 0.925

$$\text{cov}(x, y) = 18.5$$

$$r = \frac{18.5}{4 \times 5}$$

$$r = 0.925$$

Which of the following is used to find correlation between two qualitative characteristics?

- (a) Karl Pearson
- ☒ (b) Spearman rank correlation
- (c) Concurrent deviation
- (d) Scatter diagram

Degree of Agreement

Question-



If the sum of squares of the difference of ranks, given by two judges A and B, of 8 students is 21, what is the value of rank correlation coefficient?

(a) 0.7

(b) 0.65

(c) 0.75

(d) 0.8

$$\sum D^2 = 21$$

$$N = 8$$

$$r = 1 - \frac{6 \sum D^2}{N^3 - N}$$

$$= 1 - \frac{6 \times 21}{8^3 - 8} = 1 - \frac{126}{504} = 0.75$$

If the rank correlation coefficient between marks in management and mathematics for a group of students is 0.6 and the sum of squares of the differences in ranks is 66, what is the number of students in the group?

- (a) 10
- (b) 9
- (c) 8
- (d) 11

$$r = 0.6$$

$$\sum D^2 = 66$$

$$N = ?$$

$$r = 1 - \frac{6 \sum D^2}{N^3 - N}$$

$$0.6 = 1 - \frac{6 \times 66}{N^3 - N}$$

$$-0.4 = - \frac{396}{N^3 - N}$$

$$N^3 - N = \frac{396}{0.4}$$

$$N^3 - N = 990$$

$$10^3 - 10 = 990$$

If the concurrent deviation correlation coefficient is $\frac{1}{\sqrt{3}}$ and the number of concurrent deviations is 6, what is the value of n (total pairs of data)?

- (a) 9
- (b) 8
- (c) 10
- (d) None of these

$$\begin{aligned} r &= \frac{1}{\sqrt{3}} \\ C &= 6 \\ n &= ? \end{aligned} \quad \left| \quad \begin{aligned} r &= \sqrt{\frac{2C-m}{m}} \\ \frac{1}{\sqrt{3}} &= \sqrt{\frac{2(6)-m}{m}} \\ \frac{1}{3} &= \frac{12-m}{m} \\ \Rightarrow m &= 36-3m \\ \Rightarrow 4m &= 36 \\ \Rightarrow m &= 9 \end{aligned} \right.$$

now

$$\begin{aligned} m &= n-1 \\ 9 &= n-1 \\ \boxed{n=10} \end{aligned}$$

Which of the following is **spurious correlation**?

- (a) Correlation between two variables having no causal relationship
- (b) Negative correlation
- (c) Bad relation between two variables
- (d) Very low correlation between two variables.

(x)



Question-



For some bivariate data, the following results were obtained for the two variables X and Y :

$$\bar{X} = 40.0, \quad \bar{Y} = 50.0, \quad b_{YX} = -1.5, \quad b_{XY} = -0.7$$

The most probable value of Y when $X = 45$ is:

(a) 42.5

(b) 45.0

(c) 47.0

(d) None of these

y on x
 $\Downarrow$

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

$$y - 50 = -1.5(x - 40)$$

$$y - 50 = -1.5(45 - 40)$$

$$y = 42.5$$

Question-



If $4Y - 6X = 20$ is the regression line of Y on X , and the coefficient of correlation between X and Y is 0.8 , what is the value of the regression coefficient of X on Y ?

(a) 0.534

(b) 0.600

(c) 0.675

(d) None of these

$y \text{ on } x: 4y - 6x = 20$

$\& \boxed{r = 0.8}$

$\boxed{b_{xy} = ?}$

$y \text{ on } x: -6x + 4y = 20$

$b_{yx} = -\frac{a}{b} = -\frac{(-6)}{4} = 1.5$

$\sqrt{b_{yx} \times b_{xy}} = r$

$\sqrt{1.5 \times b_{xy}} = 0.8$

$1.5 b_{xy} = 0.64$

$b_{xy} = 0.42$

If $b_{YX} = 0.5$, $b_{XY} = 0.46$, then the value of the correlation coefficient r is.

(a) 0.23

(b) 0.25

(c) 0.39

(d) 0.48

$$\begin{aligned} r &= \sqrt{b_{YX} \times b_{XY}} \\ &= \sqrt{0.5 \times 0.46} \\ &= \sqrt{0.23} \\ &= 0.47 \end{aligned}$$

Question-



If $b_{YX} = -0.7$, $b_{XY} = -0.5$, then the value of the correlation coefficient r is:

(a) 0.58

(b) -0.58

(c) 0.65

(d) -0.65

$$r = \sqrt{(-0.7)(-0.5)} \\ = -0.59$$

Question-



The regression lines will be perpendicular to each other when the value of r is:

- (a) 1
- (b) -1
- (c) $\frac{1}{2}$
- (d) 0

Which one of the following statements is correct regarding the limit of the two regression coefficients?

(A) No limit. X

~~(B) Must be positive.~~

~~(C) One positive and the other negative.~~

~~(D) Product of the regression coefficients must be numerically less than unity.~~

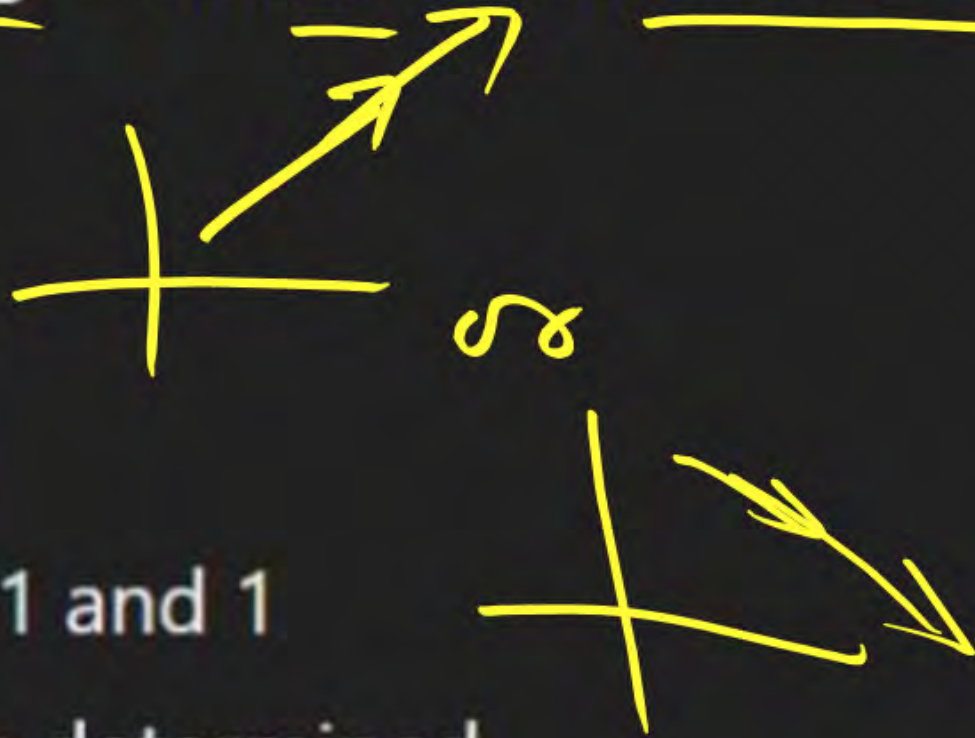
$$b_{yx} \times b_{xy} \leq 1$$
$$b_{xy} \leq \frac{1}{b_{yx}}$$

Question-



When two regression lines are coincident, the value of the correlation coefficient r is:

- (a) 0
- (b) 1 or -1
- (c) Between -1 and 1
- (d) Cannot be determined



If the two regression lines coincide, the value of r^2 is:

(a) 0

(b) 1

(c) Between 0 and 1

(d) Undefined

$$r = -1 \Rightarrow r^2 = 1$$

$$r = 1 \Rightarrow r^2 = 1$$

Question-



Find the coefficient of correlation.

ω $2x + 3y = 2 \Rightarrow y \text{ on } x \Rightarrow b_{yx} = -\frac{a}{b} = -\frac{2}{3}$

$4x + 3y = 4 \Rightarrow x \text{ on } y \Rightarrow b_{xy} = -\frac{b}{a} = -\frac{3}{4}$

Options:

(a) -0.71

(b) 0.71

(c) -0.5

(d) 0.5

$b_{yx} \times b_{xy}$
 $= \left(-\frac{2}{3}\right)\left(-\frac{3}{4}\right)$
 $= \frac{1}{2} < 1$

Assumption correct

$r = \sqrt{b_{yx} \times b_{xy}}$
 $= -\sqrt{\frac{2}{3} \times \frac{3}{4}}$
 $= -0.70$

Question-



The following two equations are the regression equations of Y on X and X on Y , respectively:

$$\begin{cases} 2X + 3Y = 2 \\ 4X + 3Y = 4 \end{cases}$$

Find the mean values of X and Y :

- ☒ (a) $\bar{X} = 1, \bar{Y} = 0$
- (b) $\bar{X} = 0.5, \bar{Y} = 0.5$
- (c) $\bar{X} = 2, \bar{Y} = 1$
- (d) $\bar{X} = 1.5, \bar{Y} = 0.25$

$$2(1) + 3(0) = 2$$

Question-



The intersecting point of two regression lines falls at the X-axis. If the mean of X-values is 16, the standard deviations of X and Y are respectively, 3 and 4, then the mean of Y-values is:

- (a) $\frac{16}{3}$
- (b) 4
- (c) 0
- (d) 1

Question-



If the relation between two variables x and u is $u + 3x = -15$ and the relation between two other variables v and y is $2y + 5v = 23$. If the regression coefficient of y on x is known as 0.80, what would be the regression coefficient of v on u ?

(a) $\frac{8}{75}$

(b) $\frac{75}{8}$

(c) $\frac{-8}{75}$

(d) None

$$u + 3x = -15$$

$\Downarrow$

$$u = -15 - 3x$$

$$2y + 5v = 23$$

$\Downarrow$

$$5v = 23 - 2y$$

$$v = \frac{23 - 2y}{5}$$

$$v = 4.6 - 0.4y$$

$$b_{yx} = 0.80$$

$$b_{vu} = ?$$

we

$$b_{vu} = \frac{-0.4}{-3} \times b_{yx}$$

$$= \frac{0.4}{3} \times 0.8$$

$$= 0.1066$$

Question-



The correlation co-efficient between X and Y is 0.8. If we add a number 10 in the X variable and subtracted 20 from Y variable, then the new correlation co-efficient will be

(A) 0.6

(B) 0.4

(C) 0.9

(D) 0.8

$$r = 0.8$$

Question-



When both the regression co-efficients are $b_{xy} = 0.7$ and $b_{yx} = 0.8$, respectively, then correlation co-efficient between x and y is

(A) 0.56

(B) 0.75

(C) 0.28

(D) 0.87

$$\sqrt{0.7 \times 0.8} \\ = 0.74$$

Question-



For 9 college students group, the sum of squares of differences in ranks for History and Hindi marks was found to be 62, then what is the value of rank correlation co-efficient?

