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b) Verify by continuity of the defined function f(x) is given by $f(x)=\begin{cases}2-x\ ;\ x<2\\ 2+x\ ;\ x\geq 2\end{cases}$ at $x=2$

44. a) A project has the following time schedule.

Activity	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
Duration (in days)	7	6	14	5	11	7	11	4	18

Construct the network and calculate EST, EFT, LST and LFT and determine the critical path of the project and duration to complete the project. *(OR)*

b) Differentiate with respect to x : $\sqrt{\frac{(x-1)(x-2)}{(x-3)(x^2+x+1)}}$

45. a) Calculate the coefficient of correlation for the ages of husbands and their respective wives.

Age of husbands	23	27	28	29	30	31	33	35	36	39
Age of wives	18	22	23	24	25	26	28	29	30	32

(OR)

b) The annual demand for an item A is 800 units and unit price is ₹0.02 if ordering cost is ₹5 per order and annual holding cost is 10% of unit price, then determine the following (i) EOQ in units (ii) Minimum inventory cost (iii) EOQ in Rupees (iv) EOQ in years of supply (v) Number of orders per year

46. a) A company has three machines A,B,C which produces 25%, 30% and 50% of the product respectively. Their respective defective percentages are 5, 4 and 2. From these products one is chosen and inspected. If it is defective, what is probability that it has been made by the machine B.

(OR)

b) Find the equation of the circle on the line joining the points (1,0), (0,1) and having its centre on the line $x + y = 1$

47. a) If the payment of ₹2,000 is made at the end of every quarter for 10 years at the rate of 8% per year, then find the amount of annuity. $[(1.02)^{40} + 2.2080]$

(OR)

b) The total cost of 4 kg onion, 3 kg wheat and 2 kg rice is ₹320, the total cost of 2 kg onion, 4 kg wheat and 6 kg rice is ₹560. The total cost of 6 kg onion, 2 kg wheat and 3 kg rice is ₹380. Find the cost of each item per kg by matrix conversion method.

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SECOND REVISION TEST - 2025

Standard XI Reg.No. ☐☐☐☐☐☐

BUSINESS MATHEMATICS AND STATISTICS

Time : 3.00 hrs **Part - I** *Marks : 90*

I. Choose the correct answer: 20 x 1 = 20

1. The number of Hawkin's Simmon conditions for the viability of an input-output analysis is
   a) 4 b) 1 c) 2 d) 3
2. If any three rows of a determinant are identical then the value of the determinant is
   a) 1 b) 0 c) 3 d) 2
3. The number of ways in selecting 4 players out of 5 is
   a) 25 b) 4 ! c) 5 d) 20
4. The sum of the binomial coefficient is
   a) 2n b) 2^n c) n + 17 d) n^2
5. The equation of directrix of the parabola $y^2 = x$ is
   a) $x - 4 = 0$ b) $4x + 1 = 0$ c) $x + 4 = 0$ d) $4x - 1 = 0$
6. The angle between the pair of straight lines $x^2 - 7xy + 4y^2 = 0$
   a) $\tan^{-1}\left(\frac{\sqrt{33}}{5}\right)$ b) $\tan^{-1}\left(\frac{1}{3}\right)$ c) $\tan^{-1}\left(\frac{5}{\sqrt{33}}\right)$ d) $\tan^{-1}\left(\frac{1}{2}\right)$
7. The value of $\sin 15^\circ \cos 15^\circ$ is
   a) $\sqrt{3}/2$ b) 1 c) $1/4$ d) $1/2$
8. If P sec 50° = tan 50°, then the value of P is
   a) tan 50° b) cos 50° c) sec 50° d) sin 50°
9. The graph of $y = 2x^2$ is passing through the point
   a) (2,0) b) (0,0) c) (0,2) d) (2,1)
10. If $f(x) = x^2 - x + 1$ then $f(x + 1)$ is
    a) 1 b) x^2 c) $x^2 + x + 1$ d) x
11. If $u = e^{x^2}$ then $\frac{\partial u}{\partial x}$ =
    a) $2xe^{x^2}$ b) 0 c) e^{x^2} d) $2e^{x^2}$
12. The calculation of dividend is based on
    a) market value b) capital c) face value d) none of these
13. Example of contigent annuity is
    a) An endowment fund to give scholarship the students
    b) Personal loan from a bank
    c) Instalment of payment for a plot of land
    d) All the above
14. Which of the following represents median?
    a) Q_3 b) Q_1 c) D_2 d) Q_2
15. The maximum value of f(x) = sin x is
    a) $1/\sqrt{2}$ b) 1 c) $-1/\sqrt{2}$ d) $\sqrt{3}/2$

