

CDS 2 2024

LIVE

MATHS

REVISION

CLASS 14



NAVJYOTI SIR



27 August 2024 Live Classes Schedule

9:00AM --- 27 AUGUST 2024 DAILY DEFENCE UPDATES --- DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:30AM --- MOCK PERSONAL INTERVIEWS --- ANURADHA MA'AM

NDA 2 2024 LIVE CLASSES

11:00AM --- GK - CURRENT AFFAIRS REVISION - CLASS 3 --- DIVYANSHU SIR

1:00PM --- MATHS REVISION - CLASS 14 --- NAVJYOTI SIR

2:00PM --- CHEMISTRY REVISION - CLASS 7 --- SHIVANGI MA'AM

5:30PM --- ENGLISH - REVISION - CLASS 8 --- ANURADHA MA'AM

CDS 2 2024 LIVE CLASSES

11:00AM --- GK - CURRENT AFFAIRS REVISION - CLASS 3 --- DIVYANSHU SIR

2:00PM --- CHEMISTRY REVISION - CLASS 7 --- SHIVANGI MA'AM

3:00PM --- MATHS REVISION - CLASS 14 --- NAVJYOTI SIR

5:30PM --- ENGLISH - REVISION - CLASS 8 --- ANURADHA MA'AM



REVISION TOPICS :

- **Logarithms**
- **Set Theory**
- **Probability**

Q) What is the value of $\frac{(\log_{27} 9)(\log_{16} 64)}{\log_4 \sqrt{2}}$?

(a) 1

(b) 2

(c) 4

(d) 8

Q) What is the value of $\frac{(\log_{27} 9)(\log_{16} 64)}{\log_4 \sqrt{2}}$?

(a) 1

(b) 2

(c) 4

(d) 8

$$\frac{\left(\frac{\log_3 9}{\log_3 27}\right) \left(\frac{\log_4 64}{\log_4 16}\right)}{\frac{1}{\log_{\sqrt{2}} 4}} = \frac{\cancel{3} \times \cancel{3}}{\cancel{3} \times \cancel{3}} = \frac{1}{1} = 1$$

4

Ans: (c)

$$\log_b a = \frac{\log_m a}{\log_m b}$$

$$\log_b a = \frac{1}{\log_a b}$$

Q) If $(\log_x x)(\log_3 2x)(\log_{2x} y) = \log_x x^2$, then what is the value of y ?

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

(b) 9

(c) 18

(d) 27

$$1 \times \log_3 2x \times \log_{2x} y = 2$$

$$\frac{1}{\log_{2x} 3} \times \log_{2x} y = 2$$

$$\log_{2x} y = 2 \log_{2x} 3$$

$$\log_{2x} y = \log_{2x} 3^2$$

$$\Rightarrow \underline{y = 3^2 = 9}$$

$$m \log a = \log(a^m)$$

Q) If $(\log_x x)(\log_3 2x)(\log_{2x} y) = \log_x x^2$, then what is the value of y ?

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

(b) 9

(c) 18

(d) 27

Ans: (b)

Q) If $4^{\log_9 3} + 9^{\log_2 4} = 10^{\log_x 83}$, then x is

(a) 4

(b) 9

(c) 10

(d) None of these

$$4^{\frac{1}{\log_3 9}} + 9^2 = 10^{\log_x 83}$$

$$4^{\frac{1}{2}} + 81 =$$

$$2 + 81 =$$

$$\textcircled{83} = \underline{10}^{\log_x \textcircled{83}}$$

$$\Rightarrow \underline{\underline{x = 10}}$$

$$a^{\log_m x} = x$$

$$\Rightarrow \boxed{a = m}$$

Q) If $4^{\log_9 3} + 9^{\log_2 4} = 10^{\log_x 83}$, then x is

(a) 4

(b) 9

(c) 10

(d) None of these

Ans: (c)

Q) What is the value of $2 \log_8 2 - \frac{\log_3 9}{3}$?

(a) 0

(b) 1

(c) 2

(d) 1/3

$$2 \left(\frac{1}{\log_2 8} \right) - \frac{2}{3}$$

$$= 2 \left(\frac{1}{3} \right) - \frac{2}{3} = \frac{2}{3} - \frac{2}{3} = 0$$

Q) What is the value of $2 \log_8 2 - \frac{\log_3 9}{3}$?

