

MATHS, STATS & REASONING

All Questions is compulsory.

(1) Ans. c
 Explanation:

$$|\text{adj}A| = |A|^{n-1}$$

$$= 7^{3-1} = 7^2 = 49$$

(2) Ans. c
 Explanation :
 $A = A^T$

$$\begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix} = \begin{bmatrix} 5 & y \\ x & 0 \end{bmatrix}$$
 $x = y$

(3) Ans. a
 $m \times n \quad n \times m = m \times m$

(4) Ans. c
 Explanation :

$$A = P \left(1 + \frac{r_1}{100}\right) \left(1 + \frac{r_2}{100}\right) \left(1 + \frac{r_3}{100}\right)$$

$$550 = P \left(\frac{109}{100}\right) \left(\frac{106}{100}\right) \left(\frac{103}{100}\right)$$
 $P = 462.16$

(5) Ans. c

(6) Ans. d

(7) Ans. a

(8) Ans. b

(9) Ans. c
 Explanation :

$$2^{x^2} = 3^{y^2} = 12^{z^2} = K$$

$$12 = 2^2 \times 3$$

$$k^{\frac{1}{z^2}} = k^{\frac{2}{x^2}} \times k^{\frac{1}{y^2}}$$

$$\frac{2}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$$

(10) Ans. b

Explanation :

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

$$121 = 100 \left(1 + \frac{r}{100}\right)^2$$

$$r = 10\%$$

(11) Ans. a

Explanation :

$$A = P \left(1 + \frac{rt}{100}\right)$$

$$248 = Q \left(1 + \frac{16 \times 4.5}{300}\right)$$

$$Q = 200$$

(12) Ans. a

(13) Ans. b

(14) Ans. c

(15) Ans. b

Explanation :

$$SI = \frac{2000 \times 5 \times 6}{100} = 600$$

(16) Ans. a

(17) Ans. b

Explanation :

$$P = \frac{R}{r}$$

$$= \frac{50,000 \times 1200}{12}$$

$$= \text{Rs. } 50,00,000$$

(18) Ans. a

(19) Ans. b

(20) Ans. b

(21) Ans. b

(22) Ans. c

(23) Ans. b
 Explanation :

$$\frac{10000 \times 2 \times r}{100} + \frac{6000 \times 3 \times r}{100} = 1900$$

$$r = 5\%$$

(24) Ans. a
 Explanation:

$$\frac{x \times 2 \times 5}{100} = \frac{y \times 3 \times 5}{100} = \frac{z \times 4 \times 5}{100}$$

$$2x = 3y = 4z$$

$$x : y : z = 6 : 4 : 3$$

(25) Ans. a
 Explanation :
 Black Red + White Ball

$$3 \quad 6$$

$$3c_1 \times 6c_2 + 3c_2 \times 6c_1 + 3c_3 = 64$$

(26) Ans. d

(27) Ans. d

(28) Ans. c

(29) Ans. a

(30) Ans. c *Mittal Commerce Classes*
 Explanation :
 $(A-B) \cup c$
 $\{2, 6, 9\} \cup \{2, 6, 8\}$
 $= \{2, 6, 8, 9\}$

(31) Ans. b
 Explanation :
 $11c_x = 11c_{2x-4}$
 $x + 2x - 4 = 11$
 $x = 5$
 $7c_x = 7c_5 = 21$

(32) Ans. d
 Explanation :

$$\log_3 x + \log_3 x = \frac{3}{2}$$

$$\log_3 x \times \frac{3}{2} = \frac{3}{2}$$

$$\log_3 x = 1$$

$$x = 3$$

(33) Ans. a
 Explanation :
 $x + y = 6 \text{ K}$
 $y + z = 7 \text{ K}$
 $z + x = 8 \text{ K}$
 $2(x+y+z) = 21 \text{ K}$
 $\frac{2 \times 14}{21} = \text{K}$
 $\text{K} = \frac{4}{3}$
 $x + y = 6 \times \frac{4}{3} = 8$
 $x + y + z = 14$
 $8 + z = 14$
 $z = 6$

(34) Ans. c

(35) Ans. a

(36) Ans. b

(37) Ans. c

(38) Ans. b

(39) Ans. c

(40) Ans. d *Mittal Commerce Classes*

(41) Ans. a

(42) Ans. c
 Explanation :
 $f'(x) = 3x^2 + 2$
 $\int f'(x)dx = \int (3x^2 + 2)dx$
 $f(x) = x^3 + 2x + c$
 $f(0) = 0$
 $0 = c$
 $f(x) = x^3 + 2x$
 $f(2) = 8 + 4 = 12$

(43) Ans. a
 Explanation :
 Let cost of one chair and one table are x and y respectively, then
 $5x + 3y = 350 \dots\dots(i)$
 $3x + 5y = 370 \dots\dots(ii)$
 on solving eqⁿ (i) and eqⁿ (ii)
 $x = 40, y = 50$
 Cost of one table and two chairs is Rs. 130