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16. The probability of drawing a spade from a pack of cards is.
    a) $4/13$ b) $1/52$ c) $1/4$ d) $1/13$
17. If X and Y are two variables, then there can be atmost
    a) Three regression lines b) One regression lines
    c) More regression lines d) Two regression lines
18. If the value of the two variables move in same direction, then the correlation is said to be
    a) Perfect positive b) Negative c) No correlation d) Positive
19. The objective of network analysis is to
    a) Minimize the total project duration
    b) Minimize the production delays, interruption and conflicts
    c) Minimize the total project cost d) All the above
20. The maximum value of the objective function $z = 3x + 5y$ subject to the constraints $2x + 5y \le 10$, $x \ge 0$, $y \ge 0$ is
    a) 25 b) 6 c) 31 d) 15

Part - II

II. Answer any 7 questions. (Q.No.30 is compulsory) **7 x 2 = 14**

21. Evaluate : $\begin{vmatrix} x & x+1 \\ x-1 & x \end{vmatrix}$
22. In how many ways 7 pictures can be hung from 5 pictures nails on a wall?
23. Find the focus and Vertex of the parabola $y^2 = 20x$
24. Evaluate : $\lim_{x \to \infty} \frac{2x+5}{x^2+3x+9}$
25. The total cost C in Rupees of making x units of a product is $C(x) = 50 + 4x + 3\sqrt{x}$. Find the marginal cost of the product at 9 units of output.
26. Find the market value of 325 shares of face value ₹100 at a premium of ₹18.
27. An aeroplane flies along the four sides of a square of 100, 200, 300 and 400 kilometres per hour respectively. Find the average speed of the plane in its flight around the square.
28. Calculate the correlation co-efficient from the following data.
    $N = 9$, $\Sigma X = 45$, $\Sigma Y = 108$, $\Sigma X^2 = 285$, $\Sigma Y^2 = 1356$, $\Sigma XY = 597$
29. Develop a network based on the following information.

Activity	A	B	C	D	E	F	G	H
Immediate predecessor	–	–	A	B	C,D	C,D	E	F

30. Find the value of tan 150°

Part - III

III. Answer any 7 questions. (Q.No.40 is compulsory) **7 x 3 = 21**

31. Find λ, if the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 2 & \lambda & 4 \\ 9 & 7 & 11 \end{bmatrix}$ has no inverse.

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32. Find the rank of the word 'CHAT' in dictionary.
33. For what value of a and b does the equation $(a-2)x^2 + by^2 + (b-2)xy + 4x + 4y - 1 = 0$ represents a circle? Write down the resulting equation of the circle.
34. Show that $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{2}{11}\right) = \tan^{-1}\left(\frac{3}{4}\right)$
35. The total cost function y for x units is given by $y = 3x\left(\frac{x+7}{x+5}\right) + 5$. Show that the marginal cost (MC) decreases continuously as the output x increases.
36. Which is better investment, 20% stock at ₹140 or 10% stock at ₹70?
37. Compute Q_1, D_2 and P_{90} from the following data.

Marks	10	20	30	40	50	60
No.of students	4	7	15	8	7	2

38. The following are ranks obtained by 10 students in Commerce and Accountancy

Commerce	6	4	3	1	2	7	9	8	10	5
Accountancy	4	1	6	7	5	8	10	9	3	2

Find the Rank correlation co-efficient.