(a) 0

(b) 1

(c) 2

(d) 1/3

Ans: (a)

Q) If $\log_{10} (x + 1) + \log_{10} 5 = 3$, then what is the value of x ?

(a) 199

(b) 200

(c) 299

(d) 300

Q) If $\log_{10} (x + 1) + \log_{10} 5 = 3$, then what is the value of x ?

(a) 199

(b) 200

(c) 299

(d) 300

Ans: (a)

Q) If $\log_e \left(\frac{a+b}{2} \right) = \frac{1}{2} (\log_e a + \log_e b)$, then

(a) $a = b$

(b) $a = \frac{b}{2}$

(c) $2a = b$

(d) $a = \frac{b}{3}$

Q) If $\log_e \left(\frac{a+b}{2} \right) = \frac{1}{2} (\log_e a + \log_e b)$, then

(a) $a = b$

(b) $a = \frac{b}{2}$

(c) $2a = b$

(d) $a = \frac{b}{3}$

Ans: (a)

Q) The value of $e^{(\log_{10} \tan 1^\circ + \log_{10} \tan 2^\circ + \dots + \log_{10} \tan 89^\circ)}$ is equal to

(a) 0

(b) 1

(c) e

(d) $\frac{1}{e}$

$$\log_m a + \log_m b = \log_m (a \cdot b)$$

$$e^{(\log_{10} (\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ))}$$

$$\underline{\tan 1^\circ} \tan 2^\circ \dots \underline{\tan 45^\circ} (\cot 44^\circ) \dots \underline{\cot 1^\circ}$$

$$= e^{(\log_{10} (1))}$$

$$= \tan 45^\circ = \underline{1}$$

$$= e^0 = 1$$

$$\log_m (1) = 0$$

Q) The value of $e^{(\log_{10} \tan 1^\circ + \log_{10} \tan 2^\circ + \dots + \log_{10} \tan 89^\circ)}$ is equal to

(a) 0

(b) 1

(c) e

(d) $\frac{1}{e}$

Ans: (b)

Q) If $x < 0$, $y < 0$, then $\log(xy)$ is equal to

(a) $\log x + \log y$

(b) $\log(-x) + \log(-y)$

(c) $-\log x - \log y$

(d) None of these

Q) If $x < 0$, $y < 0$, then $\log(xy)$ is equal to

(a) $\log x + \log y$

(b) $\log(-x) + \log(-y)$

(c) $-\log x - \log y$

(d) None of these

Ans: (b)

Q) What is $\log(a + \sqrt{a^2 + 1}) + \log\left(\frac{1}{a + \sqrt{a^2 + 1}}\right)$ equals

to?

(a) 1

(b) 0

(c) 2

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

Q) What is $\log(a + \sqrt{a^2 + 1}) + \log\left(\frac{1}{a + \sqrt{a^2 + 1}}\right)$ equals

to?

(a) 1

(b) 0

(c) 2

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

Ans: (b)

Q) If $\log_k x \log_5 k = 3$, then what is the value of x ?

(a) k^5

(b) $5k^3$

(c) 243

(d) 125

Q) If $\log_k x \log_5 k = 3$, then what is the value of x ?

(a) k^5

(b) $5k^3$

(c) 243

(d) 125

Ans: (d)

Q) For what value(s) of x is

$$\log_{10} (999 + \sqrt{x^2 - 3x + 3}) = 3?$$

- (a) 0
(b) Only 1
(c) Only 2
(d) 1, 2

$$a^m = \underline{b}$$

$$\Rightarrow \log_a b = m$$

$$\Rightarrow 999 + \sqrt{x^2 - 3x + 3} = 10^3$$

$$\sqrt{x^2 - 3x + 3} = 1000 - 999$$

$$x^2 - 3x + 3 = 1$$

$$\underline{x^2 - 3x + 2 = 0}$$

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

$$\underline{x = 1, 2}$$

Q) For what value(s) of x is

$$\log_{10} (999 + \sqrt{x^2 - 3x + 3}) = 3?$$

- (a) 0
(b) Only 1
(c) Only 2
(d) 1, 2

Ans: (d)

Q) If $\frac{\log x}{\log 5} = \frac{\log 36}{\log 6} = \frac{\log 64}{\log y}$, what are the values of x and y , respectively?

