REVISION PAPER 1

SECTION A (40 Marks)

(Attempt all questions from this section)

1. (*a*) Find the number of terms in the A P.

$18, 15\frac{1}{2}, 13, \ldots, (-47)$ **(3)**

(*b*) Find the values of x, which satisfy the inequation: $-1\frac{1}{6} \leq \frac{x}{2} + \frac{5}{6} < 2,\ x \in R$

Graph the solution set on the number line. **(3)**

(*c*) There were 50 questions in an examination paper numbered 1 to 50. Write down the probability that the number of question chosen will

(*i*) contain more than one digit. (*ii*)contain at least one figure 3.

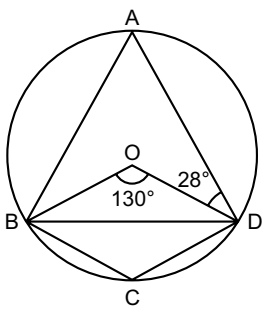
(*iii*) not be divisible by either 2 or 3.

(*iv*) ends in 5. **(4)**

2. (*a*) Find x, y if $\begin{bmatrix} -4 & 1 \\ 2 & 5 \end{bmatrix}\begin{bmatrix} -2 \\ 3x \end{bmatrix} + 2\begin{bmatrix} -3 \\ 2 \end{bmatrix} = 5\begin{bmatrix} 1 \\ y \end{bmatrix}$ **(3)**

(*b*) Akanksha opened a Recurring Deposit Account in a bank and deposited ₹2000 per month. If the bank paid interest at the rate of 11% p.a., what is the amount received by her after 2 years? **(3)**

(*c*) A, B, C and D are points on the circumference of the circle with centre O. $\angle BOD = 130°$, $\angle ADO = 28°$. Find $\angle BAD$, $\angle BCD$, $\angle OBD$ and $\angle ABO$.

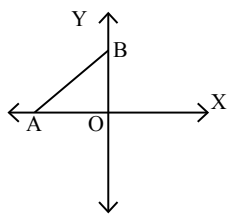


3. (*a*) Prove that $(x - 3)$ is a factor of $6x^3 - 23x^2 + 9x + 18$. Hence factorise the given expression fully. **(3)**

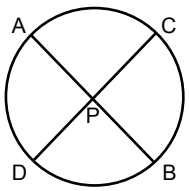
(*b*) A is on x-axis and B is on y-axis. If midpoint of AB is (–3, 4), find the

(*i*) co-ordinates of A and B.

(*ii*) slope of AB. **(3)**



(*c*) AB and CD are two chords of a circle intersecting at P.
Prove that AP × BP = CP × DP.
If AP = 5 cm, PB = 12 cm and CD = 19 cm, find the length of CP. **(4)**



4. (*a*) Solve the following equation and calculate the answer correct to 3 significant figures.
$(x - 2)^2 - 2x - 5 = 0$. **(3)**

(*b*) Calculate the ratio in which P(7, b) divides the line joining A(2, 6) and B(10, –2). Also find the value of b. **(3)**

(*c*) Use graph paper to answer the following questions.

(*i*) Plot P(3, 1) and Q(0, 5). Reflect Q in the origin to get Q′.

(*ii*) Reflect P in y-axis to get R.

(*iii*) Reflect P and R in x-axis to get P′ and R′.

(*iv*) Give a name to figure PQRR′Q′P′.

(*v*) Find its perimeter. **(4)**

SECTION B (40 Marks)

(Attempt any four questions from this section)

5. (*a*) A shopkeeper bought a TV set at a discount of 20% from a wholesaler, the printed price of the TV set being ₹24,000. The shopkeeper sells it to consumer at a discount of 10% on the printed price. If the rate of GST is 18%, find:

(*i*) GST paid by the shopkeeper.

(*ii*) amount paid by the consumer for the TV set. **(3)**

(*b*) Using properties of proportion, solve for *a*, if **(3)**

$$\frac{\sqrt{7a^2+1}+2a}{\sqrt{7a^2+1}-2a}=7$$

(*c*) A marksman, firing at a target, can score from 0 to 6 points for each of his shots. After firing 25 shots his scores were distributed as follows.

Scores	0	1	2	3	4	5	6
No. of shots	2	8	4	5	3	2	1

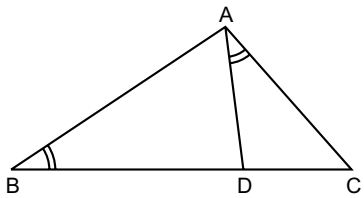
Find the mean, mode and median of the distribution. **(4)**

6. (*a*) D is a point on side BC of ΔABC, such that ∠DAC = ∠B.

(*i*) Prove that ΔABC ~ ΔDAC.

(*ii*) If DC = 4 cm, BD = 5 cm and area of ΔABC = 18 cm^2, find AC.