39. A furniture dealer deals only in two items viz., tables and chairs. He has to invest ₹10,000 and a space to store atmost 60 pieces. The cost of a table is ₹500 and the cost of a chair is ₹200. He can sell all the items that he buys. He is getting a profit of ₹50 per table and ₹15 per chair. Formulate this problem as an LPP so as to maximize the profit
40. Find $\frac{dy}{dx}$, if $x = a\sec^3\theta$, $y = b\tan^3\theta$

Part - IV

IV. Answer all the questions. **7 x 5 = 35**

41. a) Show that the matrices $A = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 4/5 & -2/5 & -1/5 \\ -1/5 & 3/5 & -1/5 \\ -1/5 & -2/5 & 4/5 \end{bmatrix}$ are inverse of each other.

    (OR)

    b) If $\tan\alpha = 1/3$ and $\tan\beta = 1/7$, then prove that $\tan(2\alpha + \beta) = \pi/4$

42. a) Find the term independent of x in the expansion of $\left(2x^2 + \frac{1}{x}\right)^{12}$

    (OR)

    b) If the demand for a commodity x is $q = 5 - 2p_1 + p_2 - p_1^2 p_2$, find the partial elasticities $\frac{Eq}{Ep_1}$ and $\frac{Eq}{Ep_2}$ when $p_1 = 3$ and $p_2 = 7$

43. a) By the Mathematical Induction, prove that $1 + 2 + 3 + \ldots\ldots + n = \frac{n(n+1)}{2}$ for all $n \in N$

    (OR)

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Second Revision - 2025 (Business M.

M. Keerthana
M.Sc (Maths).

1. a 3
2. b 0
3. c 5
4. b 2^n
5. b $4x+1=0$
6. a $\tan^{-1}\left(\frac{\sqrt{33}}{5}\right)$
7. c 1/4
8. d $\sin 50°$
9. b (0,0)
10. c x^2+x+1
11. a $2xe^{x^2}$
12. c face value
13. a An endowment fund to give Scholarship the students.
14. d Q.E.D
15. b 1
16. c 1/4
17. d Two regression lines
18. d positive
19. a Minimize the total Project duration.
20. d 15.

21. 2 mark:

$$\begin{vmatrix} x & x+1 \\ x-1 & x \end{vmatrix} = x^2 - x^2 - x + x + 1 = 1$$

22. $${}^7P_5 = \frac{7!}{(7-5)!} = 2520 \text{ ways}$$

23. $y^2 = 20x$

$a = 5$,

Focus $\Rightarrow (a,0) \Rightarrow (5,0)$

vertex $\Rightarrow (0,0) \Rightarrow (0,0)$

24. $$\lim_{x\to\infty} \frac{2x+5}{x^2+3x+9} \Rightarrow \lim_{x\to\infty} \frac{x(2+5/x)}{x^2(1+\frac{3}{x}+\frac{9}{x^2})}$$

$$= \lim_{x\to\infty} \frac{1}{x}\left(\frac{2+\frac{1}{x}}{1+\frac{3}{x}+\frac{9}{x^2}}\right)$$

$= 0$

25. $C(x) = 50+4x+3\sqrt{x}$

$$MC = \frac{d}{dx}(50+4x+3\sqrt{x})$$

$$= 4 + \frac{3}{2\sqrt{x}}$$

$x=9$, $\frac{dc}{dx} = 4\frac{1}{2}$ (or) ₹4.50

MC is ₹4.50,

26. Face value = ₹100,

Premium = ₹18

M.V = ₹118.

Market value of 325 $\Rightarrow$ no. of share × M.V

$\Rightarrow 325 \times 118 = ₹38,350$

27. $$HM = \frac{n}{\sum \frac{1}{x}} \quad \boxed{n=4}$$

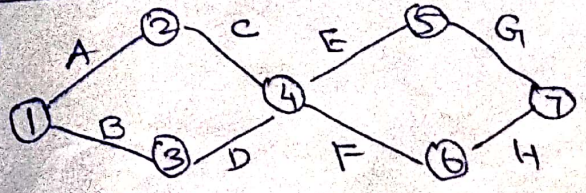
$$HM = \frac{4}{\frac{1}{100}+\frac{1}{200}+\frac{1}{300}+\frac{1}{400}}$$

$$= \frac{4}{\left(\frac{25}{1200}\right)} = 4\times 48 = 192 \text{ km/hr}$$

28. $$r = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{N\Sigma x^2 - (\Sigma x)^2}\sqrt{N\Sigma y^2 - (\Sigma y)^2}}$$

$$r = \frac{9(597) - (45\times 108)}{\sqrt{9(285)-(45)^2}\sqrt{9(1356)-(108)^2}}$$

$\boxed{r = \pm 0.95}$

29. 

