

1. At what rate of compound interest will Rs.8000 amount to Rs.9261 after 3 years? Find the compound interest on the same sum at twice the above rate for one year, if compound interest reckoned half-yearly.
2. A man invests Rs.5000 for 2 years at 8% p.a. compound interest payable half-yearly. Calculate
 - a. The C. I. at the end of the first year.
 - b. The sum due at the end of 1.5years.
3. The simple interest in 3 years and the compound interest in 2 years on a certain sum at the same rate are Rs.1200 and Rs.820 respectively. Find the principal and the rate of interest.
4. The difference between C. I. for 1.5years payable half-yearly and the S. I. for the same time at 20% pa is Rs.372. Find the sum.
5. The price of a TV set inclusive of sales tax is Rs.8960. If the sales tax is 12%, find the printed price.
6. The price of a washing machine inclusive of 8% sales tax is Rs11880, find its marked price. If the sales tax is reduced by 3%, how much less does the customer pay for it?
7. Rakesh purchased a camera for Rs19620, on which after giving a discount of 10%; sales tax was charged 9%. Find the marked price of the camera.
8. A manufacturer 'A' sells a Chair at Rs 1000 each to a dealer 'B'. B sells to a retailer 'C' at Rs 1150 each and the retailer sells the chair to customer 'D' at Rs 1400 each. If the rate of sales tax is 8%, Calculate:
 - i) The vat paid by the dealer per chair
 - ii) The vat paid by the retailer per chair
 - iii) The amount customer has to pay for a chair.
9. The marked price of an article is Rs 5000. The manufacturing company of the article sells it to a dealer at a discount of 20%. The dealer sells it to a consumer at the marked price. If the sales tax (under VAT) on the article is 10%, find:
 - i) The amount of VAT paid by the company.
 - ii) The amount of VAT paid by the dealer.
 - iii) The amount paid by the consumer for the article.

10. The entries in the passbook of a savings account are as follows. Calculate the interest due from 1st October to 31st March, if the rate of interest is 6%.

Date	amount withdrawn (debit)	amount deposited (credit)	balance
Oct 1	-	1500	1500
Oct 8	-	3550	?
Oct 17	2055		?
Nov 6	-	3000	?
Nov 15	-	5000	?
Nov 27	4500	-	?
Jan 9	-	3000	?
Feb 12	2500	-	?
Feb 25	-	5050	?
March 11	3516	-	?

11. Sanjay has opened a recurring deposit (or cumulative time deposit) account of Rs.500 per month for 36 months in a bank. Find the amount he will get at the time of maturity, if the rate of interest is 9% p.a.

12. A man sold 500 shares of Rs20 each, paying 8% at Rs 18 and invested the proceeds in Rs 10 shares, paying 12% at Rs 15. How many Rs 10 shares did he buy and what was the change in his annual income?

13. A man invested Rs 4800 in buying shares of face value Rs 100 at 20% premium. The dividend on the shares is 6% p.a. calculate

- The number of shares he buys
- His income from the investment
- The percentage return on his investment

14. What sum should a person invest in Rs25 shares, selling at Rs 36 to obtain an income of Rs 720 if the dividend declared is 12%? Also find

- The total nominal value
- The no of shares bought
- The percentage return on the investment

15. Solve the following inequations and graph the solution set on the number line:

- $2x - 3 < 5x - 3 \leq 12; x \in N$

- b. $2 < x + 3 \leq 14 - 2x; x \in \mathbb{Z}$
- c. $2(x - 2) \leq 3x - 1 \leq x + 2; x \in \mathbb{R}$
- d. $-5 \leq 2(1 - x) < x + 3; x \in \mathbb{R}$
16. Solve and write your answer correct to 2 decimal places:
- a. $6x^2 + 5x - 4 = 0$
- b. $2x^2 - 7x - 3 = 0$
- c. $x^2 + x - 3 = 0$
17. The length of the hypotenuse of a right-angled triangle exceeds the length of the base by 2cm and the altitude by 1cm. find the length of each side of the triangle.
18. If a train traveled 5km/h faster, it would take one hour less to travel 210km. Find the speed of the train.
19. A trader bought a number of articles for Rs1200. Ten were damaged and he sold each of the rest at Rs2 more than what he paid for it, thus getting on the whole transaction a profit of Rs 60. Taking the number of articles he bought as x , form an equation in x and solve it.
20. If $\frac{x}{y} = \frac{9}{10}$, find $\frac{5x + 3y}{5x - 3y}$
21. If $\frac{a}{b} = \frac{c}{d}$, show that $\frac{5a + 2b}{5c + 2d} = \frac{5a - 2b}{5c - 2d}$
22. If $\frac{3a + 4b}{3x + 4y} = \frac{3a - 4b}{3x - 4y}$, show that $\frac{a}{b} = \frac{x}{y}$
23. If $x = \frac{\sqrt{a + 3b} + \sqrt{a - 3b}}{\sqrt{a + 3b} - \sqrt{a - 3b}}$, prove that $3bx^2 - 2ax + 3b = 0$
24. Using the properties of proportion, solve the following equation for x :
- $$\frac{x^3 + 3x}{3x^2 + 1} = \frac{341}{91}$$
25. If $x - 4$ is a factor of $2x^3 - 9x^2 + x + p$, find p . Hence find all the factors.
26. Find the values of p and q if $x + 3$ and $x - 4$ are factors of $x^3 - px^2 - qx + 24$.
27. Find the values of a and b if $x + 2$ is a factor of $f(x) = ax^3 - bx^2 + 2(x - 2)$ and $f(2) = 20$.