(A) 0.48

(B) 1

(C) 0.52

(D) 0.87

$$\begin{aligned} N &= 9 \\ \sum D^2 &= 62 \\ r &= ? \end{aligned}$$

$$\begin{aligned} r &= 1 - \frac{6 \times 62}{9^3 - 9} \\ &= 0.48 \end{aligned}$$

Question-



If $r = 0.7$, then co-efficient of non-determination is

~~(A)~~ 0.51

(C) Zero

(B) 0.49

(D) 0.71

$$1 - r^2 = 1 - (0.7)^2$$

Given $x = 2y + 4$ and $y = kx + 6$ are the two lines of regression x on y and y on x respectively. If the value of correlation co-efficient (r) is 0.5, then the value of k is

(A) $\frac{1}{4}$

(C) $\frac{1}{3}$

(B) $\frac{1}{8}$

(D) $\frac{1}{2}$

$x = a + by$
 $y = a + bx$

$r = 0.5$

$b_{xy} = 2$ $b_{yx} = k$

$$r = \sqrt{b_{yx} \times b_{xy}}$$

$$0.5 = \sqrt{2 \times k}$$

$$0.25 = 2k$$

$$k = 0.125$$

Question-



If $r = 0.8$, $b_{yx} = 0.6$, $b_{xy} = 0.5$, $\bar{x} = 5$ and $\bar{y} = 3$, then the regression equation y on x is

(A) $y = 0.6x - 6.0$

(B) $y = 0.96x - 3.7$

(C) $y = 0.8x$

(D) $y = 0.6x$

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

$$y - 3 = 0.6(x - 5)$$

$$y - 3 = 0.6x - 3$$

$$y = 0.6x$$

Question

$\frac{3x-2}{5x+6}$ is the duplicate ratio of $\frac{2}{3}$ then find the value of x:

(a) 2

(b) 6

(c) 5

(d) 9

$$\frac{3x-2}{5x+6} = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$$

$$9(3x-2) = 4(5x+6)$$

$$27x - 18 = 20x + 24$$

$$7x = 42$$

$$\boxed{x = 6}$$

Question

If $x : y : z = 7 : 4 : 11$, then $\frac{x+y+z}{z}$ is:

Choices:

(a) 2

(b) 3

(c) 4

(d) 5

Question

$$\log_2 \log_2 \log_2 16$$

Choices:

(a) 0

(b) 3

(c) 1

(d) 2

$$\log_2 \{ \log_2 (\log_2 16) \}$$

$$\log_2 \{ \log_2 (4) \}$$

$$\log_2 \{ 2 \}$$

$$= 1$$

$$\frac{?}{2} = 16 = 2^4$$

$$\frac{?}{2} = 4$$

$$\frac{?}{2} = 2$$

Question

If $2^x = 3^y = 12^z$, then:

Choices:

☒ (a) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$

☒ (b) $\frac{1}{x^2} + \frac{2}{y^2} = \frac{1}{z^2}$

☒ (c) $\frac{2}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$

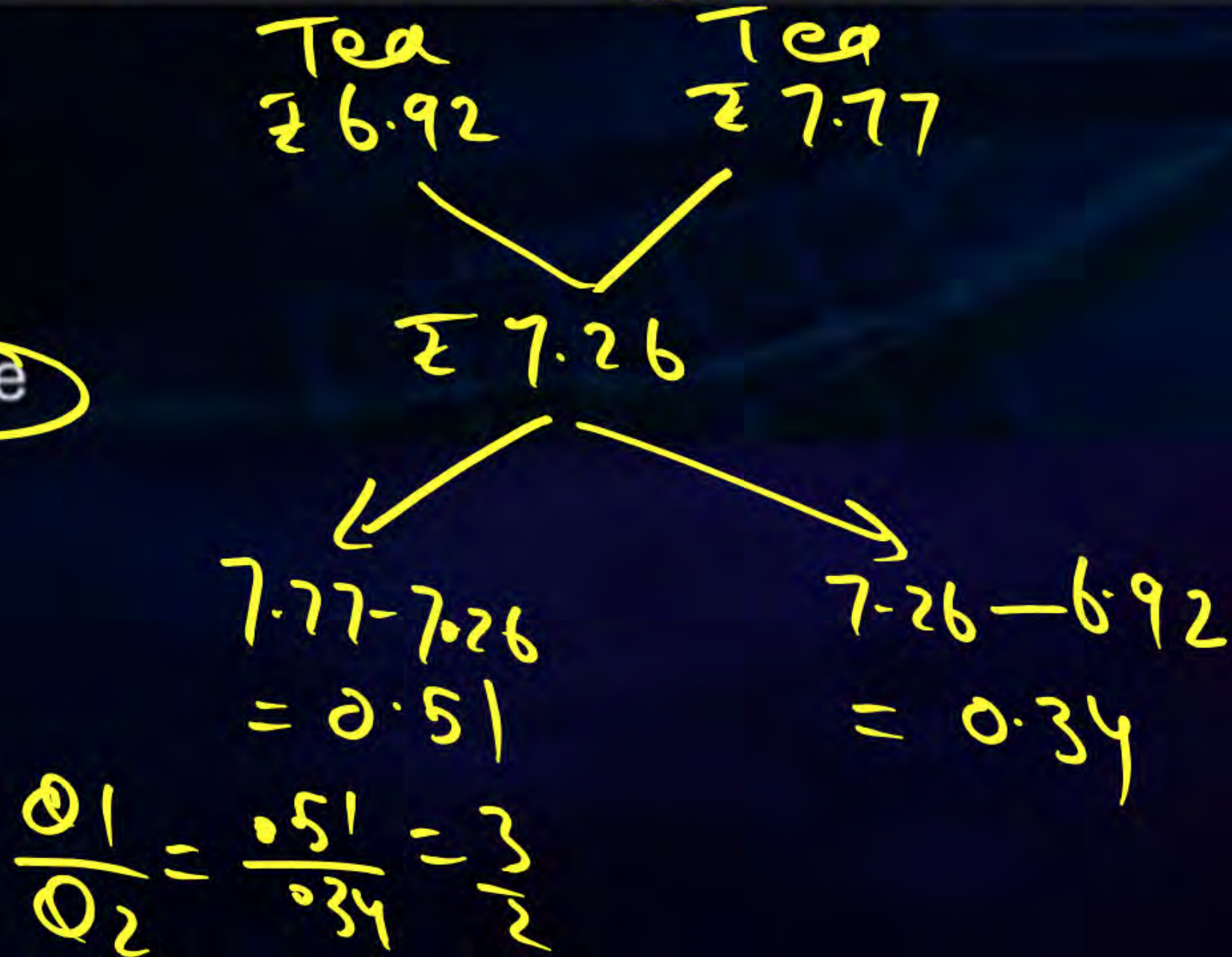
☒ (d) None

$$\begin{aligned} 12 &= 2 \times 2 \times 3 \\ \Downarrow &\quad \Downarrow \quad \Downarrow \\ \frac{1}{z} &= \frac{1}{x} + \frac{1}{x} + \frac{1}{y} \\ \text{or } \frac{1}{z} &= \frac{2}{x} + \frac{1}{y} \end{aligned}$$

Question

A dealer mixes tea costing ₹6.92 per kg with tea costing ₹7.77 per kg and sells the mixture at ₹8.80 per kg, earning a profit of $17\frac{1}{2}\%$ on his sale price. In what proportion does he mix them?

- a) 1:2
b) 2:1
c) 1:1
d) None



Selling Price = ₹ 8.80

- Profit = $8.80 \times 17.5\% = -1.54$

Cost = ₹ 7.26

Question

The value of $\log_5(1 + \frac{1}{5}) + \log_5(1 + \frac{1}{6}) + \dots + \log_5(1 + \frac{1}{624})$ is:

Choices:

(a) 2

(b) 3

(c) 5

(d) 0

$$\log_5\left(\frac{6}{5}\right) + \log_5\left(\frac{7}{6}\right) + \dots + \log_5\left(\frac{625}{624}\right)$$

$$\therefore \log A + \log B = \log AB$$

$$= \log_5 \left[\frac{6}{5} \times \frac{7}{6} \times \frac{8}{7} \times \dots \times \frac{624}{623} \times \frac{625}{624} \right]$$

$$= \log_5 \left[\frac{1}{5} \times 625 \right]$$

$$= \log_5(125) = 3$$

$$5^3 = 125$$

Question

$$\frac{\log_{2\sqrt{2}}(512)}{\log_{3\sqrt{2}}(324)} =$$

Choices:

(a) 128 : 81

(b) 2 : 3

(c) 3 : 2

(d) None

$$\frac{\log_{(2\sqrt{2})}(512)}{\log_{3\sqrt{2}}(324)}$$

$$= \frac{6}{4} = 3:2$$

$$\begin{aligned} (2\sqrt{2})^? &= 512 \\ ? &= 6 \end{aligned}$$

$$\begin{aligned} (3\sqrt{2})^? &= (324) \\ ? &= 4 \end{aligned}$$

Question

If $P = x^{1/3} + x^{-1/3}$, then $P^3 - 3P =$:

Choices:

(a) 3

(b) $\frac{1}{2} \left(x + \frac{1}{x} \right)$

☒ (c) $x + \frac{1}{x}$

(d) $2 \left(x + \frac{1}{x} \right)$

$$P = x^{\frac{1}{3}} + x^{-\frac{1}{3}}$$
$$P^3 - 3P = x + \frac{1}{x}$$

$$P = x^{\frac{1}{3}} + x^{-\frac{1}{3}}$$
$$P^3 + 3P = x + \frac{1}{x}$$

Question

The ratio of two numbers is 3 : 4. The difference of their squares is 28. The greater number is:

$$\begin{array}{c} \swarrow \quad \searrow \\ 3x \quad \& \quad 4x \end{array}$$

Choices:

(a) 8

(b) 12

(c) 24

(d) 64

$$(4x)^2 - (3x)^2 = 28$$

$$16x^2 - 9x^2 = 28$$

$$7x^2 = 28$$

$$x^2 = 4$$

$$x = 2$$

$$\begin{array}{c} 3x \quad \& \quad 4x \\ 6 \quad \& \quad 8 \end{array}$$

Question

If $x = \sqrt{3} + \frac{1}{\sqrt{3}}$ then $\left(x - \frac{\sqrt{126}}{\sqrt{42}}\right) \left(x - \frac{1}{x - \frac{2\sqrt{3}}{3}}\right) = ?$