30. $\tan 150° = \tan(180°-30°)$

$= -\tan 30°$

$\boxed{\tan 150° = -\frac{1}{\sqrt{3}}}$

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III. (31) $\begin{bmatrix} 1 & 1 & 3 \\ 2 & \lambda & 4 \\ 9 & 7 & 11 \end{bmatrix} = 0$.

$1(11\lambda - 28) - 1(22 - 36) + 3(14 - 9\lambda) = 0$

$11\lambda - 28 + 14 + 42 - 27\lambda = 0$

$\lambda = \frac{-28}{-16} = \frac{7}{4}$

(32) Rank of CHAT $= 3! + 2! + 1!$

$= 6 + 2 + 1 = 9$

(33) $(a-2)x^2 + by^2 + (b-2)xy + 4x + 4y - 1 = 0$.

(i) $xy = 0$, $b - 2 = 0$

$\boxed{b = 2}$

(ii) coeff of x^2 = coeff of y^2

$a - 2 = b$

$\boxed{a = 4}$

$2x^2 + 2y^2 + 4x + 4y - 1 = 0$

(34) $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{2}{11}\right) = \tan^{-1}\left(\frac{3}{4}\right)$

$\tan^{-1}\left(\frac{\frac{1}{2} + \frac{2}{11}}{1 - \left(\frac{1}{2} \times \frac{2}{11}\right)}\right) = \tan^{-1}\left(\frac{\frac{15}{22}}{\frac{10}{11}}\right)$

$\tan^{-1}\left(\frac{15}{22} \times \frac{11}{10}\right) = \tan^{-1}\left(\frac{3}{4}\right)$

(35) $y = 3x\left(\frac{x+7}{x+5}\right) + 5$

$\Rightarrow 3x\left(\frac{(x+5)+2}{x+5}\right) + 5$

$y = 3x\left(1 + \frac{2}{x+5}\right) + 5$

$y = 3\left(x + \frac{2x}{x+5}\right) + 5$

$\frac{dy}{dx} = 3\frac{d}{dx}\left[x + \frac{2x}{x+5}\right] + \frac{d}{dx}(5)$

$\Rightarrow 3\left(1 + 2\left(\frac{5}{(x+5)^2}\right)\right)$

$y' = 3\left(1 + \frac{10}{(x+5)^2}\right)$

which is positive

(36) Income from 20%

₹140 $= \frac{20}{140} \times 140 \times 70$

$= 20 \times 70$

$=$ ₹1400

Income from 10% at ₹70

$\Rightarrow \frac{10}{70} \times 140 \times 70 =$ ₹1400

Same investment both stocks.

(37) $Q_1 = \left(\frac{N+1}{4}\right)^{th}$ value

$\Rightarrow \frac{43+1}{4} = 11^{th}$ value $= 20$

$D_2 = \left(\frac{2(N+1)}{10}\right)^{th}$

$= \frac{88}{10} = 8.8^{th}$ value

$= 20$

$P_{90} = \left(\frac{90(N+1)}{100}\right)^{th}$ value

$= \frac{3960}{100} = 39.6^{th}$ value

$\boxed{P_{90} = 50}$

(38)

R_x	R_y	d	d^2
6	4	2	4
4	1	3	9
3	6	-3	9
1	7	-6	36
2	5	-3	9
7	8	-1	1
9	10	-1	1
8	9	-1	1
10	3	7	49
5	2	3	9
			128

$N = 11$, $\Sigma d^2 = 128$

$\rho = 1 - \frac{6\Sigma d^2}{N(N^2-1)}$

$= 1 - 6 \times 128 / 990 = 0.224$

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(39) Variables:

x_1 and x_2 denotes the number of tables and chairs.

