(1)　Ans. c
Explanation:

$$\int \frac{dx}{x^2 + 2x - 3} = \int \frac{dx}{x^2 + 2x + 1 - 4}$$

$$= \int \frac{dx}{(x^2 + 1)^2 - 2^2}$$

$$\therefore \quad \int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \log\left(\frac{x - a}{x + a}\right) + c$$

$$= \frac{1}{4} \log \frac{x - 1}{x + 3} + c$$

(2)　Ans. c
Explanation:
Taking logarithms, we may write

$$\log y = \frac{1}{2}[\log(1 - x) - \log(1 + x)]$$

[differentiation] $\frac{1}{y}\frac{dy}{dx} = \frac{1}{2}\left[\frac{-1}{1 - x} - \frac{1}{1 + x}\right]$

By cross multiplication

$$(1 - x^2)\frac{dy}{dx} = -y$$

(3)　Ans. a
Explanation:

$$\frac{dy}{dx} = 6x^2 - 6x - 12$$

$$\frac{dy}{dx} \text{ at x=0 = -12}$$

(4)　Ans. a
Explanation:

$\int (x^3 + 3^x)\, dx$ 　　　　　$[e^{\log x} = x]$

$$\frac{1}{4}x^4 + \frac{3^x}{\log 3} + c$$

(5) Ans. c
Explanation:
$$\int f'(x) = \int (x-1)$$

$$f(x) = \frac{x^2}{2} - x + c$$

$$y = \frac{x^2}{2} - x + c$$

passing through the point (2,0)
c = 0

$$y = \frac{x^2}{2} - x$$

(6) Ans. b
Explanation:
$T_5 = a + 4d = 14$ .... (i)
$T_{12} = a + 11d = 35$ .... (ii)
On solving equation (i) and (ii)
a=2

(7) Ans. d
Explanation:
$$S_n = \sum n(n+1)$$

$$S_n = \sum n^2 + \sum n$$

$$S_n = \frac{n(n+1)(2n+1)}{6} + \frac{n(n+1)}{2}$$

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

(8) Ans. d
Explanation:

$$A = \frac{R}{r} = [(1+r)^n - 1]$$

$$796870 = \frac{R}{0.1}[(1+0.1)^{10} - 1]$$

R= 50,000

(9) Ans. c
Explanation:
No of diagonals in a polygon with n sides

$$= {}^nC_2 - n = \frac{n(n-3)}{2}$$

(10) Ans. b
Explanation:
Here, we have an A.P. with a = 3,00,000 d= 10,000
And n = 20
Using the sum formula , we get,

$$S_{20} = \frac{20}{2} = [6,00,000 + 19 \times 10,000]$$

= 79,00,000

(11) Ans. b
Explanation:

$$a=3 , r= \frac{1}{2}$$

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

$$\frac{3069}{512} = \frac{3[1 - \frac{1}{2^n}]}{1 - \frac{1}{2}}$$

$$\frac{3069}{3072} = 1 - \frac{1}{2^n}$$

$$\frac{1}{2^n} = \frac{1}{1024}$$

n= 10

(12) Ans. c
Explanation:
a=132 , l = 468
l = a +(n-1)d
468 = 132 + (n-1)(12)
n =29

$$S_n = \frac{n}{2}(a + l)$$

$$S_{29} = \frac{29}{2}(132 + 468) = 8700$$

(13) Ans. b
Explanation:

$$\begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix} \times \begin{bmatrix} 3 & 4 & 5 & 6 \end{bmatrix}$$

$$= \begin{bmatrix} 3 & 4 & 5 & 6 \\ 6 & 8 & 10 & 12 \\ 15 & 20 & 25 & 30 \end{bmatrix}$$

(14) **Ans. b**
Explanation:
R is reflexive and symmetric but not transitive, since $(1,2) \in R$ and $(2,3) \in R$ but $(1,3)$ does not belong to R.

(15) **Ans. c**
Explanation:

$$\frac{3x-4}{2} \geq \frac{x+1-4}{4}$$

12x-16 $\geq$ 2x-6
10x $\geq$ 10
X $\geq$ 1

(16) **Ans. c**
Explanation:
$D = b^2-4ac$
$\quad = (-8)^2-4(3)(4)$
$\quad = 16$
If $D \geq 0$ and a perfect square then roots are real, rational and unequal.