- (a) $\frac{5}{6}$
- (b) $\frac{6}{5}$
- (c) $\frac{2}{3}$
- (d) $-\frac{3}{5}$

$$x - \frac{\sqrt{126}}{\sqrt{42}}$$

$$= x - \sqrt{3}$$

$$= \left(\sqrt{3} + \frac{1}{\sqrt{3}}\right) - \sqrt{3}$$

$$= \frac{1}{\sqrt{3}}$$

$$x - \frac{2\sqrt{3}}{3}$$

$$\Rightarrow \left(\sqrt{3} + \frac{1}{\sqrt{3}}\right) - \frac{2\sqrt{3}}{3}$$

$$\Rightarrow \sqrt{3} + \frac{1}{\sqrt{3}} - \frac{2}{\sqrt{3}}$$

$$\Rightarrow \sqrt{3} - \frac{1}{\sqrt{3}}$$

$$\left(x - \frac{\sqrt{126}}{\sqrt{42}}\right) \left(x - \frac{1}{x - \frac{2\sqrt{3}}{3}}\right)$$

$$= \frac{1}{\sqrt{3}} \left\{ \sqrt{3} + \frac{1}{\sqrt{3}} - \frac{1}{\frac{2}{\sqrt{3}}} \right\}$$

$$= \frac{1}{\sqrt{3}} \left\{ \sqrt{3} + \frac{1}{\sqrt{3}} - \frac{\sqrt{3}}{2} \right\}$$

$$= \frac{1}{\sqrt{3}} \left\{ \frac{3+1}{\sqrt{3}} - \frac{\sqrt{3}}{2} \right\}$$

$$= \frac{1}{\sqrt{3}} \left\{ \frac{8-3}{2\sqrt{3}} \right\}$$

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

Question

If $x = \sqrt{3} + \frac{1}{\sqrt{3}}$ then $\left(x - \frac{\sqrt{126}}{\sqrt{42}}\right) \left(x - \frac{1}{x - \frac{2\sqrt{3}}{3}}\right) = ?$

~~(a) $\frac{5}{6}$~~

(b) $\frac{6}{5}$

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

(d) $-\frac{3}{5}$

$$x = \sqrt{3} + \frac{1}{\sqrt{3}}$$

$$= 1.7320 + 0.5773$$

$$x = 2.3094$$

$$\left(x - \frac{\sqrt{126}}{\sqrt{42}}\right) \left\{ x - \frac{1}{x - \frac{2\sqrt{3}}{3}} \right\}$$

$$= \{ 2.3094 - 1.7320 \} \left\{ 2.3094 - \frac{1}{2.3094 - 1.1547} \right\}$$

$$= 0.5774 \{ 2.3094 - 0.8660 \}$$

$$= 0.8334$$

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

Question

If $\log_a \sqrt{3} = \frac{1}{6}$, find the value of 'a':

Choices:

(a) 9

(b) 81

(c) 27

(d) 3

$$\log_a(\sqrt{3}) = \frac{1}{6}$$
$$\Downarrow$$
$$(\sqrt{3}) = (a)^{1/6}$$

$$(\sqrt{3})^6 = a$$

$$a = 27$$

if $\log_a(x) = y$

then

$$x = a^y$$

Q:

If $\log_a(ab) = x$, then $\log_b(ab)$ is:

Choices:

(a) $\frac{1}{x} = \frac{1}{4}$

(b) $\frac{x}{1+x} = \frac{4}{5}$

☒ (c) $\frac{x}{x-1} = \frac{4}{3}$

(d) None of these

$\log_a(ab) = x$

$a=2$ & $b=8$

$\log_2(2 \times 8) = x$

$\log_2(16) = x$

$4 = x$

$\log_b(ab) = ?$

$\log_8(2 \times 8)$
 $= \log_8(16)$

$= \log_{2^3}(2^4)$

$= \frac{4}{3} \log_2 2$

$= \frac{4}{3}(1) = \frac{4}{3}$

$\log(x)^n = n \log x$

$\log_a(x) = \frac{1}{b} \log_{a^b} x$

Question

The salaries of A, B, and C are in the ratio 2 : 3 : 5. If increments of 15%, 10%, and 20% are allowed respectively to their salaries, what will be the new ratio of their salaries?

Choices:

(a) 3 : 3 : 10

(b) 10 : 11 : 20

(c) 23 : 33 : 60

(d) Cannot be determined

$$A = 200 + 15\% = 230$$

$$B = 300 + 10\% = 330$$

$$C = 500 + 20\% = 600$$

Question

If $A : B = 5 : 3$, $B : C = 6 : 7$, and $C : D = 14 : 9$, then the value of $A : B : C : D$ is:

Choices:

~~X~~ (a) $20 : 14 : 12 : 9$

~~X~~ (b) $20 : 9 : 12 : 14$

~~X~~ (c) $20 : 9 : 14 : 12$

☒ (d) $20 : 12 : 14 : 9$

Handwritten work for choice (d):

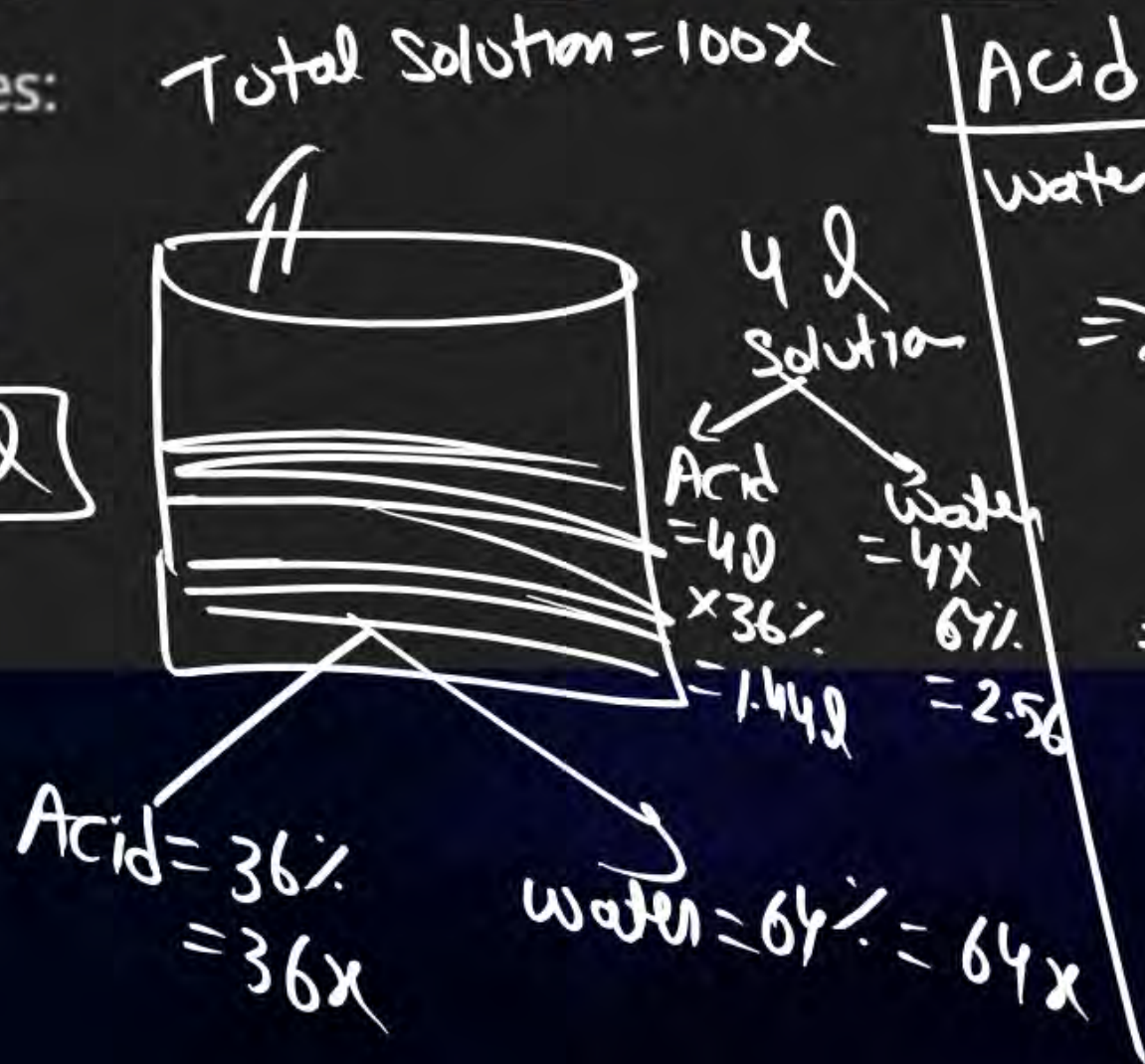
$$\begin{array}{l} \overbrace{20 : 12}^{4 : 3} : \overbrace{14 : 9}^{14 : 9} \\ \quad \quad \quad \underbrace{\quad \quad}_{6 : 7} \end{array}$$

Question

A vessel contained a solution of acid and water in which water was 64%. Four litres of the solution were taken out of the vessel, and the same quantity of water was added. If the resulting solution contains 30% acid, the quantity (in litres) of the solution in the beginning in the vessel was:

Choices:

- (a) 12
- (b) 36
- ☒ (c) 24
- (d) 2



$$\frac{\text{Acid}}{\text{Water}} = \frac{36x - 1.44}{64x - 2.56 + 4} = \frac{30}{70} = \frac{3}{7}$$

$$\Rightarrow \frac{36x - 1.44}{64x + 1.44} = \frac{3}{7}$$

$$\Rightarrow 252x - 10.08 = 192x + 4.32$$

$$\Rightarrow 60x = 14.4$$

$$\Rightarrow x = \frac{14.4}{60}$$

Total sol.
 $= 100x$
 $= \frac{14.4}{60} \times 100 = 24$

Question

Incomes of R and S are in the ratio 7 : 9, and their expenditures are in the ratio 4 : 5. Their total expenditure is equal to the income of R. What is the ratio of their savings?