(i) objective function:

Profit $x_1 \Rightarrow 50x_1$,

Profit $x_2 \Rightarrow 15x_2$

$50x_1 + 15x_2$

$Z = 50x_1 + 15x_2$

(ii) Constraints:

$x_1 + x_2 \leq 60$.

Cost of $x_1 \Rightarrow 500x_1$,

Cost of $x_2 \Rightarrow 200x_2$

Cost $\Rightarrow 500x_1 + 200x_2$

$500x_1 + 200x_2 \leq 10000$

$5x_1 + 2x_2 \leq 100$

(iv) Non-negative restriction:

$Z = 50x_1 + 15x_2$

$x_1 + x_2 \leq 60$

$5x_1 + 2x_2 \leq 100$.

$x_1, x_2 \geq 0$.

---

(40) $x = a\sec^3\theta$, $y = b\tan^3\theta$

$\frac{dx}{d\theta} = 3a\sec^2\theta \cdot \tan\theta \sec\theta$

$\frac{dy}{d\theta} = 3a\tan^2\theta \cdot \sec^2\theta$

$\frac{dy}{dx} = \frac{3a\tan^2\theta\sec^2\theta}{3a\sec^3\theta \cdot \tan\theta}$

$= \sin\theta$

$\boxed{\frac{dy}{dx} = \sin\theta}$

W.41(a) $A = \begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$

$B = \begin{pmatrix} 4/5 & -2/5 & -1/5 \\ -1/5 & 3/5 & -1/5 \\ -1/5 & -2/5 & 4/5 \end{pmatrix}$

$AB = BA = I$.

$AB = \frac{1}{5}\begin{pmatrix} 8-2-1 & -4+6-2 & -2-2+4 \\ 4-3-1 & -2+9-2 & -1-3+4 \\ 4-2-2 & -2+6-4 & -1-2+8 \end{pmatrix}$

$= \frac{1}{5}\begin{pmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

$BA = \frac{1}{5}\begin{pmatrix} 8-2-1 & 8-6-2 & 4-2-2 \\ -2+3-1 & -2+9-2 & -1+3-2 \\ -2-2+4 & -2-6+8 & -1-2+8 \end{pmatrix}$

$= \frac{1}{5}\begin{pmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

$\boxed{AB = BA = I}$

(b) $\tan\alpha = \frac{1}{3}$, $\tan\beta = \frac{1}{7}$

$\tan(2\alpha+\beta) = \pi/4$

$\tan(2\alpha+\beta) = \frac{\tan 2\alpha + \tan\beta}{1 - \tan 2\alpha \tan\beta}$

$\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha} = \frac{3}{4}$

$\tan(2\alpha+\beta) = \frac{\frac{3}{4} + \frac{1}{7}}{1 - \left(\frac{3}{4} \times \frac{1}{7}\right)}$

$= \frac{25}{28} \times \frac{28}{25} = 1 = \tan\pi/4$

$\boxed{2\alpha + \beta = \pi/4}$

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42(a) $\left(2x^2+\frac{1}{x}\right)^{12}$

$x=2x^2$, $a=1/x$, $n=12$

$24-3r=0$

$24=3r$

$r=8$

$T_{r+1} = {}^nC_r x^{n-r} a^r$

$= {}^{12}C_r 2^{12-r} x^{24-2r} x^{-r}$

$= {}^{12}C_r 2^{12-r} x^{24-3r}$

$\Rightarrow {}^{12}C_8 2^{12-8} x^0$

$= {}^{12}C_4 \times 2^4 \times 1 = 7920$

(b) $q = 5-2p_1+p_2-p_1^2p_2$

$p_1=3$, $p_2=7$,

$\frac{\partial q}{\partial p_1} = -2-2p_1p_2$

$\frac{\partial q}{\partial p_2} = 1-p_1^2$

(i) $\frac{Eq}{Ep_1} = \frac{-p_1}{q} \cdot \frac{\partial q}{\partial p_1}$

$= \frac{2p_1+2p_1^2p_2}{5-2p_1+p_2-p_1^2p_2}$

$p_1=3$, $p_2=7$

$\frac{Eq}{Ep_1} = \frac{2(3)+2(9)(7)}{5-6+7-9(7)} = \frac{-132}{57}$

(ii) $\frac{Eq}{Ep_2} = \frac{-p_2}{q}\frac{\partial q}{\partial p_2}$

$= \frac{-p_2+p_2p_1^2}{5-2p_1+p_2-p_1^2p_2}$

$p_1=3$, $p_2=7$

$\frac{Eq}{Ep_2} = \frac{-7+7(9)}{5-6+7-9(7)} = \frac{-56}{57}$

43(a)