- (a) 8, 25 (b) 25, 8 (c) 8, 8 (d) 25, 25

Q) If $\frac{\log x}{\log 5} = \frac{\log 36}{\log 6} = \frac{\log 64}{\log y}$, what are the values of x and y , respectively?

- (a) 8, 25 (b) 25, 8 (c) 8, 8 (d) 25, 25

Ans: (b)

Q) How many number of digits are there in 2^{98} ?

(Given that $\log_{10} 2 = 0.30103$)

(a) 98

(b) 99

(c) 30

(d) 29

$$x = 2^{98}$$

$$\log_{10} x = \log_{10} (2^{98})$$

$$= 98 \times \log_{10} (2)$$

$$= 98 \times 0.3010$$

$$= \underline{29.4980}$$

$$\begin{array}{r} 0.3010 \\ \times 98 \\ \hline 24080 \\ 270900 \\ \hline 29.4980 \end{array}$$

<u>x</u>	<u>log₁₀ x</u>	<u>no. of digits</u>
<u>10</u>	1	1+1 = 2
<u>100</u>	2	2+1 = 3
<u>1000</u>	3	3+1 = 4

no. of digits of 'x' = integral (log₁₀ x) + 1

$$= 29 + 1 = \boxed{30}$$

Q) How many number of digits are there in 2^{98} ?

(Given that $\log_{10} 2 = 0.30103$)

(a) 98

(b) 99

(c) 30

(d) 29

Ans: (c)

Q) What is the number of digits in the numeral form of 8^{17} ?

(a) 51

(b) 16

(c) 15

(d) 14

$$x = 8^{17}$$

$$\log_{10} x = 17 \log_{10} 8$$

$$= 17 \log_{10} 2^3$$

$$= 51 \log_{10} 2 = 51 \times 0.3010$$

=

Q) What is the number of digits in the numeral form of 8^{17} ?

(a) 51

(b) 16

(c) 15

(d) 14

Ans: (b)

Q) What is the least integral value of $2 \log_{10} x - \log_x (0.01)$?

(a) 0

(b) 2

(c) 4

(d) 3

Q) What is the least integral value of $2 \log_{10} x - \log_x (0.01)$?

(a) 0

(b) 2

(c) 4

(d) 3

Ans: (c)

Q) A dice is thrown. The probability that a number greater than 4 may appear at the dice is

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

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

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

(d) $\frac{1}{5}$

$$\frac{\text{no. of favourable outcomes}}{\text{Total no. of outcomes}}$$

$$\frac{2}{6} = \frac{1}{3}$$

Q) A dice is thrown. The probability that a number greater than 4 may appear at the dice is

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

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

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

(d) $\frac{1}{5}$

Ans: (a)

Q) Three dice are thrown. What is the probability that the same number will appear on each of them?

(a) $\frac{1}{6}$
(c) $\frac{1}{24}$

(b) $\frac{1}{18}$
(d) $\frac{1}{36}$

Total no. of outcomes = $6 \times 6 \times 6$
 $= 216$

prob. = $\frac{6}{216} = \frac{1}{36}$

$(1, 1, 1)$
 $(2, 2, 2)$
 $(3, 3, 3)$
 \vdots
 $(6, 6, 6)$

no. of favourable outcomes = 6

Q) Three dice are thrown. What is the probability that the same number will appear on each of them?

(a) $\frac{1}{6}$
(c) $\frac{1}{24}$

(b) $\frac{1}{18}$
(d) $\frac{1}{36}$

Ans: (d)

Q) Three coins are tossed together, then the probability of getting atleast one head is

(a) $\frac{1}{2}$
(c) $\frac{1}{8}$

(b) $\frac{3}{4}$
(d) $\frac{7}{8}$

$$P(\text{atleast 1 H}) = P(1 \text{ head}) + P(2 \text{ head}) + P(3 \text{ head})$$

$$= 1 - P(\text{no heads})$$

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

$$= \frac{7}{8} //$$

T T T

Q) Three coins are tossed together, then the probability of getting atleast one head is

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

(b) $\frac{3}{4}$

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

(d) $\frac{7}{8}$

Ans: (d)

Q) One card is drawn randomly from a pack of 52 cards, then the probability that it is a king or spade, is