Choices:

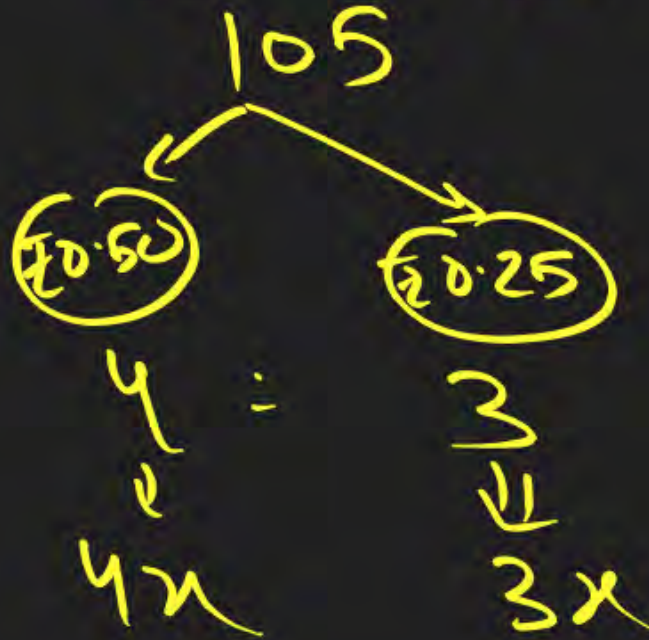
- (a) 23 : 36
- (b) 28 : 41
- (c) 31 : 43
- (d) 35 : 46

Question

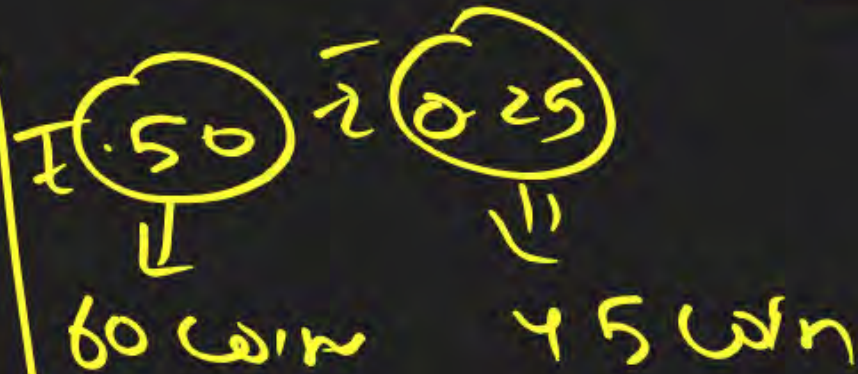
A bag contains 105 coins consisting of some 50 paise and 25 paise coins. The ratio of the number of these coins is 4 : 3. The total value (in ₹) in the bag is:

Choices:

- (a) 43.25
- (b) 41.25
- (c) 39.25
- (d) 35.25



$$\begin{aligned}\text{Total Win} &= 105 \\ 4x + 3x &= 105 \\ 7x &= 105 \\ \boxed{x} &= \boxed{15}\end{aligned}$$



$$\begin{aligned}60 \times 0.50 + 45 \times 0.25 \\ = 30 + 11.25 \\ = 41.25\end{aligned}$$

Question

If $\log_{10} 3 = x$ and $\log_{10} 4 = y$, then the value of $\log_{10} 120$ can be expressed as:

Choices:

(a) $x - y + 1$

☒ (b) $x + y + 1$

(c) $x + y - 1$

(d) $2x + y - 1$

$$\log_{10} 3 = x$$

$$\log_{10} 4 = y$$

$$\begin{aligned}\log(120) &= \log(12 \times 10) \\ &= \log(4 \times 3 \times 10) \\ &= \log_{10} 4 + \log_{10} 3 + \log_{10} 10 \\ &= y + x + 1\end{aligned}$$

Question

Find the value of $\log(x^6)$, if $\log(x) + 2\log(x^2) + 3\log(x^3) = 14$.

Choices:

(a) 3

(b) 4

(c) 5

(d) 6

$$6 \log x = ?$$

$$6(1) = 6$$

$$\log(x) + 4\log x + 9\log x = 14$$

$$\log x [1 + 4 + 9] = 14$$

$$\log x (14) = 14$$

$$\log x = 1$$

Question

A box contains 25 paise coins, 10 paise coins, and 5 paise coins in the ratio 3 : 2 : 1, and the total money is ₹40. How many 5 paise coins are there?

Choices:

(a) 65

(b) 55

(c) 40 ✓

(d) 50

$$\begin{array}{ccc} \text{₹}0.25 & \text{₹}0.10 & \text{₹}0.05 \\ 3x & 2x & 1x \end{array}$$

$$\text{Total money} = ₹40$$

$$0.25(3x) + 0.10(2x) + 0.05(x) = 40$$

$$1.00x = 40$$

$$x = 40$$

Question

$\log_3 4 \cdot \log_4 5 \cdot \log_5 6 \cdot \log_6 7 \cdot \log_7 8 \cdot \log_8 9$ is equal to:

Choices:

(a) 3

(b) 2

(c) 1

(d) 0

$$\frac{\log(4)}{\log(3)} \times \frac{\log(5)}{\log(4)} \times \frac{\log(6)}{\log(5)} \times \frac{\log(7)}{\log(6)} \times \frac{\log(8)}{\log(7)} \times \frac{\log(9)}{\log(8)}$$

$$= \frac{\log 9}{\log 3} = \frac{\log(3)^2}{\log(3)} = \frac{2 \log(3)}{\log(3)} = 2$$

$$\log_a(x) = \frac{\log(x)}{\log(a)}$$

Question

A group of 400 soldiers posted at a border area had a provision for 31 days. After 28 days, 280 soldiers from this group were called back. Find the number of days for which the remaining ration will be sufficient.

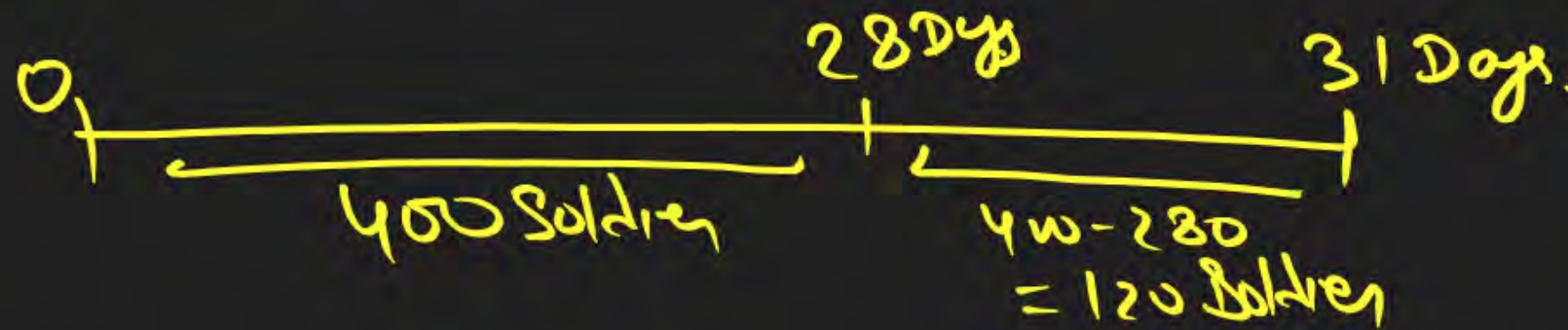
Choices:

(a) 3

(b) 6

(c) 8

(d) 10



$$120 \times x \text{ days} = 1200$$

$$x = \frac{1200}{120}$$

$$x = 10 \text{ Days}$$

$$\text{Total food} = 400 \times 31 = 12400 \text{ units}$$

$$\text{Food used till 28 Days} = 400 \times 28 = 11200 \text{ units}$$

Food left

$$\underline{\underline{1200 \text{ units}}}$$

Question

If $x = y^a$, $y = z^b$, $z = x^c$, then the value of abc is:

Choices:

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Question

If $2^x = 4^y = 8^z$ and

$$\frac{1}{2x} + \frac{1}{4y} + \frac{1}{6z} = \frac{24}{7}$$

then the value of z is:

Choices:

(a) $\frac{7}{16}$

(b) 7

☒ (c) $\frac{7}{48}$

(d) $\frac{7}{64}$

$$2^x = 4^y = 8^z$$

$$2^x = 2^{2y} = 2^{3z}$$

wt $x = 2y = 3z = k$

$$\frac{1}{2x} + \frac{1}{4y} + \frac{1}{6z} = \frac{24}{7}$$

$$\frac{1}{2} \left[\frac{1}{x} + \frac{1}{2y} + \frac{1}{3z} \right] = \frac{24}{7}$$

$$\frac{1}{2} \left[\frac{1}{k} + \frac{1}{k} + \frac{1}{k} \right] = \frac{24}{7}$$

$$\Rightarrow \frac{1}{2} \left[\frac{3}{k} \right] = \frac{24}{7}$$

$$\Rightarrow 21 = 48k$$

$$\Rightarrow k = \frac{21}{48}$$

or

$$3z = k$$

$$3z = \frac{21}{48}$$

$$z = \frac{7}{48}$$

Question

If $x = 2 + \sqrt{3}$ and $y = 2 - \sqrt{3}$, then the value of $x^2 + y^2 = ?$

A. 14

B. 4

C. 2

D. 6

(June 2024 Exam)

Question

$\log_2 \log_2 \log_4 256 + 2 \log_{\sqrt{2}} 2$ is equal to:

(A) 2

(B) 3

(C) 5

(D) 7

Question

What is the value of

$$\left(\frac{x^b}{x^c}\right)^{b+c-a} \cdot \left(\frac{x^c}{x^a}\right)^{c+a-b} \cdot \left(\frac{x^a}{x^b}\right)^{a+b-c} ?$$

- (A) x^{abc}
- (B) x^{a+b+c}
- (C) -1
- (D) 1

(September 2024 Exam)

Question

Q. If $\underbrace{4^x} = \underbrace{5^y} = \underbrace{20^z}$, then z is equal to

(A) $\frac{x+y}{xy}$

(B) xy

(C) $\frac{1}{xy}$

(D) $\frac{xy}{x+y}$

$$\underbrace{4}_2 \times \underbrace{5}_5 = \underbrace{20}_{2 \times 5}$$

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$$

$$\Rightarrow \frac{x+y}{xy} = \frac{1}{z}$$

$$\frac{xy}{x+y} = z$$



Topic : Equations



Quadratic Eqn. $\rightarrow$ degree = 2

$$ax^2 + bx + c = 0, a \neq 0$$

$\Rightarrow$ 2 roots $\Rightarrow \alpha, \beta$

$$\textcircled{1} \alpha + \beta = -\frac{b}{a}$$

$$\textcircled{2} \alpha\beta = \frac{c}{a}$$

, $D \rightarrow$ Discriminant
 $D = b^2 - 4ac$

* If Roots are Real
 $\Rightarrow \boxed{D \geq 0}$

* If Roots are equal
 $\boxed{D = 0}$

* If Roots are not real
 $\boxed{D < 0}$ (Im)

