

## 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 :  
 $2^{x^2} = 3^{y^2} = 12^{z^2} = K$   
 $12 = 2^2 \times 3$   
 $k^{\frac{1}{z^2}} = k^{2/x^2} \times k^{1/y^2}$   
 $\frac{2}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$

(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                          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  
Explanation :  
 $(A-B) \cup c$   
 $\{2, 6, 9\} \cup \{2, 6, 8\}$   
 $= \{2, 6, 8, 9\}$

(31) Ans. b  
Explanation :  
 ${}^{11}C_x = {}^{11}C_{2x-4}$   
 $x + 2x - 4 = 11$   
 $x = 5$   
 ${}^7C_x = {}^7C_5 = 21$

(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 :

$$x + y = 6 \text{ K}$$

$$y + z = 7 \text{ K}$$

$$\underline{z + x = 8 \text{ K}}$$

$$2(x+y+z) = 21 \text{ K}$$

$$\frac{2 \times 14}{21} = \text{K}$$

$$\text{K} = \frac{4}{3}$$

$$x + y = 6 \times \frac{4}{3} = 8$$

$$x + y + z = 14$$

$$8 + z = 14$$

$$z = 6$$

(34) Ans. c

(35) Ans. a

(36) Ans. b

(37) Ans. c

(38) Ans. b

(39) Ans. c

(40) Ans. d

(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 eq<sup>n</sup> (i) and eq<sup>n</sup> (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

(62) Ans. b

Explanation :

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

$$= 8000 \left(1 + \frac{5}{100}\right)^3$$

(63) Ans. b

Explanation :

$$ar^3 = 3$$

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

(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 :  
 $\alpha + \beta = -7$  ,  $\alpha \beta = 12$   
 $(\alpha + \beta)^3 = \alpha^3 + \beta^3 + 3\alpha\beta(\alpha + \beta)$   
 $-343 = \alpha^3 + \beta^3 + 3(12)(-7)$   
 $\alpha^3 + \beta^3 = -91$   
 $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{\alpha^3 + \beta^3}{\alpha\beta} = \frac{-91}{12}$
- (82) Ans. b  
 Explanation :  
 $x + 2 > 0$   
 $x > -2$   
 $2x - 6 > 0$   
 $x > 3$   
 $(3, \infty)$
- (83) Ans. d
- (84) Ans. a  
 Explanation :  
 No. of diagonals =  $n_{c_2} - n$   
 $= 6_{c_2} - 6 = 9$
- (85) Ans. b
- (86) Ans. a
- (87) Ans. b
- (88) Ans. c
- (89) Ans. b
- (90) Ans. d  
 Explanation :  
 After 3 yrs - Rs. 2688  
 After 4 yrs - Rs. 2784  
 1 yr SI = 96  $P = 2688 - 3 \times 96 = 2400$   
 $SI = \frac{Prt}{100}$   
 $96 = \frac{2400 \times r \times 1}{100}$   
 $r = 4\%$

(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 :  
 $n(A \times B) = n(A) \times n(B)$   
 $= 5 \times 3 = 15$

(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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