(17) **Ans. a**
Explanation:

Sum of roots $(\alpha+\beta) = \frac{-b}{a} = 2$

Product of roots $(\alpha\beta) = \frac{c}{a} = -\frac{1}{2}$

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

$(2)^3 = \alpha^3 + \beta^3 + 3\left(-\frac{1}{2}\right)(2)$

$\alpha^3 + \beta^3 = 11$

(18) **Ans. b**
Explanation:
By option -1, 3, 4

(19) **Ans. c**
Explanation:

	Grade I	Grade II	
Plant A	6	3	≤ 120
Plant B	4	10	≤ 180

6x +3y $\leq$ 120
4x +10y $\leq$ 180

(20) Ans. c

Explanation:

A X B = { (2,4), (2,5) ,(3,4),(3,5) }

B X C = { (4,5),(4,6)(5,5)(5,6) }

(A X B)U (B X C) = {(2,4), (2,5) ,(3,4),(3,5), (4,5),(4,6)(5,5)(5,6) }

(21) Ans. d

Explanation:

$$B^2 = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix} X \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 9 & 4 \\ 32 & 17 \end{bmatrix}$$

$$B^2-4B = \begin{bmatrix} 9 & 4 \\ 32 & 17 \end{bmatrix} - \begin{bmatrix} 4 & 4 \\ 32 & 12 \end{bmatrix}$$

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

(22) Ans. b

Explanation:

n(m U E) = n (m)+ n(E) − n(m ∩ E)

= 40% + 30%-10%

= 60%

The percentage of students who passed in both subject = 100% − 60% = 40%.

(23) Ans. c

Explanation:

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

$$\frac{25}{16} P = P(1 + \frac{r}{100})^2$$

$$\left(\frac{5}{4}\right)^2 = (1 + \frac{r}{100})^2$$

$$\frac{5}{4} = 1 + \frac{r}{100}$$

r = 25%

(24) Ans. d

Explanation:

first part = x , second part = 2600-x

$$\frac{x \times 3 \times 5}{100} = \frac{(2600 - x) \times 6 \times 4}{100}$$

15x = 62,400-24x

$$39x = 62,400$$
$$X = 1,600$$
Second part = 2,600 – 1,600
= Rs. 1,000

(25) Ans. c
Explanation:
Let the ages of A and B are 5x and 7x
$$5x + 9 = 2(7x - 9)$$
$$5x + 9 = 14x - 18$$
$$X = 3$$
The present age of B = 7x = 7 X 3 = 21 years.

(26) Ans. c
Explanation:
Product of extreme terms = product of mean terms
$$(23 - x)(78 - x) = (30 - x)(57 - x)$$
$$x = 6$$

(27) Ans. c
Explanation:

$$A = P\left(1 + \frac{5}{100}\right)^n$$

$$A = P\left(\frac{21}{20}\right)^n$$

$$\frac{P}{A} = \left(\frac{20}{21}\right)^n$$

(28) Ans. a
Explanation:
A = 5B , A = 3C
A + B + C = 1380

$$A + \frac{A}{5} + \frac{A}{3} = 1380$$

A = 900
A = 3C
900 = 3C
C = 300

(29) Ans. d
Explanation:
No. of different ways can be failed = $2^4 - 1$

(30) Ans. a
Explanation:

$$\frac{4a^{\frac{1}{2}+\frac{2}{3}-\frac{7}{3}}}{3a^{-\frac{5}{3}+\frac{3}{2}}} = \frac{4}{3}a^{-1} = \frac{4}{3} \times \frac{1}{4} = \frac{1}{3}$$