* If Roots are Real and unequal
 $\boxed{D > 0}$

Quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

① If one root is negative of other $\Rightarrow \boxed{b=0}$

② If one root is reciprocal of other $\Rightarrow \boxed{c=a}$

* If $D \rightarrow +ve$ & is a perfect square $\Rightarrow$ roots $\rightarrow$ rational roots

* If $D \rightarrow +ve$ but is not a perfect square
roots $\rightarrow$ irrational

eg: $-3 + \sqrt{2}$
 $\downarrow$
 $-3 - \sqrt{2}$

$\hookrightarrow \begin{matrix} a + \sqrt{b} \\ a - \sqrt{b} \end{matrix}$

QUESTION



#Q. If $\frac{3}{x+y} + \frac{2}{x-y} = -1$, $\frac{1}{x+y} - \frac{1}{x-y} = \frac{4}{3}$, then x and y are :

1 $\overset{x,y}{2,1} \rightarrow \frac{1}{3} + \frac{2}{1} = 3$

2 $\checkmark \quad 1,2 \rightarrow \frac{1}{3} + \frac{2}{-1} = 1 - 2 = -1; \quad \frac{1}{3} - \left(\frac{1}{-1}\right) = \frac{1}{3} + 1 = \frac{1+3}{3} = \frac{4}{3}$

3 $-1, 2$

4 $-2, 1$

QUESTION



#Q. In a MCQ paper consisting of 100 questions of 1 mark each, a candidate get 70% marks. If the candidate attempted all questions and there was a penalty of 0.25 marks for wrong answers, the difference between number of right answers and wrong answers is:

1 32

2 52

3 24

4 None

R-W

= 52

$$76 = \text{Right} \rightarrow x \times 1$$

$$24 = \text{Wrong} \rightarrow (100 - x) \times (-0.25)$$

$$x + (100 - x)(-0.25) = 70$$

$$x - 25 + 0.25x = 70$$

$$1.25x = 95$$

$$x = 76$$

QUESTION



#Q. The age of a man is five times the sum of ages of his two sons and after 10 years, his age will be double the sum of their ages. The present age of the man must be :

$$S = \frac{C_1}{+10} + \frac{C_2}{+10}$$

S.

1 40 years

2 50 years

3 55 years

4 60 years

$$M = 5S = 5 \times 10 = 50$$

↓
10 سال बाद

$$M + 10 = 2(S + 20)$$

$$5S + 10 = 2S + 40$$

$$3S = 30$$

$$S = 10$$

QUESTION

$$\alpha^2 + \beta^2 = ?$$

$$(\alpha + \beta)^2 - 2\alpha\beta$$

$$(4)^2 - 2(1) = 16 - 2 = 14$$

#Q. If α and β are the roots of the equation $x^2 - 4x + 1 = 0$ then the value of $\alpha^3 + \beta^3$ will be :

$$\alpha + \beta = -\frac{b}{a} = -\frac{(-4)}{1} = 4$$

$$\alpha\beta = \frac{c}{a} = \frac{1}{1} = 1$$

$$\alpha^3 + \beta^3 = ?$$

$$(\alpha + \beta)^3 = \alpha^3 + \beta^3 + 3\alpha\beta(\alpha + \beta)$$

$$64 = \alpha^3 + \beta^3 + 3(1)(4)$$

$$64 - 12 = 52$$

1 -76

2 76

3 52

4 -52



QUESTION



#Q. A rational root of the cubic equation $2x^3 - x^2 - 4x + 2 = 0$ is :

$$x^2(2x-1) - 2(2x-1) = 0$$

$$(2x-1)(x^2-1) = 0$$

$$2x-1=0, \quad x^2-1=0$$

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

$$x^2 = 1$$

$$x = \pm 1$$

1 $\frac{1}{2}$

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

3 2

4 -2

QUESTION



#Q. If the roots of the equation $x^3 - 15x^2 + kx - 45 = 0$ are in AP, find the value of k:

$$(5)^3 - 15(5)^2 + 5k - 45 = 0$$

$\alpha, \beta, \gamma \Rightarrow A.P.$

$$125 - 375 + 5k - 45 = 0$$

$$2\beta = \alpha + \gamma$$

$$-295 + 5k = 0$$

$$5k = 295$$

$$k = \frac{295}{5}$$

$$= 59$$

$$\alpha + \beta + \gamma = -(-15) = 15$$

$$2\beta + \beta = 15$$

$$3\beta = 15$$

$$\beta = 5$$

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

roots $\rightarrow \alpha, \beta, \gamma$

$$(1) \alpha + \beta + \gamma = -\frac{b}{a}$$

$$(2) \alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a}$$

$$(3) \alpha\beta\gamma = -\frac{d}{a}$$

1 56

2 59

3 -56

4 -59

QUESTION



#Q. Find the value of k so that $x = 2$ is a root of the equation $3x^2 - kx + 5 = 0$

$$3(2)^2 - k(2) + 5 = 0$$

$$12 - 2k + 5 = 0$$

$$17 = 2k$$

$$k = \frac{17}{2}$$

1 $17/4$

2 $-17/4$

3 $17/2$

4 None

QUESTION



#Q. If $m + \sqrt{m} = \frac{14}{25}$, then value of m is:

1 ~~$3/25 \rightarrow \frac{3}{25} + \frac{\sqrt{3}}{5}$~~

2 ~~$1/25 \rightarrow \frac{1}{25} + \frac{1}{5} = \frac{1+5}{25} = \frac{6}{25}$~~

3 ~~$9/25 \rightarrow \frac{9}{25} + \frac{3}{5} = \frac{9+15}{25} = \frac{24}{25}$~~

4 ~~$4/25 \rightarrow \frac{4}{25} + \frac{2}{5} = \frac{4+10}{25} = \frac{14}{25}$~~

QUESTION



#Q. The harmonic mean of the roots of the equation $(5 + \sqrt{2})x^2 - (4 + \sqrt{5})x + (8 + 2\sqrt{5}) = 0$ is:

1 2

2 8

3 6

4 4

$$\alpha + \beta = \frac{(4 + \sqrt{5})}{(5 + \sqrt{2})}$$

$$\alpha\beta = \frac{(8 + 2\sqrt{5})}{5 + \sqrt{2}}$$

roots $\rightarrow \alpha, \beta$

$$HM = \frac{2\alpha\beta}{\alpha + \beta}$$

$$= \frac{2 \times 2(4 + \sqrt{5})}{5 + \sqrt{2}}$$

$$= 4$$

$$\frac{4 + \sqrt{5}}{5 + \sqrt{2}}$$

QUESTION



#Q. If square of a number exceeds thrice of the number by 18, then the number is :

1 ~~-5~~ $\rightarrow (-5)^2 = 3(-5) + 18$
 $25 = 3$

2 ~~-6~~ $\rightarrow (-6)^2 = 3(-6) + 18$
 $36 = 0$

3 $6 \rightarrow (6)^2 = 3(6) + 18$
 $36 = 36$

4 None

QUESTION



#Q. One root of the equation: $x^2 - 2(5 + m)x + (7 + m) = 0$ is reciprocal of the other. Find the value of m .

1 -20/3

2 -7

3 7

4 None

$$\begin{aligned}c &= a \\ 7 + m &= 1 \\ m &= 1 - 7 = -6\end{aligned}$$

QUESTION



- #Q. A small manufacturing firm produces two types of gadgets A and B, which are first processed in the foundry then sent to the machine shop for finishing. The number of man-hours of labour required in each shop for the production of each unit of A and B, and the number of man-hours the firm has available per week are as follows:

Gadget	Foundry	Machine-shop
A (x)	$10x$	$5x$
B (y)	$6y$	$4y$
Firm's capacity per week	1000	600

Let the firm manufactures x units of A and y units of B. The constraints are:

- (a) $10x+6y \leq 1000$, $5x+4y \geq 600$, $x \geq 0, y \leq 0$
- (b) $10x+6y \leq 1000$, $5x+4y \leq 600$, $x \geq 0, y \geq 0$
- (c) $10x+6y \geq 1000$, $5x+4y \leq 600$, $x \leq 0, y \leq 0$
- (d) $10x+6y \leq 1000$, $5x+4y \geq 600$, $x \leq 0, y \leq 0$

$$10x + 6y \leq 1000$$

$$5x + 4y \leq 600$$

$$x, y \geq 0$$

QUESTION



#Q. A bag contained 25 paise, 10 paise and 5 paise are in the ratio 3:2:1. The total value is ₹ 40, the number of 5 paise coins is

1 45

2 48

3 40

4 20

$$25(3x) + 10(2x) + 5(x) = 40 \times 100$$

$$100x = 4000$$
$$x = 40$$

$$25p \rightarrow 3x$$

$$10p \rightarrow 2x$$

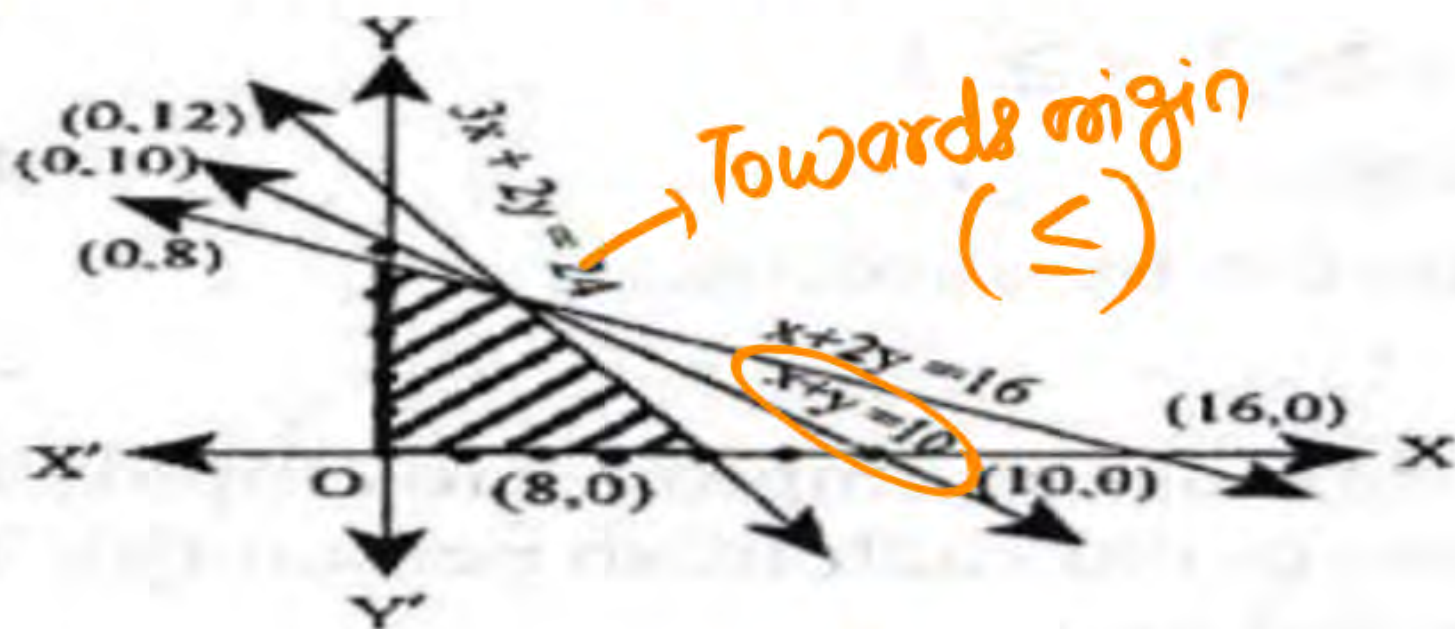
$$5p \rightarrow x = 40$$

QUESTION



$\leq$ $\longleftrightarrow$ $<$ line
 $\geq$ $\longleftrightarrow$ $>$ $---$

The shaded region represents:



- (a) $3x + 2y \leq 24, x + 2y \leq 16, x + y \leq 10, x \geq 0, y \geq 0$
- (b) $3x + 2y \leq 24, x + 2y \leq 16, x + y \geq 10, x \geq 0, y \geq 0$
- (c) $3x + 2y \leq 24, x + 2y \leq 16, x + y < 10, x > 0, y > 0$
- (d) None of these.