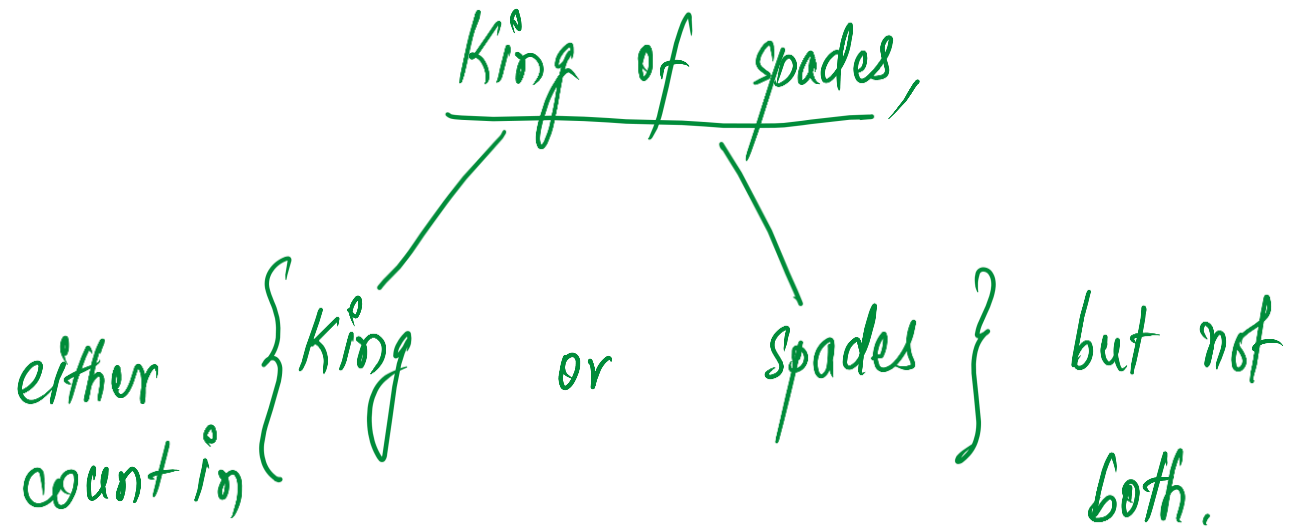
(a) $\frac{1}{26}$

(b) $\frac{3}{26}$

(c) $\frac{4}{13}$

(d) $\frac{3}{13}$

$$\frac{4}{52} + \frac{12}{52} = \frac{16}{52} = \frac{4}{13}$$



Q) One card is drawn randomly from a pack of 52 cards, then the probability that it is a king or spade, is

(a) $1/26$

(b) $3/26$

(c) $4/13$

(d) $3/13$

Ans: (c)

Q) From a pack of 52 cards two cards are drawn in succession one by one without replacement. The probability that both are aces is

(a) $\frac{2}{13}$

(b) $\frac{1}{51}$

(c) $\frac{1}{221}$

(d) $\frac{2}{21}$

$$\text{1st card} = \frac{4}{52}$$

$$\text{2nd card} = \frac{3}{51}$$

$$\begin{aligned} \text{probability} &= \frac{4}{52} \times \frac{3}{51} = \frac{1}{13} \times \frac{1}{17} \\ &= \frac{1}{221} \end{aligned}$$

Q) From a pack of 52 cards two cards are drawn in succession one by one without replacement. The probability that both are aces is

(a) $\frac{2}{13}$

(b) $\frac{1}{51}$

(c) $\frac{1}{221}$

(d) $\frac{2}{21}$

Ans: (c)

Q) From a pack of 52 cards, two cards are drawn, the first being replaced before the second is drawn. What is the probability that the first is a diamond and the second is a king ?

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

(b) $\frac{4}{13}$

(c) $\frac{1}{52}$

(d) $\frac{4}{15}$

and $\text{---} (x) \text{---}$ multiply
or $\text{---} (+) \text{---}$ add

$$\frac{13}{52} \times \frac{4}{52} = \frac{1}{4} \times \frac{1}{13} = \underline{\underline{\frac{1}{52}}}$$

Q) From a pack of 52 cards, two cards are drawn, the first being replaced before the second is drawn. What is the probability that the first is a diamond and the second is a king ?