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

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

$P(1)$ is true,

$P(k) = 1+2+\cdots+k = \frac{k(k+1)}{2}$

$P(k)$ is true,

$P(k+1) = P(k)+k+1$

$= \frac{k(k+1)}{2}+k+1$

$= \frac{(k+1)(k+2)}{2}$

$P(k+1)$ is also true.

(b) $f(x) = \begin{cases} 2-x, & x<2 \\ 2+x, & x\geq 2 \end{cases}$ $x=2$

$L(f(x))_{x=2^-} = \lim_{x\to 2^-} f(x)$

$= \lim_{h\to 0} f(2-h)$

$= \lim_{h\to 0} h = 0$

$R(f(x))_{x=2} = \lim_{x\to 2^+} f(x)$

$= \lim_{h\to 0} (2+(2+h))$

$= \lim_{h\to 0} (4+h) = 4$

$f(2) = 2+2 = 4$

$\lim_{x\to 2^-} f(x) \neq \lim_{x\to 2^+} f(x)$

$f(x)$ is not continuous at $x=2$

44(a)

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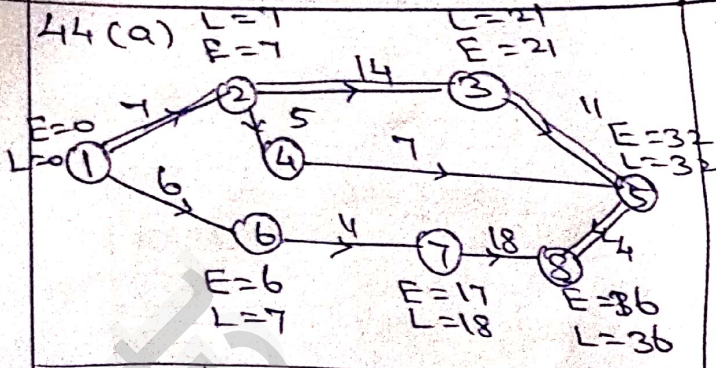
44 (a)



Activity	duration	EST	EFT	LST	LFT
1-2	7	0	7	0	7
1-6	6	0	6	1	7
2-3	14	7	21	7	21
2-4	5	7	12	20	25
3-5	11	21	32	21	32
4-5	7	12	19	7	14
6-7	11	6	17	7	18
5-8	4	32	36	32	36
7-8	18	17	36	18	36

Critical Path:

1 → 2 → 3 → 5 → 8

(b) $y = \left(\frac{(x-1)(x-2)}{(x-3)(x^2+x+1)}\right)^{1/2}$

$\log y = \frac{1}{2}\{\log(x-1) + \log(x-2) - \log(x-3) - \log(x^2+x+1)\}$

$\frac{1}{y}y' \Rightarrow \frac{1}{2}\left\{\frac{1}{x-1}(1) + \frac{1}{x-2}(1) + \frac{1}{x-3}(1) - \frac{1}{x^2+x+1}(2x+1)\right\}$

$\frac{dy}{dx} \Rightarrow \frac{1}{2}y\left\{\frac{1}{x-1} + \frac{1}{x-2} - \frac{1}{x-3} + \frac{2x+1}{x^2+x+1}\right\}$

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

45(a) $\Sigma x = 311$, $\Sigma y = 257$

$\Sigma x^2 = 9875$, $\Sigma y^2 = 6763$,

$\Sigma xy = 8171$, $N = 10$,

x	y	x^2	y^2	xy
23	18	529	324	414
27	22	729	484	594
28	23	784	529	644
29	24	841	576	696
30	25	900	625	750
31	26	961	676	806
33	28	1089	784	924
35	29	1225	841	1015
36	30	1296	900	1080
39	32	1521	1024	1248
311	257	9875	6763	8171