Question

$$2x - y < 0$$

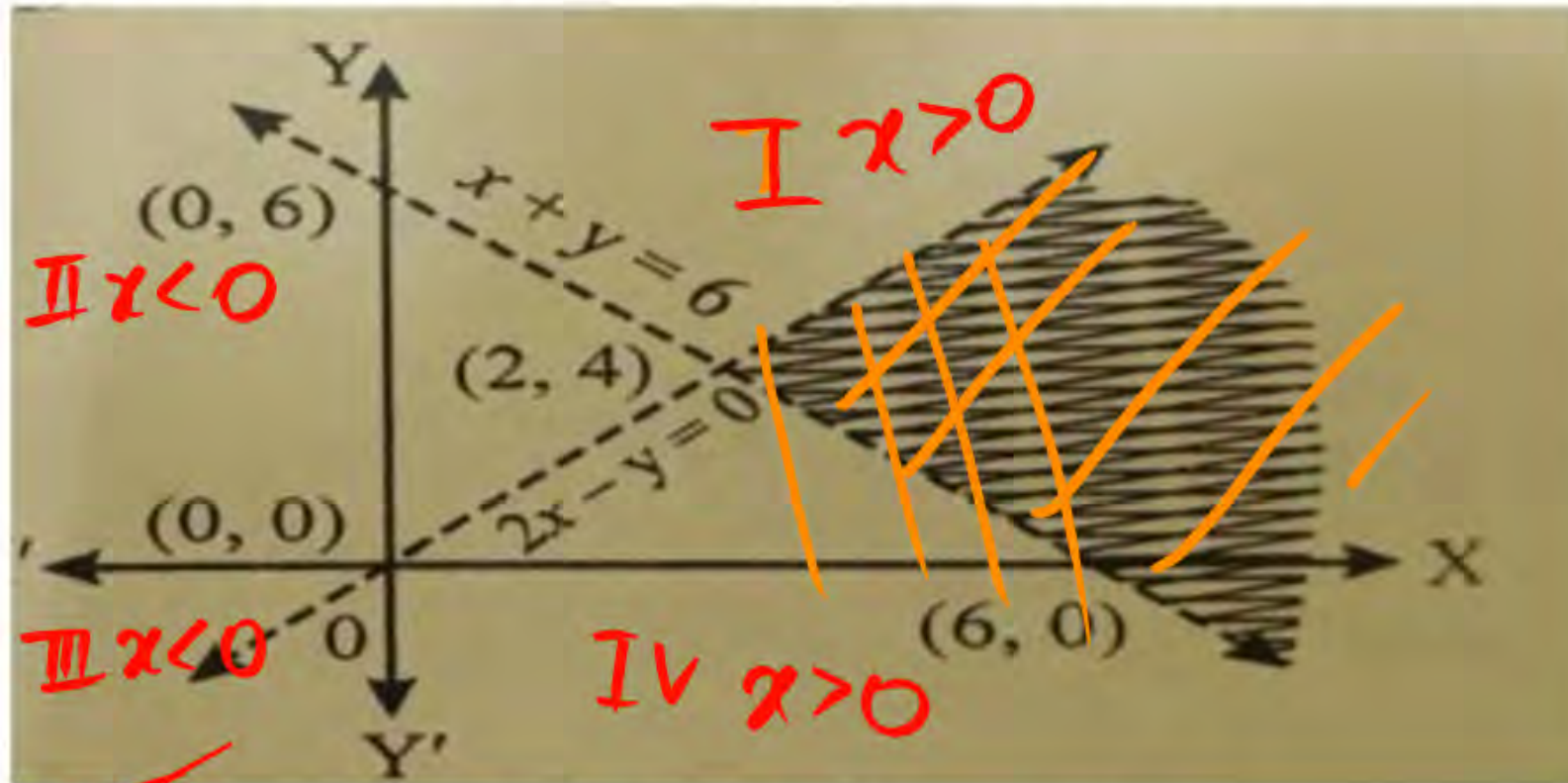
$$2x < y$$

$$2x - y > 0$$

$$2x > y$$



The shaded area is represented by which of the following option?



- (a) $x + y > 6$; $2x - y > 0$; $x > 0$
- (b) $x + y < 6$; $2x - y > 0$; $x < 0$
- (c) $x + y > 6$; $2x - y < 0$; $x > 0$
- (d) $x + y > 6$; $2x - y > 0$; $x < 0$

Question



$$20 + 0 \leq 20$$
$$30 + 0 \leq 12$$

On solving the inequalities $2x + 5y \leq 20$, $3x + 2y \leq 12$, $x \geq 0$, $y \geq 0$, we get the following situation $(2, 3) \rightarrow 4 + 15 \leq 20$, $6 + 6 \leq 12$;

- (a) $(0, 0)$, $(0, 4)$, $(4, 0)$ and $(20/11, 36/11)$
- (b) $(0, 0)$, $(10, 0)$, $(0, 6)$ and $(20/11, 36/11)$
- (c) $(0, 0)$, $(0, 4)$, $(4, 0)$ and $(2, 3)$
- (d) $(0, 0)$, $(10, 0)$, $(0, 6)$ and $(2, 3)$

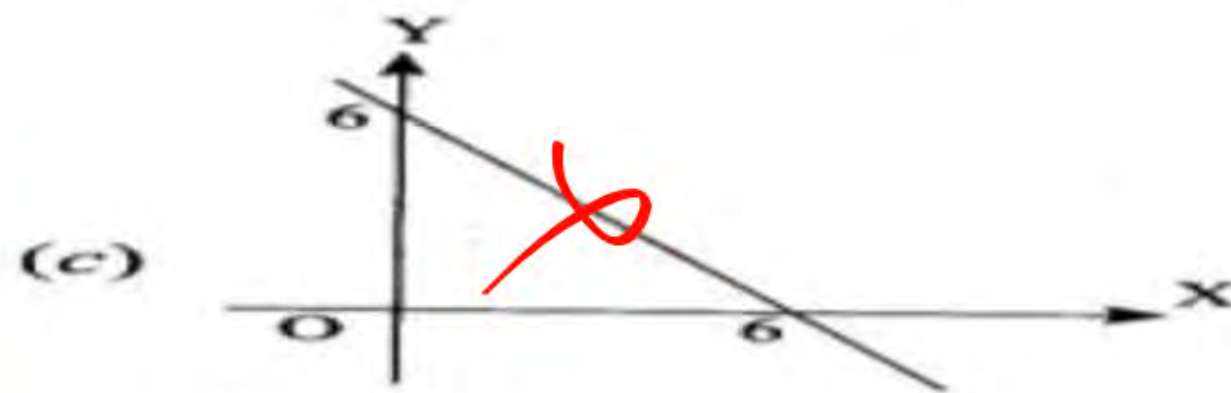
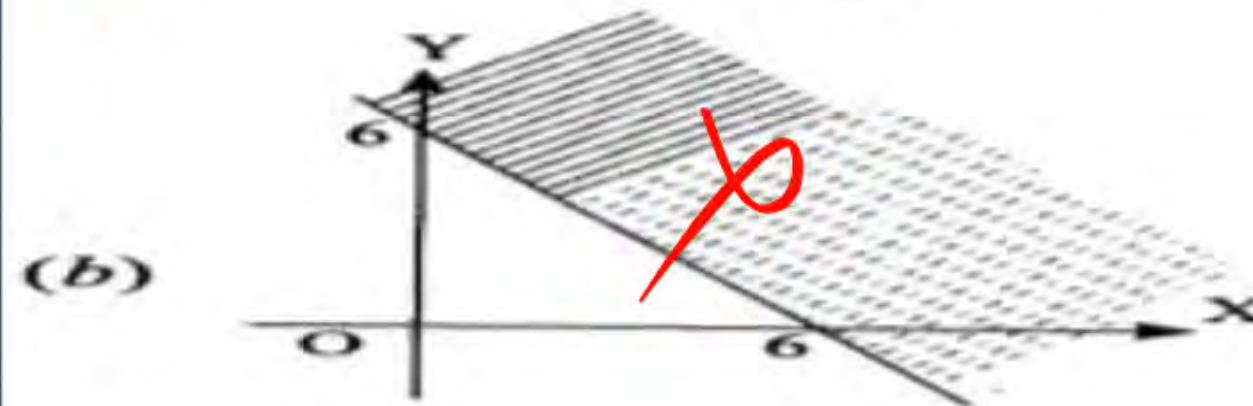
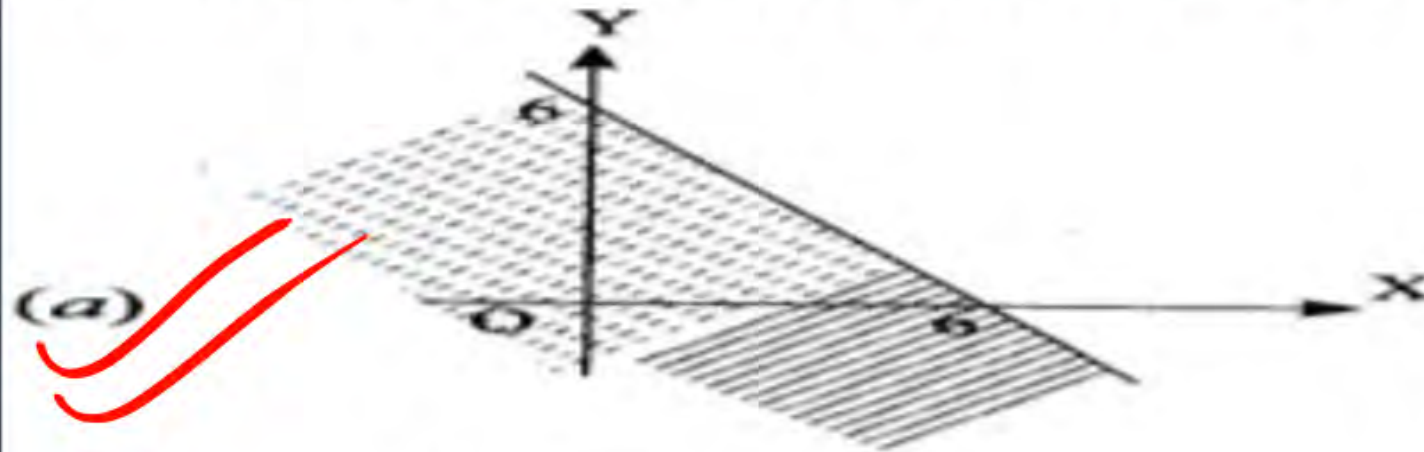
Question



(a) None of these.