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

(b) $\frac{4}{13}$

(c) $\frac{1}{52}$

(d) $\frac{4}{15}$

Ans: (c)

Q) A coin is tossed 4 times. The probability that at least one head turns up, is

(a) $1/16$

(b) $2/16$

(c) $14/16$

(d) $15/16$

Q) A coin is tossed 4 times. The probability that at least one head turns up, is

(a) $1/16$

(b) $2/16$

(c) $14/16$

(d) $15/16$

Ans: (d)

Q) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is $\frac{1}{5}$ and that of wife's selection is $\frac{1}{3}$. What is the probability that only one of them will be selected?

(a) $\frac{1}{5}$
(c) $\frac{3}{5}$

(b) $\frac{2}{5}$
(d) $\frac{4}{5}$

Q) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is $\frac{1}{5}$ and that of wife's selection is $\frac{1}{3}$. What is the probability that only one of them will be selected?

(a) $\frac{1}{5}$
(c) $\frac{3}{5}$

(b) $\frac{2}{5}$
(d) $\frac{4}{5}$

Ans: (b)

Q) A bag contains 5 black balls, 4 white balls and 3 red balls. If a ball is selected random wise the probability that it is a black or red ball, is

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

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

(c) $\frac{5}{12}$

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

- Q)** A bag contains 5 black balls, 4 white balls and 3 red balls. If a ball is selected random wise the probability that it is a black or red ball, is
- (a) $1/3$ (b) $1/4$
(c) $5/12$ (d) $2/3$

Ans: (d)

Q) The probability of having a king and a queen, when the two cards are drawn at random from a pack of 52 cards is

(a) $\frac{16}{663}$

(b) $\frac{8}{663}$

(c) $\frac{4}{663}$

(d) $\frac{2}{663}$

Q) The probability of having a king and a queen, when the two cards are drawn at random from a pack of 52 cards is

(a) $\frac{16}{663}$

(b) $\frac{8}{663}$

(c) $\frac{4}{663}$

(d) $\frac{2}{663}$

Ans: (b)

Q) Two balls are selected from a box containing 2 blue and 7 red balls, respectively. What is the probability that atleast one ball is blue?

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

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

(c) $\frac{5}{12}$

(d) $\frac{7}{12}$

Q) Two balls are selected from a box containing 2 blue and 7 red balls, respectively. What is the probability that atleast one ball is blue?

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

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

(c) $\frac{5}{12}$

(d) $\frac{7}{12}$

Ans: (a)

Q) The chance of winning the race of the horse A is $\frac{1}{5}$ and that of horse B is $\frac{1}{6}$. What is the probability that the race will be won by A or B ?

(a) $\frac{1}{30}$

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

(c) $\frac{11}{30}$

(d) $\frac{1}{15}$

Q) The chance of winning the race of the horse A is $\frac{1}{5}$ and that of horse B is $\frac{1}{6}$. What is the probability that the race will be won by A or B ?

(a) $\frac{1}{30}$

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

(c) $\frac{11}{30}$

(d) $\frac{1}{15}$

Ans: (c)

Q) There is a point inside a circle. What is the probability that this point is close to the circumference than to the centre?

(a) $\frac{3}{4}$

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

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

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

Q) There is a point inside a circle. What is the probability that this point is close to the circumference than to the centre?

(a) $\frac{3}{4}$

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

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

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

Ans: (a)

- Q)** If A and B are any two events such that $P(A \cup B) = \frac{3}{4}$,
 $P(A \cap B) = \frac{1}{4}$ and $P(\bar{A}) = \frac{2}{3}$, where \bar{A} stands for the
complementary event of A , what is the value of $P(B)$?
- (a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{9}$ (d) $\frac{2}{9}$

- Q)** If A and B are any two events such that $P(A \cup B) = \frac{3}{4}$,
 $P(A \cap B) = \frac{1}{4}$ and $P(\bar{A}) = \frac{2}{3}$, where \bar{A} stands for the
complementary event of A , what is the value of $P(B)$?
- (a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{9}$ (d) $\frac{2}{9}$

Ans: (b)

Q)What is the probability of getting a sum of 7 with two dice?

(a) $\frac{1}{6}$

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

(c) $\frac{1}{12}$

(d) $\frac{5}{36}$

Q)What is the probability of getting a sum of 7 with two dice?