(31) Ans. c
Explanation:

$$x^{(a+b)(a^2+ab+b^2)} x^{(b+c)(b^2-bc+c^2)} x^{(b^2-bc+c^2)} x^{(c+a)(c^2-ac+a^2)}$$

$$= x^{a^3+b^3} . x^{b^3+c^3} . x^{c^3+a^3}$$

$$= x^{2(a^3+b^3+c^3)}$$

(32) Ans. a
Explanation:

$$\log_t{}^a + \log_t{}^b + \log_t{}^c = \log_t{}^z$$

$$\log_t{}^{(abc)} = \log_t{}^z$$

Z = abc

(33) 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 logy
3a logx – 3a logy = 9 logx

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

(34) Ans. a
Explanation:

Present value of growing property $= \dfrac{R}{i-g}$

$$= \frac{60}{0.07 - 0.05} = 3000$$

(35) Ans. b
Explanation:

No. of such ways $= \dfrac{(n-1)!}{2}$

$$= \frac{5!}{2}$$

(36) 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

(37) Ans. c
Explanation:
A = 2 I
A^5 = 32 I
A^5 = 16. 2I
A^5 = 16A

(38) Ans. c
Explanation:
$^np_r = r!\ ^nc_r$
2880 = r! X 120
r! = 24
r = 4

(39) Ans. d
Explanation:
fog(x) = f[g(x)]
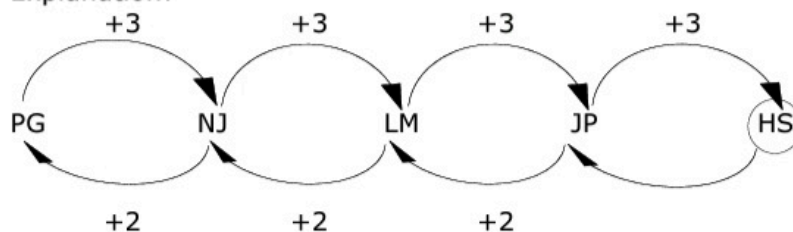   = f[2x-3]
   = $(2x-3)^2+3(2x-3)+1$
   = $4x^2-6x+1$
fog(-1) = 4+6+1 = 11

(40) Ans. d
Explanation:
Number of permutations of n distinct objects taken r at a time when a particular object is not taken in any arrangement is $^{n-1}p_r$
No. of arrangements = $^{14}p_6$

(41) Ans. c
Explanation:

(42) Ans. b
Explanation:
1, 10, 37, 118
1 x 3 + 7   = 10
10 x 3 + 7   = 37
37 x 3 + 7   = 118
118 x 3 + 7   = 361

(43) Ans. b

Explanation:

$$\text{STSTRUM} = \frac{119}{7} = 17$$

1234567

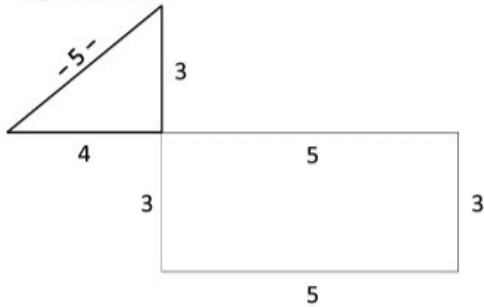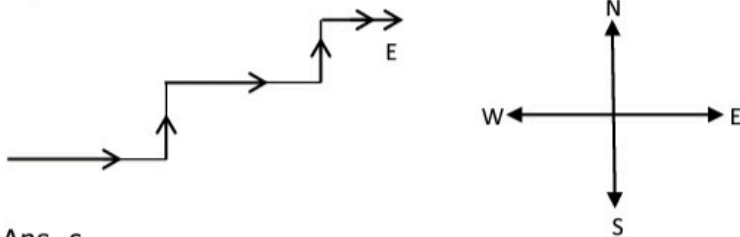$$\because \quad \text{STEP} = \frac{60}{4} = 15$$

1234

(44) Ans. d

Explanation:
STUDENT

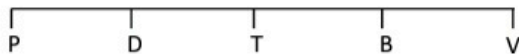(45) Ans. a

Explanation:

AMNESTY = NMAEYTS

BRIGADE = IRBGEDA
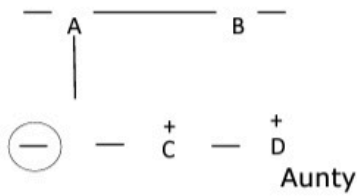
(46) Ans. c

Explanation:

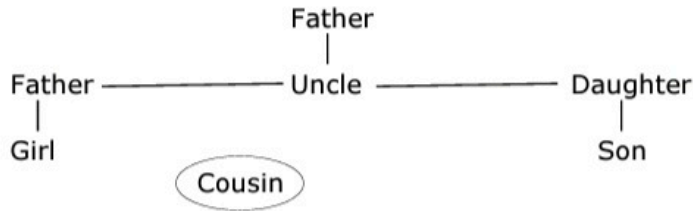(47) Ans. c

Explanation:

(48) Ans. c

Explanation:

(49) Ans. a

Explanation:

X > T

T ≠ D

S ≠ T & S ≠ D

⇒ X > T ≠ D ≠ S

(50) Ans. d
Explanation:

(51) Ans. d
Explanation:

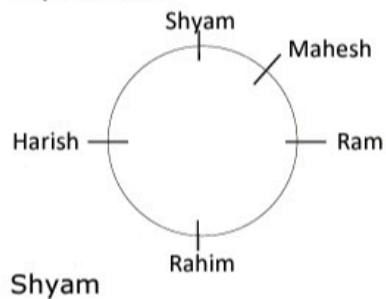**(52)** Ans. c
Explanation:

Brother
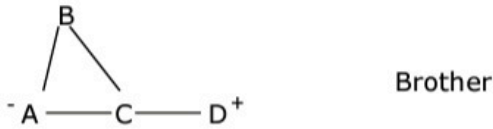
(53) Ans. d
Explanation:

South-West

(54) Ans. c
Explanation:
For dividing 12 into two whole nos. the sum of ratio must be a factor of 12. So they cannot be 3:2.

(55) Ans. d
Explanation:

Shyam

(56) Ans. b
Explanation:
Mahesh

(57) Ans. a
Explanation:

Bus | Train | Boat

I   √

II x

(58) Ans. c
Explanation:

Flowers (Goats) — Branch / Roots

I   x
II √

Flowers (Goats) — Branch / Roots

I   √
II x
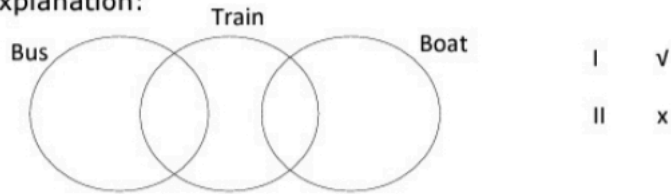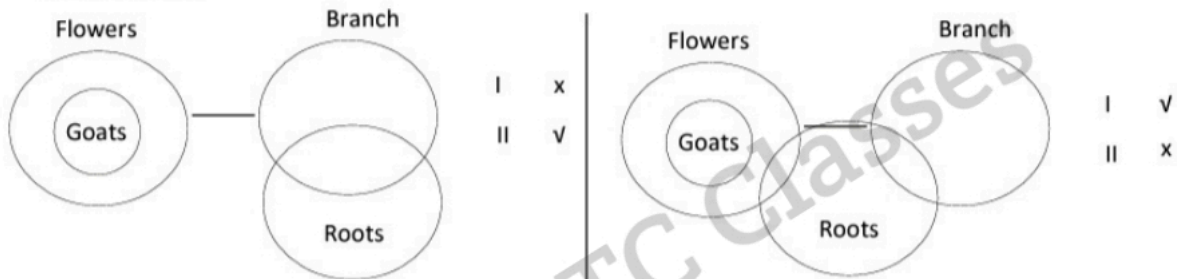
Either I or II

(59) Ans. d
Explanation:

R / W / T

I   √

II √
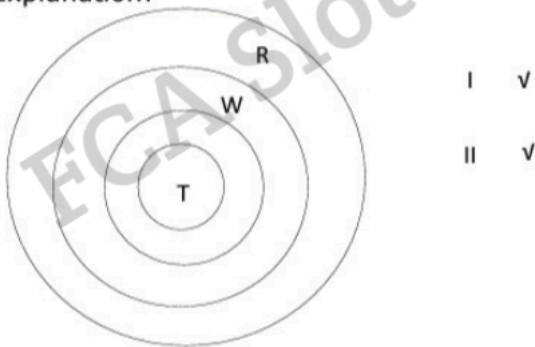
(60) Ans. b
Explanation:

Cats | Cows | Horses

I   x

II √
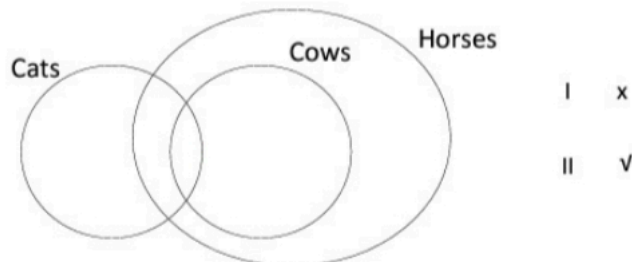
(61) Ans. a
Explanation:
The colour of a flower is an example of An attribute.

(62) Ans. b

Explanation:

The data are known to be Secondary if the data, as being already collected, are used by a different person or agency.

(63) Ans. b

Explanation:

Mutually exclusive classification is usually meant for a continuous variable

(64) Ans. c

Explanation:

0-10	15
10-20	23
20-30	27
30-40	19
40-50	16

$SO = 19 + 16 = 35$

(65) Ans. a

Explanation:

$$\bar{x} = A + \frac{\Sigma\, dx}{n}$$

(66) Ans. c

Explanation:

$$New\ Mean = \frac{\bar{x}}{\alpha} \qquad New\ Mean = \frac{\bar{x}}{\alpha} + 10$$

(67) Ans. d

Explanation:

$$25000 = \frac{n_1 \times 27000 + n_2 \times 17000}{n_1 + n_2} \qquad SO \quad n_1 = 80\,\% \quad n_2 = 20\,\%$$

(68) Ans. b

Explanation:

$$\bar{x}_{com} = \frac{K\bar{x} + 10\,K\,\bar{y}}{11\,K} \qquad \bar{x}_{com} = \frac{\bar{x} + 10\,\bar{y}}{11}$$

(69) Ans. a

Explanation:

HM is the reciprocal of the AM of reciprocal of observations.

$$H.M = \frac{n}{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{n}}$$

(70) Ans. c

Explanation:

Suitable form of average in this case is HM because it used for average rate.

(71) Ans. a
Explanation:
$Q2 - Q1 \Rightarrow Q3 - Q2$

(72) Ans. b
Explanation:
$D2 = \dfrac{2(n+1)}{10} th = \dfrac{n+1}{5} th$ So it is 20 *th Percentile*

(73) Ans. b
Explanation:
For ordering shoes of various sizes for resale, mode size will be more appropriate

(74) Ans. a
Explanation:

10 x 2.5 = 25 and marks of passed is 281-25 Avg. is $= \dfrac{256}{40} \Rightarrow 6.4$

(75) Ans. a
Explanation:
$\dfrac{15+25}{2} = 20$ $SD = \dfrac{range}{2} = \dfrac{10}{2} = 5$

(76) Ans. a
Explanation:
52, 56, 68, 70, 75, 80, 82
Median = 70

X	|X-M|
52	18
56	14
68	2
70	0
75	5
80	10
82	12
	61

$MD = \dfrac{61}{7} = 8.71428$

$MD\ Coefficient = \dfrac{8.71428}{70} \times 100$

(77) Ans. a
Explanation:

$\sigma = \sqrt{\dfrac{\sum (x - \bar{x})^2}{n}}$

(78) Ans. c
Explanation:

1, 2, 3, 4.........................n   SD is $\sqrt{\dfrac{n^2-1}{12}}$

(79) Ans. b
Explanation:
$40 \times 100 = 4000 - 50 + 40 = \dfrac{3990}{100} = 39.90$

$\bar{x} = 39.90$

$\sigma = \sqrt{\dfrac{\sum x^2}{n} - \bar{x})^2}$

$5.1 = \sqrt{\dfrac{\sum x^2}{100} - 1600}$

$E x^2 = 162601 - 2500 + 1600 = 161701$

$\sigma = \sqrt{\dfrac{161701}{100} - 1592}.01$

$\sigma = 5$

(80) Ans. c
Explanation:
If events are mutually exclusive, then both events cannot occur at the same time.