Which of the following graph represents the inequality $x + y \leq 6$ is

$$x + y \leq 6$$



(d) None of these

CA FOUNDATION

CHANAKYA 3.0

Sequence Series

Quantitative Aptitude

By- Anurag Chauhan



Question

Find the sum of n terms of the A.P., whose n^{th} term is $5n + 1$.

(A) $\frac{2n}{7}$

(B) $\frac{n}{2}$

(C) $\frac{n(7 + 5n)}{2}$

(D) $\frac{n(7 + 4n)}{2}$

$S_n = ?$

$$a_n = 5n + 1$$

$$a_1 = 5 + 1 = 6$$

$$a_2 = 5(2) + 1 = 11$$

$$a_3 = 5(3) + 1 = 16$$

$$\begin{aligned} S_n &= \frac{n}{2} \{ 2a + (n-1)d \} \\ &= \frac{n}{2} \{ 2(6) + (n-1)(5) \} \\ &= \frac{n}{2} \{ 12 + 5n - 5 \} \\ &= \frac{n}{2} \{ 7 + 5n \} \end{aligned}$$

The sum of first three terms of a G.P. is $\frac{21}{2}$ and their product is 27. Which of the following is not a term of the G.P., if the numbers are positive?

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

~~(B) 3~~

~~(C) $\frac{3}{2}$~~

~~(D) 6~~

Sum
Terms: $\frac{a}{r}, a, ar$

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

$\frac{3}{2} + 3 + 6 = \frac{21}{2}$

Product = 27
 $\frac{a}{r} \cdot a \cdot ar = 27$

$a^3 = 27$

$a = 3$

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

$\frac{3}{2} + 3 + 6$
 $= 1.5 + 9$
 $= 10.5$

Question

Insert 4 numbers between 2 and 22 such that the resulting sequence is an Arithmetic Progression (A.P.).

~~(A)~~ 5, 9, 13, 17

~~(C)~~ 4, 10, 15, 19

~~(B)~~ 4, 8, 12, 16

(D) 6, 10, 14, 18

2, 6, 10, 14, 18, 22

Question

Find the sum of series $1 + \frac{1}{2} + \frac{1}{4} + \dots$ upto 6 terms.

~~(A)~~ $\frac{32}{63}$

~~(C)~~ $\frac{26}{53}$

~~(B)~~ $\frac{63}{32}$

~~(D)~~ $\frac{53}{26}$

$$r = \frac{a_2}{a_1} = \frac{0.5}{1} = 0.5$$

$$S_n = a \left(\frac{r^n - 1}{r - 1} \right)$$

$$= 1 \left\{ \frac{(0.5)^6 - 1}{0.5 - 1} \right\} = \frac{-0.984375}{-0.5} = 1.96875$$

Question

The product of three numbers which are in GP is 512. Then the second number is

(A) 2 ☒

☒ (B) 3

(C) 6 ☒

☒ (D) 8

$$(a) (a) (ax) = 512$$

$$a^3 = 512$$

$$a = 8$$

Question

Find the 9th term of the A.P. 8, 5, 2, -1, -4,

(A) -10

(B) -24

(C) -16

(D) -4

$$d = 5 - 8 = -3$$

$$\begin{aligned} a_9 &= a + 8d \\ &= 8 + 8(-3) \\ &= 8 - 24 \\ &= -16 \end{aligned}$$

Question

The sum of series $1 + 2 + 3 + \dots$ is 55. The number of terms is

(A) 40

(B) 30

(C) 20

(D) 10

1
2
3
4
5
6
7
8
9
10

$$S_n = 55$$

$$\frac{n}{2} \{2a + (n-1)d\} = 55$$

$$\frac{n}{2} \{2(1) + (n-1)(1)\} = 55$$

$$\Rightarrow \frac{n}{2} \{2 + n - 1\} = 55$$

$$\frac{n}{2} (n+1) = 55$$

$$\boxed{n=10}$$

Question

If for an infinite geometric progression, first term is 'a', common ratio is 'r', the sum is 8 and the second term is $\frac{7}{8}$, then :

~~(A)~~ $a = 4$ & $r = \frac{7}{16}$

~~(B)~~ $a = 3$ & $r = \frac{7}{24}$

(C) $a = 7$ & $r = \frac{1}{8}$

~~(D)~~ $a = 2$ & $r = \frac{7}{32}$

$$\begin{aligned} a_2 &= ar \\ &= 4 \times \frac{7}{16} \\ &= \frac{7}{4} \end{aligned}$$

$$\begin{aligned} S_{\infty} &= \frac{a}{1-r} \\ &= \frac{7}{1-\frac{1}{8}} \\ &= \frac{7}{\frac{7}{8}} = 7 + \frac{8}{7} = 8 \end{aligned}$$

Question

The numbers x , 8 , y are in G.P. and the numbers x , y , -8 are in A.P. The values of x and y respectively shall be :

~~(A)~~ 4, 16

~~(B)~~ 16, 4

~~(C)~~ 4, 8

~~(D)~~ 8, 4

$$a \quad ar^2$$
$$8^2 = xy$$

GP: $x, 8, y$ AP: $x, y, -8$

$\downarrow \quad \downarrow \quad \downarrow$

16, 4, -8

-12 -12

Question

If fourth term of A.P. series is zero, then what is the ratio of twenty-fifth term to eleventh term?

(A) 4

(B) 5

(D) 2

(C) 3

$$a_4 = 0$$

$$a + 3d = 0$$

$$a = -3d$$

$$\begin{aligned}\frac{a_{25}}{a_{11}} &= \frac{a + 24d}{a + 10d} \\ &= \frac{-3d + 24d}{-3d + 10d} \\ &= \frac{21d}{7d} = 3\end{aligned}$$

Question

The n th term of the series $9, 7, 5, \dots$ and $15, 12, 9, \dots$ are same. Find the n th term?

- (a) 7
- (b) 8
- (c) 9
- (d) 10

Question

The largest value of n for which $\frac{1}{2} + \frac{1}{2^2} + \dots + \frac{1}{2^n} < 0.998$ is

• (a) 9

• (b) 6

• (c) 7

• ☒ (d) 8

$$a \left\{ \frac{1 - r^n}{1 - r} \right\} < 0.998$$

$$\frac{1}{2} \left\{ \frac{1 - (0.5)^n}{1 - 0.5} \right\} < 0.998$$

$$\cancel{0.5} \left\{ \frac{1 - (\frac{1}{2})^n}{\cancel{0.5}} \right\} < 0.998$$

$$1 - \frac{1}{(2)^n} < 0.998$$

$$1 - 0.998 < \frac{1}{(2)^n}$$

$$0.002 < \frac{1}{(2)^n}$$

$$2^n < \frac{1}{0.002}$$

$$2^n < 500$$

$$\begin{aligned} 2^1 &= 2 \\ 2^2 &= 4 \\ 2^3 &= 8 \\ 2^4 &= 16 \\ 2^5 &= 32 \\ 2^6 &= 64 \\ 2^7 &= 128 \\ 2^8 &= 256 \\ 2^9 &= 512 \end{aligned}$$



Topic : Number Series



Identify the pattern

QUESTION

#Q. 22, 24, 28, ?, 52, 84

$$\begin{array}{ccccccc}
 & & & 36 & & & \\
 22, & 24, & 28, & ?, & 52, & 84 \\
 \underbrace{\hspace{1cm}} & \underbrace{\hspace{1cm}} & \underbrace{\hspace{1cm}} & \underbrace{\hspace{1cm}} & \underbrace{\hspace{1cm}} & \underbrace{\hspace{1cm}} \\
 +2 & +2 & +4 & +8 & +16 & +32
 \end{array}$$

~~1 36~~

2 38

3 42

4 46

QUESTION

#Q. 2, 5, 9, 19, 37, ?

1 73

2 75

3 76

4 78

2, 5, 9, 19, 37, ?

$$2 \times 2 + 1 = 5$$

$$5 \times 2 - 1 = 9$$

$$9 \times 2 + 1 = 19$$

$$19 \times 2 - 1 = 37$$

$$37 \times 2 + 1 = 74 + 1 = 75$$



QUESTION

#Q. 6, 13, 25, 51, 101, ?

1 201

2 202

3 203

4 205

6, 13, 25, 51, 101, ?

$$6 \times 2 + 1 = 13$$

$$13 \times 2 - 1 = 25$$

$$25 \times 2 + 1 = 51$$

$$51 \times 2 - 1 = 101$$

$$101 \times 2 + 1 = 202 + 1 = 203$$

QUESTION



#Q. * 10000, 11000, 9900, 10890, 9801, ?

$$10,000 \quad 11,000 \\ +10\%$$

$$11,000 - 10\% = 9900$$

$$9900 + 10\% = 10,890$$

$$10,890 - 10\% = 9801 + 10\% \\ = 10781.1$$

1 10241

2 10423

3 ~~10781~~

4 10929

QUESTION

#Q. 6, 12, 21, ?, 48

1 33

2 38

3 40

4 45

$$21 + 12 = 33$$

$$\begin{array}{ccccccc} 6 & 12 & 21 & ? & 48 \\ \underbrace{} & \underbrace{} & \underbrace{} & \underbrace{} & \underbrace{} \\ +6 & +9 & +12 & +15 \end{array}$$



QUESTION

#Q. 3, 10, 101, ?

1 10101

2 10201

3 10202

4 11012

3, 10, 101, ?

$$3^2 + 1 = 10$$

$$10^2 + 1 = 101$$

$$101^2 + 1 = 10202$$

QUESTION

#Q. 48, 24, 96, 48, 192, ?