(a) $\frac{1}{6}$

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

(c) $\frac{1}{12}$

(d) $\frac{5}{36}$

Ans: (a)

Q) In a relay race, there are six teams A, B, C, D, E and F . What is the probability that A, B, C finish first, second, third respectively ?

- (a) $\frac{1}{2}$ (b) $\frac{1}{12}$ (c) $\frac{1}{60}$ (d) $\frac{1}{120}$

Q) In a relay race, there are six teams A, B, C, D, E and F . What is the probability that A, B, C finish first, second, third respectively ?

- (a) $\frac{1}{2}$ (b) $\frac{1}{12}$ (c) $\frac{1}{60}$ (d) $\frac{1}{120}$

Ans: (d)

Q) Two men hit at a target with probabilities $\frac{1}{2}$ and $\frac{1}{3}$ respectively. What is the probability that exactly one of them hits the target?

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

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

(c) $\frac{1}{6}$

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

Q) Two men hit at a target with probabilities $\frac{1}{2}$ and $\frac{1}{3}$ respectively. What is the probability that exactly one of them hits the target?

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

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

(c) $\frac{1}{6}$

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

Ans: (a)

Q) There are 4 letters and 4 directed envelopes. These 4 letters are randomly inserted into the 4 envelopes. What is the probability that the letters are inserted into the corresponding envelopes?

(a) $\frac{11}{12}$
(c) $\frac{1}{24}$

(b) $\frac{23}{24}$
(d) None of these

Q) There are 4 letters and 4 directed envelopes. These 4 letters are randomly inserted into the 4 envelopes. What is the probability that the letters are inserted into the corresponding envelopes?

(a) $\frac{11}{12}$

(b) $\frac{23}{24}$

(c) $\frac{1}{24}$

(d) None of these

Ans: (c)

Q) A committee of two persons is constituted from two men and two women. What is the probability that the committee will have only women?

(a) $\frac{1}{6}$

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

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

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

Q) A committee of two persons is constituted from two men and two women. What is the probability that the committee will have only women?

(a) $\frac{1}{6}$

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

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

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

Ans: (a)

Q) Which one of the following is a null set ?

(a) $\{0\}$ ✗

(b) $\{\{\{\}\}\}$ ✗

(c) $\{\{\}\}$ ✗

(d) $\{x \mid x^2 + 1 = 0, x \in R\}$

$$\emptyset = \{ \}$$

$$A = \{x \mid x^2 + 1 = 0, x \in R\}$$

$$x^2 + 1 = 0$$

$$\underbrace{x^2 = -1}$$

for $x \in R, x^2 > 0$, so, $A = \{ \} = \emptyset$ (null set)

Q) Which one of the following is a null set ?

(a) $\{0\}$

(b) $\{\{\}\}$

(c) $\{\{\}\}$

(d) $\{x \mid x^2 + 1 = 0, x \in R\}$

Ans: (d)

Q) If $A = \{1, 2, 5, 6\}$ and $B = \{1, 2, 3\}$, then what is

$(A \times B) \cap (B \times A)$ equal to?

- (a) $\{(1, 1), (2, 1), (6, 1), (3, 2)\}$
- (b) $\{(1, 1), (1, 2), (2, 1), (2, 2)\}$
- (c) $\{(1, 1), (2, 2)\}$
- (d) $\{(1, 1), (1, 2), (2, 5), (2, 6)\}$

$$B \times A = \{$$

$$(A \times B) \cap (B \times A)$$

$$= \{(1, 1), (2, 1), (1, 2), (2, 2)\}$$

$$\begin{aligned} \underline{A} \times \underline{B} = & \{ \underline{(1, 1)}, \overset{\checkmark}{\underline{(1, 2)}}, \underline{(1, 3)} \\ & \overset{\checkmark}{\underline{(2, 1)}}, \underline{(2, 2)}, \underline{(2, 3)} \\ & \underline{(5, 1)}, \underline{(5, 2)}, \underline{(5, 3)} \\ & \underline{(6, 1)}, \underline{(6, 2)}, \underline{(6, 3)} \} \end{aligned}$$

Q) If $A = \{1, 2, 5, 6\}$ and $B = \{1, 2, 3\}$, then what is

$(A \times B) \cap (B \times A)$ equal to?