(81) Ans. a
Explanation:
$P(A^1) = 1 - P(A)$
$1 - 3/8$
$= 5/8$

(82) Ans. a
Explanation:
$A = \dfrac{2}{5}$ $A' = \dfrac{3}{5}$ $B = \dfrac{7}{10}$ $B' = \dfrac{3}{10}$

$AB' + BA'$

$\dfrac{2}{5} \times \dfrac{3}{10} + 7/10 \times \dfrac{3}{5}$ SO $\dfrac{6}{50} + \dfrac{21}{50} = \dfrac{27}{50}$

(83) Ans. a
Explanation:

(2, 3) (3, 2) (1, 4) (4, 1)   SO $\dfrac{4}{36} = \dfrac{1}{9}$

(84) Ans. a
Explanation:
$$\frac{13}{52} \times \frac{12}{51} = \frac{1}{17}$$

(85) Ans. c
Explanation:
$$\frac{^5c_2}{^7c_2} = \frac{10}{21}$$

(86) Ans. c
Explanation:
P=2
P=2(1-P)
P=2-2P
3P=2
P=2/3
$$q = \frac{1}{3}$$
$$^5c_3 \left(\frac{2}{3}\right)^3 \left(\frac{1}{3}\right)^2$$
$$= \frac{80}{243}$$

(87) Ans. a
Explanation:
$$A = \frac{1}{5} \qquad\qquad A' = \frac{4}{5}$$

(88) Ans. b
Explanation:

X	P	PX
5	1/3	5/3
6	1/4	6/4
7	5/12	35/12

$$\frac{5}{3} + \frac{6}{4} + \frac{35}{12}$$
$$\frac{20 + 18 + 35}{12} = 6.08$$

(89) Ans. c
Explanation:

X	P	PX
1	1/3	1/3
2	1/3	2/3
3	1/3	3/3

$$\frac{1}{3} + \frac{2}{3} + \frac{3}{3}$$

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

(90) **Ans. c**
Explanation:
$\beta(n, p)$ is symmetrical when $p = 0.5$ or $q = 0.5$

(91) **Ans. b**
Explanation:

$$4_{C_0} \, p^0 q^4 = \frac{16}{81}$$

$$q = \frac{2}{3} \quad p = \frac{1}{3}$$

$$4_{C_4} \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^0 = \frac{1}{81}$$

(92) **Ans. d**
Explanation:

$$m = 150 \times \frac{2}{100} = 3 \quad p(more\ than\ 2) = 1 - \frac{e^{-3} 3^0}{0!} - \frac{e^{-3} 3^1}{1!} - \frac{e^{-3} 3^2}{2!}$$

$$= 1 - \frac{e^{-3} 3^0}{0!} - \frac{e^{-3} 3^1}{1!} - \frac{e^{-3} 3^2}{2!} = 0.58$$

(93) **Ans. c**
Explanation:
$\mu = 0 \quad \sigma = 1$

(94) **Ans. c**
Explanation:
The normal curve is symmetrical

(95) **Ans. c**
Explanation:
Because of the symmetry of Normal distribution the median and the mode have the same value as that of the mean

(96) **Ans. c**
Explanation :
The symbol $\phi(a)$ indicates the area of the standard normal curve between $-\infty$ To a

(97) Ans. d
      Explanation:
      If X & Y are two independent normal variates with means μ_1 & μ_2 and standard deviations σ_1 & σ_2 respectively, then X + Y follows Means = $\mu_1 + \mu_2$, S.D = $\sqrt{\sigma_1^2 + \sigma_2^2}$

(98) Ans. b
      Explanation:
      In semi averages method, we decide the data into two equal parts

(99) Ans. b
      Explanation:
      Depression in business is cyclical

(100) Ans. b
      Explanation:
      The multiplicative time series model is Y = T x S x C x I

**