- 1 76
- 2 90
- 3 96
- 4 98

$$\begin{array}{ccccccc}
 48 & , & 24 & , & 96 & , & 48 & , & 192 & , & ? & & 96 \\
 \underbrace{\hspace{1cm}} & & \underbrace{\hspace{1cm}} & & \underbrace{\hspace{1cm}} & & \underbrace{\hspace{1cm}} & & \underbrace{\hspace{1cm}} & & \underbrace{\hspace{1cm}} & & \underbrace{\hspace{1cm}} \\
 -24 & & +72 & & -48 & & +144 & & -96 & & & &
 \end{array}$$

$\underbrace{\hspace{10em}}_{\times 2} \qquad \underbrace{\hspace{10em}}_{\times 2}$

QUESTION



#Q. 4, 6, 9, $13\frac{1}{2}$, ?

1 $17\frac{1}{2}$

2 19

~~3 $20\frac{1}{4}$~~

4 $22\frac{3}{4}$

4, 6, 9, 13.5 , ? 20.25

$+2 \times 1.5$ $+3 \times 1.5$ $+4.5 \times 1.5$ $+6.65$

$\div 2$ $\swarrow$ $4.5 + \frac{4.5}{2}$

$2 + \frac{2}{2} = 3$ $3 + \frac{3}{2}$

QUESTION

#Q. 1, 1, 2, 6, 24, ?, 720

1 100

2 104

3 108

4 120



1, 1, 2, 6, 24, ?, 720

120

$$1 \times 1 = 1$$

$$1 \times 2 = 2$$

$$2 \times 3 = 6$$

$$6 \times 4 = 24$$

$$24 \times 5 = 120$$

$$120 \times 6 = 720$$

QUESTION

#Q. 3, 15, ?, 63, 99, 143

1 27

2 35

3 45

4 56

Handwritten solution showing the sequence: 3, 15, 35, 63, 99, 143. The differences between terms are 12, 20, 28, 36, 44, which are in an arithmetic progression with a common difference of 8. The value 35 is circled, and an arrow points to it from the question mark.

$$\begin{array}{cccccc} 3 & , & 15 & , & ? & , & 63 & , & 99 & , & 143 \\ \hline & & +12 & & +20 & & +28 & & +36 & & +44 \\ \hline & & +8 & & +8 & & +8 & & +8 & & \end{array}$$



QUESTION



26 → even

#Q. Find odd one out : 69, 55, 26, 13, 5

69, 55, 26, 13, (5)

$$6 \times 9 + 1 = 55$$

$$5 \times 5 + 1 = 26$$

$$2 \times 6 + 1 = 13$$

$$1 \times 3 + 1 = 4$$

1

5

2

13

3

26

4

55

QUESTION



#Q. Find odd one out : 4, 10, 22, 46, 96, 190, 382

94

1 4

2 10

3 96

4 382

$$4 \times 2 + 2 = 10$$

$$10 \times 2 + 2 = 22$$

$$22 \times 2 + 2 = 46$$

$$46 \times 2 + 2 = 94$$

4, 10, 22, 46, ~~96~~, 190, 382

+6 +12 +24 +48 +96 +192

QUESTION



#Q. Find odd one out : 380, 188, 92, 48, 20, 8, 2

44

$$\begin{array}{ccccccc} 2, & 8, & 20, & \cancel{48}, & 92, & 188, & 380 \\ \underbrace{}_{+6} & \underbrace{}_{+12} & \underbrace{}_{+24} & \underbrace{}_{+48} & \underbrace{}_{+96} & \underbrace{}_{+192} \end{array}$$

1 8

2 20

3 48

4 188

QUESTION



#Q. Find odd one out : 1, 3, 10, 21, 64, 129, 356, 777

1, 3, 10, 21, 64, 129, ~~356~~, 777

1 1

2 129

3 10

4 356

$$1 \times 2 + 1 = 3$$

$$3 \times 3 + 1 = 10$$

$$10 \times 2 + 1 = 21$$

$$21 \times 3 + 1 = 64$$

$$64 \times 2 + 1 = 129$$

$$129 \times 3 + 1 = 388$$

$$388 \times 2 + 1 = 777$$

QUESTION



#Q. Find odd one out : 2, 6, 24, 96, 285, 568, 567

2, 6, 24, 96, 285, 568, 567

$$2 \times 6 - 6 = 12 - 6 = 6$$

$$568 \times 1 - 1 = 567$$

$$6 \times 5 - 5 = 30 - 5 = 25$$

$$25 \times 4 - 4 = 100 - 4 = 96$$

$$96 \times 3 - 3 = 285$$

$$285 \times 2 - 2 = 568$$

1 6

2 24

3 285

4 567

QUESTION



#Q. In a certain code, LUTE is written as MUTE and FATE is written as GATE, then how will BLUE be written in that code ?

☒ 1 CLUE

☐ 2 GLUE

☐ 3 FLUE

☐ 4 SLUE

BLUE $\xrightarrow{+1}$ CLUE

QUESTION



#Q. If FISH is written as EHRG in a certain code, how would JUNGLE be written in that code ?

- ☒ 1 ITMFKD
- ☐ 2 ITNFKD
- ☐ 3 KVOHMF
- ☐ 4 TIMFKD

JUNGLE
| | | | |

F I S H
| | | |
E H R G

QUESTION



#Q. IF $A = 2$, $M = 26$, $Z = 52$, then $BET = ?$

$$\begin{array}{ccc} 2 & 5 & 20 \\ \times 2 & \times 2 & \times 2 \\ \hline 4 & 10 & 40 \\ \hline & & 54 \end{array}$$

$$A = 2 = 1 \times 2$$

$$M = 26 = 13 \times 2$$

$$Z = 52 = 26 \times 2$$

1 44

2 54

3 64

4 72

QUESTION



#Q. If in a certain code language “oka peru” means “fine cloth”; “meta lisa” means “clear water” and “dona lisa peru” means “fine clear weather”, which word in that language means “weather”?

1 peru

2 oka

3 meta

4 dona

Dona Lisa Peru
fine clear weather

Oka Peru
fine cloth

Meta Lisa
clear water

Peru — fine

Lisa — clear

Dona — weather

QUESTION



#Q. In a certain code language 123 means bright little boy, 145 means tall big boy and 637 means beautiful little flower. Which digit in that language means bright

1 1

2 2

3 3

4 4

1 2 3
Bright Little Boy

1 4 5
Tall Big Boy

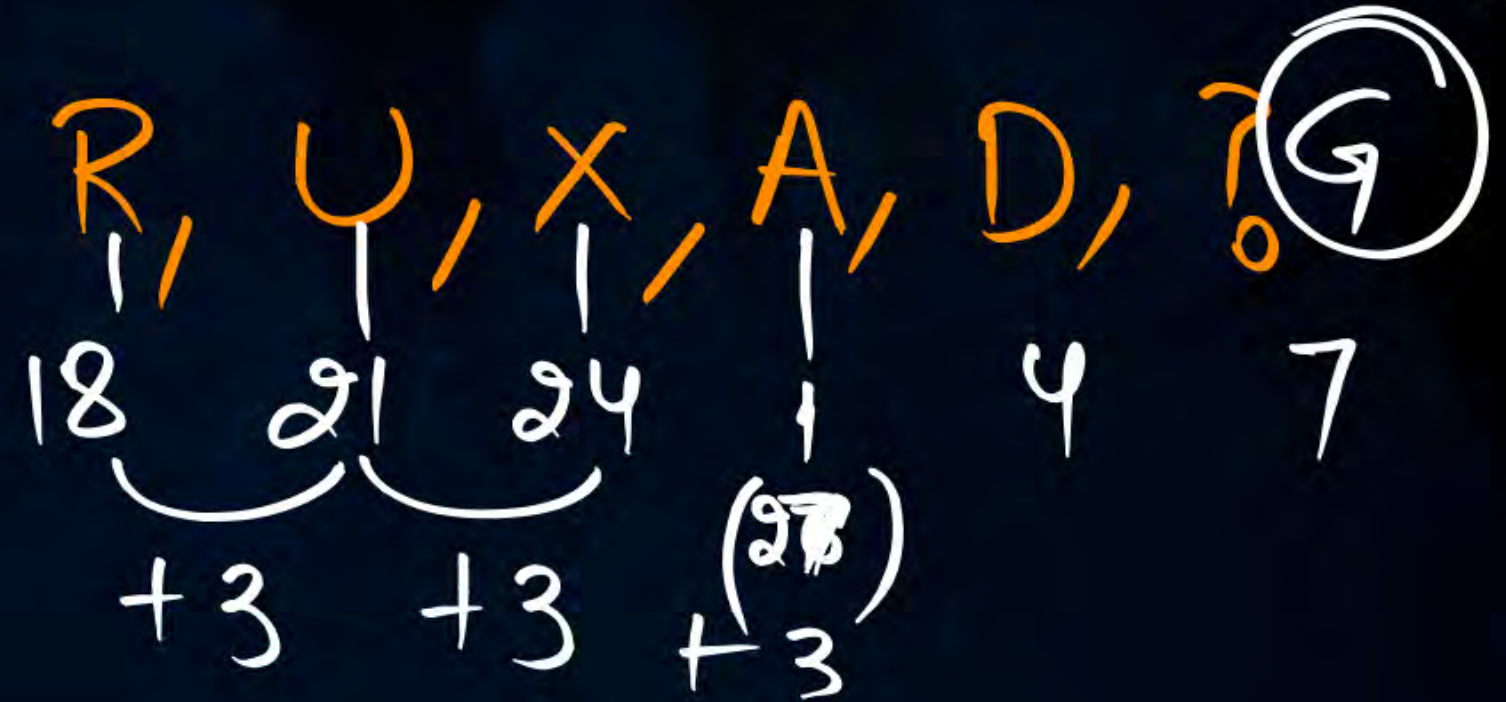
6 3 7
Beautiful Little flower

1-Boy
3-little
2-Bright

QUESTION



#Q. R, U, X, A, D, ?



1 E

2 F

3 G

4 H

Question

E J O T X
5 10 15 20 25
(Sep 2024)



#Q. Find the odd man out : 7, 23, 47, 119, 171, 287

A 171

B 119

C 287

D 7

$$\begin{array}{cccccc} 7 & 23 & 47 & 119 & 171 & 287 \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 3^2 - 2 & 5^2 - 2 & 7^2 - 2 & 11^2 - 2 & 13^2 - 2 & 17^2 - 2 \\ = 7 & = 23 & & & = 169 - 2 & = 287 \\ & & & & = 167 & \end{array}$$

THANK
YOU BACHCHO