- (a) $\{(1, 1), (2, 1), (6, 1), (3, 2)\}$
- (b) $\{(1, 1), (1, 2), (2, 1), (2, 2)\}$
- (c) $\{(1, 1), (2, 2)\}$
- (d) $\{(1, 1), (1, 2), (2, 5), (2, 6)\}$

Ans: (b)

Q) The set $\{2, 4, 16, 256, \dots\}$ can be represented as which one of the following?

(a) $\left\{x \in \mathbb{N} \mid x = 2^{2^n}, n \in \mathbb{N}\right\}$ α

$$\{2, 4, 16, 256, \dots\}$$

(b) $\left\{x \in \mathbb{N} \mid x = 2^{2^n}, n = 0, 1, 2, \dots\right\}$

$$2^{2^n},$$

(c) $\left\{x \in \mathbb{N} \mid x = 2^{4n}, n = 0, 1, 2, \dots\right\}$ α

(d) $\left\{x \in \mathbb{N} \mid x = 2^{2n}, n = 0, 1, 2, \dots\right\}$ α

Q) The set $\{2, 4, 16, 256, \dots\}$ can be represented as which one of the following?

(a) $\left\{x \in \mathbb{N} \mid x = 2^{2^n}, n \in \mathbb{N}\right\}$

(b) $\left\{x \in \mathbb{N} \mid x = 2^{2^n}, n = 0, 1, 2, \dots\right\}$

(c) $\left\{x \in \mathbb{N} \mid x = 2^{4n}, n = 0, 1, 2, \dots\right\}$

(d) $\left\{x \in \mathbb{N} \mid x = 2^{2n}, n = 0, 1, 2, \dots\right\}$

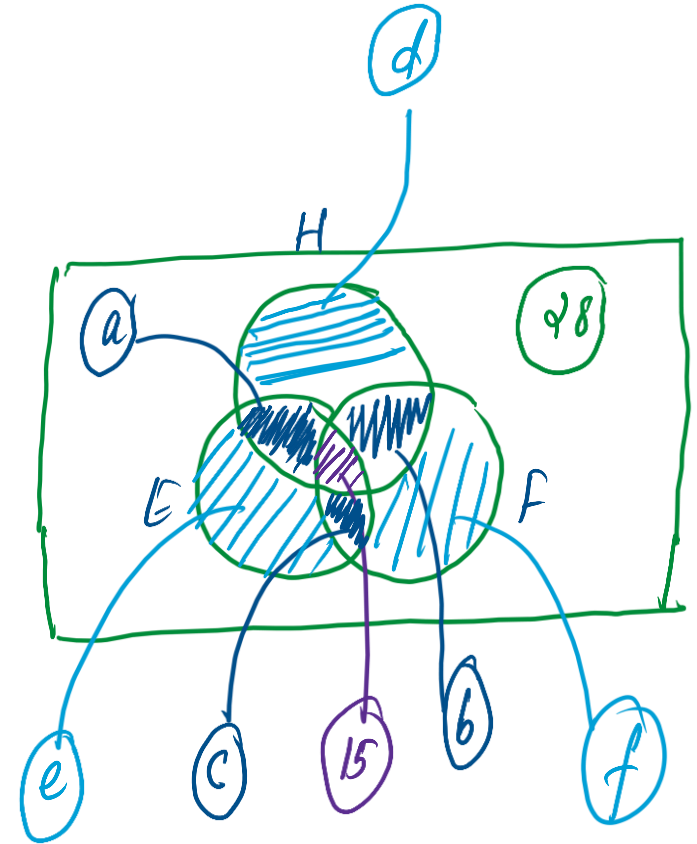
Ans: (b)

DIRECTIONS

: Read the following passage and

give answer.

The students of a class are offered three languages (Hindi, English and French). 15 students learn all the three languages whereas 28 students do not learn any language. The number of students learning Hindi and English but not French is twice the number of students learning Hindi and French but not English. The number of students learning English and French but not Hindi is thrice the number of students learning Hindi and French but not English. 23 students learn only Hindi and 17 students learn only English. The total number of students learning French is 46 and the total number of students learning only French is 11.



$$a = 2b$$

$$e = 17$$

$$c = 3b$$

$$f = 11$$

$$d = 23$$

$$b + c + 15 + f = 46$$

Q) How many students learn precisely two languages?

(a) 55

(b) 40

(c) 30

(d) 13

Ans: (c)

Q) How many students learn at least two languages?