(44) Ans. a

Explanation :

$$y = \frac{1}{1-x} \quad [S_{\infty} = \frac{a}{1-r}]$$

$$y - xy = 1$$

$$y - 1 = xy$$

$$x = \frac{y-1}{y}$$

(45) Ans. a

Explanation :

$$\frac{1}{7!} + \frac{1}{8 \times 7!} = \frac{N}{9 \times 8 \times 7!}$$

$$1 + \frac{1}{8} = \frac{N}{72}$$

$$\frac{9}{8} \times 72 = N$$

$$N = 81$$

(46) Ans. a

(47) Ans. c

Explanation :

$$A(x) = M(x)$$

$$\frac{c(x)}{x} = c'(x)$$

$$150 - 5x + \frac{x^2}{6} = 150 - 10x + \frac{x^2}{2}$$

$$5x = \frac{x^2}{2} - \frac{x^2}{6}$$

$$x = 15$$

(48) Ans. b

(49) Ans. d

(50) Ans. c

(51) Ans. b

(52) Ans. d

Explanation:

No. of different ways can be failed = $2^4 - 1$

(53) Ans. a

Explanation:

If $(b+c), (c+a), (a+b)$ are in A.p.

Then $2(c+a) = b+c+a+b$

$2b = a+c$

(54) Ans. b

Explanation:

$$x^{2a-3}y^{2a} = x^{6-a}y^{5a}$$

$$x^{3a-9} = y^{3a}$$

Taking logarithm

$$(3a-9)\log x = 3a \log y$$

$$3a \log x - 3a \log y = 9 \log x$$

$$a \log \frac{x}{y} = 3 \log x$$

(55) Ans. c

(56) Ans. b

(57) Ans. c

(58) Ans. b

Explanation:

$$\begin{aligned}
 \text{No. of such ways} &= \frac{(n-1)!}{2} \\
 &= \frac{5!}{2}
 \end{aligned}$$

(59) Ans. b

(60) Ans. b

(61) Ans. c

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(62) Ans. b

Explanation :

$$\begin{aligned}
 A &= P \left(1 + \frac{r}{100}\right)^n \\
 &= 8000 \left(1 + \frac{5}{100}\right)^3
 \end{aligned}$$

(63) Ans. b

Explanation :

$$ar^3 = 3$$

$$\begin{aligned}
 a \times ar \times ar^2 \dots \dots \dots ar^6 &= a^7 r^{21} \\
 &= (ar^3)^7 \\
 &= 3^7
 \end{aligned}$$

(64) Ans. d

(65) Ans. b

(66) Ans. d

(67) Ans. c

(68) Ans. c

(69) Ans. c

(70) Ans. d

(71) Ans. c

(72) Ans. a

(73) Ans. b

(74) Ans. a

(75) Ans. a

(76) Ans. c

(77) Ans. a

(78) Ans. a
 Explanation:
 $\text{gof}(3)$
 $= \text{gof}(x)$
 $= g[f(x)]$
 $= g[x^2]$
 $= x$
 $\text{gof}(3) = 3$

(79) Ans. c
 Explanation:

$$2I = \int_a^b 1 \cdot dx$$

$$2I = \int_2^3 1 \cdot dx$$

$$2I = [x]_2^3$$

$$2I = 1$$

$$I = 1/2$$

(80) Ans. b
 Explanation:
 $\log 2 + 2\log 3 + 3\log 4$
 $\log 2 + \log 9 + \log 64$

$$= \log 1152$$

(81) Ans. c

Explanation :

$$\alpha + \beta = -7, \quad \alpha \beta = 12$$

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

$$-343 = \alpha^3 + \beta^3 + 3(12)(-7)$$

$$\alpha^3 + \beta^3 = -91$$

$$\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{\alpha^3 + \beta^3}{\alpha\beta} = \frac{-91}{12}$$

(82) Ans. b

Explanation :

$$x + 2 > 0$$

$$x > -2$$

$$2x - 6 > 0$$

$$x > 3$$

$$(3, \infty)$$

(83) Ans. d

(84) Ans. a

Explanation :

$$\text{No. of diagonals} = n_{c_2} - n$$

$$= 6_{c_2} - 6 = 9$$

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(85) Ans. b

(86) Ans. a

(87) Ans. b

(88) Ans. c

(89) Ans. b

(90) Ans. d

Explanation :

$$\text{After 3 yrs} \quad - \quad \text{Rs. 2688}$$

$$\text{After 4 yrs} \quad - \quad \text{Rs. 2784}$$

$$1 \text{ yr SI} = 96 \quad P = 2688 - 3 \times 96 = 2400$$

$$\text{SI} = \frac{\text{Prt}}{100}$$

$$96 = \frac{2400 \times r \times 1}{100}$$

$$r = 4\%$$

(91) Ans. a

Explanation :

$$3 \log y + 5 \log x = 8 \log(x+y)$$

$$\frac{3}{y} \frac{dy}{dx} + \frac{5}{x} = \frac{8}{x+y} \left[1 + \frac{dy}{dx}\right]$$

$$\frac{dy}{dx} \left[\frac{3}{y} - \frac{8}{x+y} \right] = \frac{8}{x+y} - \frac{5}{x}$$

$$\frac{dy}{dx} = \frac{y}{x}$$

(92) Ans. a

Explanation :

$$\begin{aligned}
 n(A \times B) &= n(A) \times n(B) \\
 &= 5 \times 3 = 15
 \end{aligned}$$

(93) Ans. c

(94) Ans. c

(95) Ans. a

(96) Ans. d

(97) Ans. c

(98) Ans. a

(99) Ans. c

(100) Ans. c

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