28. Solve graphically $y = x$ and $x + y = 2$. Also find the area of the triangle formed by the lines and y-axis.

29. If $P = \begin{bmatrix} 28 & 65 \\ 23 & 12 \end{bmatrix}$ find X such that $P + X = I$, Where I is the unit matrix of order 2.

30. Find x and y if: $\begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} 2x \\ 1 \end{bmatrix} + 2 \begin{bmatrix} -4 \\ 5 \end{bmatrix} = 4 \begin{bmatrix} 2 \\ y \end{bmatrix}$

31. If $M = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ show that $M^2 - 3I = 2M$

32. Let $M \times \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 2 \end{bmatrix}$ where M is a matrix.

- State the order of the matrix M
- Find the Matrix M.

33. Solve: $\begin{bmatrix} 3 & -4 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 17 \\ 2 \end{bmatrix}$

34. If $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ show that $A^3 = A$

35. A (4, 6), B (0, 8) and C (0, -10) are the vertices of a triangle in coordinate plane.

- Write down the coordinates of A_1 , the reflection of A in the x-axis, A_2 the reflection of A in the origin.
- Write down the coordinates of B_1 the image of B by reflection in the y-axis.
- Name the two points which are invariant under reflection in the y-axis.
- Name the image of triangle ABC by reflection in the y-axis as triangle $A_3B_3C_3$.
Name the figure AA_3CC_3 .

36. If A is (4, 2) and B is (1, y), find the possible values of y so that $AB = 5$.

37. Find 'a' if the triangle formed by A (8, -10) B (7, -3) and C (0, a) is right angled at B

38. If the segment with end points (3, 4) and (14, -3) meets the x-axis at P in what ratio does P divide the segment? Also find the coordinates of P.
39. Find the ratio in which the point (2, a) divides the join of (-4, 3) and (6, 3). Hence find a.
40. Find the equation of a line through (4, 0) and parallel to $3y - 6x = 7$.
41. Find the equation of a line through (4, 0) and parallel to through (0, 3) and perpendicular to $2y = x + 1$.
42. Find the equation of a line which has the y-intercept 5 and is parallel to the line $4x - 6y = 9$. Find the coordinates of the point, where it cuts the x-axis.
43. Draw the line $y + 2x = 0$ taking at least three points. Write the equation of the image of this line in the x-axis and the origin.
44. A (2, 4) and C (8, 10) are the opposite vertices of a rhombus ABCD. Find
- The mid-point of AC.
 - The slope of AC
 - The equation of the diagonal BD
45. Plot the points A (-4, 8) B (4, 2) and C (-12, 2):
- Draw the line of symmetry of triangle ABC
 - Mark the point D if the line in 'a' and the line BC are both lines of symmetry of the quadrilateral ABCD; write down the coordinate of point D.
 - What kind of quadrilateral is figure ABCD?
 - Write down the equations of BC and the line of symmetry named in 'a'
46. BM and CN are the perpendiculars from B and C respectively to the opposite sides of a triangle ABC. Prove that
- Triangle ABM is similar to triangle CAN
 - $\frac{\Delta BNP}{\Delta CMP} = \frac{BP^2}{CP^2}$
47. ABC is a triangle and LM is drawn parallel to the side BC that meets AB and AC at L and M respectively. If AL = 2cm, BL = 4cm, AC = 9cm. calculate
- The length of CM
 - $\frac{\Delta ALM}{\Delta ABC}$
 - $\frac{\text{trapeziumBLMC}}{\Delta ALM}$

48. a) On a map drawn to a scale of 1: 250,000, a triangular plot of land has the following measurements: $AB = 3\text{cm}$, $BC = 4\text{cm}$, $\angle ABC = 90^\circ$. Calculate

i) The actual length of AB in km.

ii) The area of the plot in sq. km

b) The scale of a map is 1:50000. In the map, a triangular plot ABC of land has the following dimensions: $AB = 3\text{ cm}$, $BC = 3.5\text{ cm}$ and the angle ABC is 90 degree. Calculate:

(i) The actual length of side BC, in KM, of the land.

(ii) The area of the plot in square km.

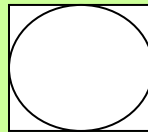
49. Draw a triangle ABC, having $BC=6\text{cm}$, $CA=5\text{cm}$, and $\angle C = 75^\circ$. Find a point P within the triangle equidistant from the sides AB and AC, and at a distance of 3cm from BC.