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

$$r = \frac{81710 - 79927}{\sqrt{98750 - 96721}\sqrt{67630 - 66049}}$$

$$r = 0.9965$$

(b) $R = 800$

$C_3 = ₹5$

$C_1 = 10\%$ of unit Price,

$\frac{10}{100} \times 0.02$

(i) $EOQ = \sqrt{\frac{2RC_3}{C_1}}$

$= \sqrt{\frac{2 \times 800 \times 5 \times 100}{10 \times 0.02}}$

$= \sqrt{20 \times 10 \times 10 \times 10 \times 10 \times 20}$

$= 2000$ units

(ii) $C_0 = \sqrt{2RC_3C_1}$

$= \sqrt{800 \times 0.02} = ₹4$

(iii) EOQ in Rupees.

$= 2000 \times 0.02$

$= ₹40.$

(iv) $\frac{EOQ}{Demand} = \frac{2000}{800} = 2.5$

(v) $\frac{Demand}{EOQ} = \frac{800}{2000} = 0.4$

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46(a)

$P(A) = \frac{20}{100}$, $P(B) = \frac{30}{100}$,

$P(C) = \frac{50}{100}$, $P(D/A) = \frac{7}{100}$

$P(D/B) = \frac{3}{100}$, $P(D/C) = \frac{5}{100}$

$$P(C/D) = \frac{P(C)\,P(D/C)}{P(B)}$$

$$\Rightarrow \frac{\frac{50}{100} \times \frac{5}{100}}{\frac{20}{100} \times \frac{7}{100} + \frac{30}{100} \times \frac{3}{100} + \frac{50}{100} \times \frac{5}{100}}$$

$$= \frac{25}{14+9+25} = \frac{25}{48} = 0.5208$$

(b)

$4x + 3y + 2z = 320$

$2x + 4y + 6z = 560$

$6x + 2y + 3z = 380$.

$$A = \begin{pmatrix} 4 & 3 & 2 \\ 2 & 4 & 6 \\ 6 & 2 & 3 \end{pmatrix}, \quad X = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$$

$$B = \begin{pmatrix} 320 \\ 560 \\ 380 \end{pmatrix}$$

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

$$\text{Adj} A = \begin{pmatrix} 0 & -5 & 10 \\ 30 & 0 & -20 \\ -20 & 10 & 10 \end{pmatrix}$$

$$A^{-1} = \frac{1}{50} \begin{pmatrix} 0 & -5 & 10 \\ 30 & 0 & -20 \\ -20 & 10 & 10 \end{pmatrix}$$

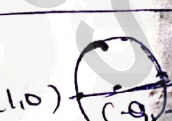
$X = A^{-1}B$

$$= \frac{1}{5} \begin{pmatrix} 0 & -5 & 10 \\ 30 & 0 & -20 \\ -20 & 10 & 10 \end{pmatrix} \begin{pmatrix} 320 \\ 560 \\ 380 \end{pmatrix}$$

$$= \frac{1}{5} \begin{pmatrix} 100 \\ 200 \\ 300 \end{pmatrix}$$

$x = 20$, $y = 40$, $z = 60$

(b)



$x^2 + y^2 + 2gx + 2fy + c = 0 \rightarrow (1)$

$2g + c = 1 \rightarrow (2)$ at $(1,0)$

$2f + c = -1 \rightarrow (3)$ at $(0,1)$

$(2) - (3)$ $g - f = 0 \rightarrow (4)$

$f = -1/2$, $g = -1/2$, $c = 0$

Required equation

$x^2 + y^2 - x - y = 0$

47(a) $a = 2000$, $n = 10$, $\frac{i}{k} = 0.02$

$$A = \frac{a}{\frac{i}{k}} \left[\left(1 + \frac{i}{k}\right)^{nk} - 1 \right]$$

$$A = \frac{2000}{0.02} \left[(1 + 0.02)^{10 \times 4} - 1 \right]$$

$$= \frac{200000}{2} \left((1 + 0.02)^{40} - 1 \right)$$

$$= 100000 \times 1.2080 = ₹\,1,20,800$$

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