(a) 15

(b) 30

(c) 45

(d) 55

Two languages + 3 languages

$(a+b+c) + 15$

$$30 + 15 = \underline{45}$$

Q) How many students learn at least two languages?

(a) 15

(b) 30

(c) 45

(d) 55

Ans: (c)

Q) What is the total strength of the class?

(a) 124

(b) 100

(c) 96

(d) 66

Ans: (a)

Q) How many students learn English and French?

(a) 30

(b) 43

(c) 45

(d) 73

$$\begin{array}{r} C = 15 \text{ — English and French} \\ + 15 \text{ — Hindi} \\ \hline 30 \\ \hline \end{array}$$

Q) How many students learn English and French?

(a) 30

(b) 43

(c) 45

(d) 73

Ans: (a)

Q) How many students learn at least one languages?

(a) 45

(b) 51

(c) 96

(d) None of these

$$\begin{aligned} \text{at least one lang.} &= 1 \text{ lang.} + 2 \text{ lang.} + 3 \text{ lang.} \\ &= \underline{96} \end{aligned}$$

Q) How many students learn at least one languages?

(a) 45

(b) 51

(c) 96

(d) None of these

Ans: (c)

Q) If $A = \{a, b, c\}$, then what is the number of proper subsets of A?

(a) 5

(b) 6

(c) 7

(d) 8

$n=3$

proper subsets of A = $2^n - 1 = 2^3 - 1 = 8 - 1 = 7$

no. of elements in A

Q) If $A = \{a, b, c\}$, then what is the number of proper subsets of A ?

- (a) 5 (b) 6 (c) 7 (d) 8

Ans: (c)

Q) Let $A = \{x : x \text{ is a square of a natural number and } x \text{ is less than } 100\}$ and B is a set of even natural numbers. What is the cardinality of $A \cap B$?

(a) 4

(b) 5

(c) 9

(d) None of the above

no. of elements,

$$A = \{1, 4, 9, 16, \dots, 81\}$$

$$B = \{2, 4, 6, 8, 10, \dots\}$$

1
4
9
16
25
36
49
64
81

$$A \cap B = \{4, 16, 36, 64\}$$

$$n(A \cap B) = 4$$

Q) Let $A = \{x : x \text{ is a square of a natural number and } x \text{ is less than } 100\}$ and B is a set of even natural numbers. What is the cardinality of $A \cap B$?

(a) 4

(b) 5

(c) 9

(d) None of the above

Ans: (a)

Q) In a group of 500 students, there are 475 students who can speak Hindi and 200 can speak Bengali. What is the number of students who can speak Hindi only?

(a) 275

(b) 300

(c) 325

(d) 350

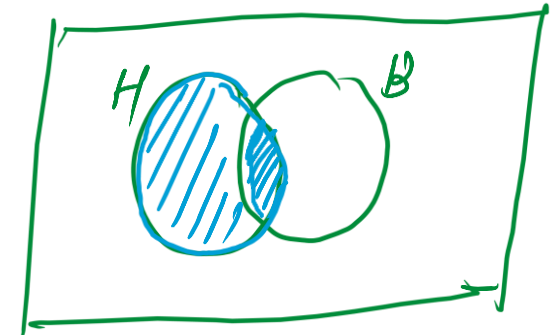
$$n(H) - n(H \cap B)$$

$$475 - 175 = \underline{300}$$

$$n(H \cup B) = n(H) + n(B) - n(H \cap B)$$

$$500 = 475 + 200 - x$$

$$\underline{x = 175}$$



**NDA 2 2024****MAHA MARATHON****28 - 31 AUG 2024****10AM TO 12PM****PHYSICS & MATHS - NAVJYOTI SIR****12PM TO 1PM****GS - SHIVANGI MA'AM****1PM TO 2PM****GK - RUBY MA'AM****2PM TO 3PM****ENGLISH - ANURADHA MA'AM****CDS 2 2024****MAHA MARATHON****28 - 31 AUG 2024****1PM TO 3PM****PHYSICS & MATHS - NAVJYOTI SIR****3PM TO 4PM****GS - SHIVANGI MA'AM****4PM TO 5PM****GK - DIVYANSHU SIR****5PM TO 6PM****ENGLISH - ANURADHA MA'AM**