50. N is a point on the diameter PQ of a circle with center O. RS is a chord perpendicular to PQ. If $PN = 4\text{cm}$ and $QN=16\text{cm}$; find the length of NO and RS.

51. A quadrilateral ABCD is circumscribed to a circle with center O. prove that

a. $AB + DC = AD + BC$

b. $\angle AOB + \angle DOC = 180^\circ$.



52. AB is a chord of a circle with center O. The tangent at B meets AO produced at P. If

$\angle BAP = 25^\circ$, calculate $\angle BAP$.

53. PQ and PR are tangents to a circle with center O at Q &R. If $\angle QPR = 60^\circ$, find

c. $\angle PQO, \angle QOR, \text{ and } \angle OQR$

d. $\angle QSR$, where S is any point on the circle.

54. ABCD is a cyclic Quadrilateral with AB as diameter. If $\angle BCD = 140^\circ$ find $\angle DBA$

55. Draw a triangle having $BC = 6\text{cm}$, $\angle B = 60^\circ$ and $\angle A = 45^\circ$. Construct a point P in this triangle such that P is equidistant from the sides of the triangle. Name the point P.

56. From a solid cylinder whose height is 8cm and radius is 6cm, a conical cavity of height 8cm and of base radius 6cm is hollowed out. Find the volume of the remaining solid correct to 1 place of decimal.

57. Lead spheres of diameter 6cm are dropped into beaker containing some water and are fully submerged. The diameter of the beaker is 18cm. Find how many lead spheres have been dropped in it, if the water rises by 40cm?

58. A spherical copper ball of diameter 9cm is melted and drawn into a wire of diameter 2mm. Find the length of the wire in meters.
59. A hollow sphere of internal and external diameter 4cm and 8cm respectively is melted into a cone of base diameter 8cm. Find the height of the cone.
60. A rectangular piece is 20m long and 15m wide. From its four corners quadrants of radii 3.5m have been cut. Find the area of the remaining part.
61. Prove the following identities:

a.
$$\frac{\sin A}{1 - \cot A} + \frac{\cos A}{1 - \tan A} = \sin A + \cos A$$

b.
$$\frac{\cot A}{\cos ecA + 1} + \frac{\cos ecA + 1}{\cot A} = 2 \sec A$$

62. Without using tables, evaluate

a. $2 \sin 35 \cos ec 35 - 3 \sec 57 \sin 33$

b.
$$\frac{5 \sin 64}{\cos 26} + \frac{3 \tan 55}{\cot 35}$$

63. A man on the top of a cliff 100m high observes angles of depression of two points on opposite sides of the cliff as 30° and 60° respectively. Find the distance between the two points.
64. From the top of a minar 300m high the angles of depression of the top and bottom of a tower are observed to be 30° and 60° respectively. Find the height of the tower.
65. An aeroplane flying horizontally 750m above the ground is observed at an elevation of 60° . If after 5sec the elevation is observed to be 30° , find the speed in m/s of the aeroplane.
66. Calculate the mean of the following distribution:

<i>C.I.</i>	0-10	10-20	20-30	30-40	40-50
<i>f</i>	3	7	12	10	8

If the frequencies of the above distribution are multiplied by 3, what will be the new mean?

67. If the mean of the following distribution is 58.2, find the missing frequency 'f':

<i>salary</i>	45	50	55	60	65	70	75	80
<i>no.ofperson</i>	6	8	10	f	6	5	2	1

68. The following table shows the marks of 120 students at ICSE examination. Calculate the mean mark.

<i>Marks%</i>	30–39	40–49	50–59	60–69	70–79	80–89	90–99
<i>no of students</i>	1	3	11	21	43	32	9

- If the marks of each student are increased by 5%, find the new mean marks.
- If the frequencies of the above distribution are doubled, what will be the new mean.

70. Find the mode for the following frequency distribution by drawing a histogram:

<i>class</i>	0–10	10–20	20–30	30–40	40–50
<i>frequency</i>	6	8	12	8	6

71. Find the median for the following distribution by drawing an ogive (cumulative frequency curve):

<i>class</i>	0–5	5–10	10–15	15–20	20–25
<i>frequency</i>	1	3	5	4	2

72. The following data shows a record of weights of 200 students in kg. Draw an ogive for this distribution.

<i>weight</i>	40–45	45–50	50–55	55–60	60–65	65–70	70–75	75–80
<i>no. of students</i>	5	17	22	45	51	31	20	9

Use ogive to estimate:

- What percentage of students weighs 55kg or more?
- If 58kg is considered as normal weight, how many are over weight?

73. A die is rolled once. What is the probability of getting i) an even number, ii) a multiple of 3, iii) a number greater than 3, iv) an even number or a prime number.

74. From a pack of 52 cards, a card is drawn at random, what is the probability that the card is i) a spade, ii) a card of red colour, iii) a king or a queen, iv) a jack or a club.