(*iii*) Find area ΔADC. **(3)**



(*b*) Tanya invests a sum of money in ₹20 shares paying 12% dividend quoted at 20% premium. If the annual dividend from these shares is ₹612, calculate:

(*i*) the number of shares she bought. (*ii*) her total investment.

(*iii*) the rate of return on her investment. **(3)**

(*c*) The total surface area of a right circular cone of slant height 17 cm is 200π cm^2. Calculate its radius. If this cone is melted and formed into solid spheres of radius 2 cm, find the number of spheres formed. **(4)**

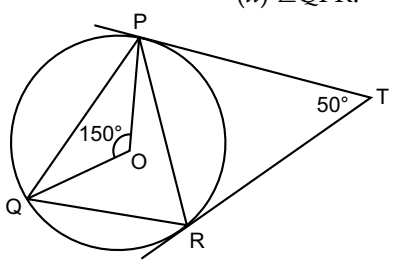
7. (*a*) If $A=\begin{bmatrix}1 & 2\\ 2 & 3\end{bmatrix}$, $B=\begin{bmatrix}2 & 1\\ 3 & 2\end{bmatrix}$ and $C=\begin{bmatrix}1 & 3\\ 3 & 1\end{bmatrix}$, find the matrix C (B – A). **(3)**

(*b*) Draw a circle of radius 4 cm. Mark its centre as C and mark a point D, such that CD = 7 cm. Using ruler and compasses only, construct two tangents from D to the circle. Measure their lengths. **(3)**

(*c*) Points A(5, –3), B(2, 6) and C are collinear. If C is on *x*-axis,

(*i*) Find the co-ordinates of C. (*ii*) Find the equation of the line. **(4)**

8. (*a*) TP and TR are tangents to the circle with centre O. If ∠POQ = 150° and ∠PTR = 50°.
Calculate: (*i*) ∠TPR (*ii*) ∠QPR.



(3)

(*b*) If *a* : *b* = *c* : *d*, then prove that **(3)**

$$\frac{\sqrt{2a^2+3b^2}}{\sqrt{2c^2+3d^2}}=\frac{\sqrt[3]{2a^3+3b^3}}{\sqrt[3]{2c^3+3d^3}}$$

(*c*) Draw a histogram for the following data and estimate the mode.

Income in ₹	5000–6000	6000–7000	7000–8000	8000–9000	9000–10000
No. of employees	4	8	20	12	6

(4)

9. (*a*) If the line through A(3, –7) and B(4, 2) is perpendicular to the line $x + py = 5$, find the value of p. **(3)**

(*b*) Prove that $(\text{cosec}\ \theta - \sin\theta)(\sec\theta - \cos\theta) = \dfrac{1}{\tan\theta + \cot\theta}$. **(3)**

Use ruler and compasses only for the following questions. All construction lines and arcs must be clearly shown.

(*c*) (*i*) Construct a ΔABC in which BC = 6.5 cm, $\angle ABC = 60°$, AB = 5 cm.

(*ii*) Construct the locus of points at a distance of 3.5 cm from A.

(*iii*) Construct the locus of points equidistant from AC and BC.

(*iv*) Mark 2 points *X* and Y which are at a distance of 3.5 cm from A and also equidistant from AC and BC. Measure XY. **(4)**

10. (*a*) Calculate the mean of the following frequency distribution by Step-deviation method.

Class	0–25	25–50	50–75	75–100	100–125	125–150
Frequency	4	8	16	13	6	3

(3)

(*b*) A map has a scale of 1 : 250,000.

(*i*) How many cm on the map is a journey of 40 km?

(*ii*) If the area of a lake on the map is 3 cm^2, what is the actual area of the lake in km^2? **(3)**

(*c*) A statue 1.8 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top and bottom of the statue are 60° and 45°. Find the height of the pedestal. **(4)**

11. (*a*) The following table shows the marks scored by 80 students in an examination.

Marks	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80
No. of students	3	7	15	24	16	8	5	2

Draw an ogive for the given distribution in a graph sheet using a scale of 2 cm = 10 units on both axes. Use the ogive to estimate the:

(*i*) median

(*ii*) lower quartile

(*iii*) number of students who scored more than 65 marks.

(*iv*) the number of students who did not pass in the examination if the passing marks were 35. **(6)**

(*b*) A trader buys *x* articles for ₹9000. If the price of each were ₹15 less, one more article could have been bought for ₹9000. Frame an equation in *x* and solve for it. **(4)**

REVISION PAPER 2

SECTION A (40 Marks)

(Attempt all questions from this section)

1. (*a*) How many terms are in the sequence 4, 12, 20, ... 100? Find its sum. **(3)**

(*b*) Find the values of x, which satisfy the inequation:

$$-3\frac{1}{2} < \frac{1}{2} - \frac{4x}{3} \leq 3\frac{1}{6}, \quad x \in I$$

Graph the solution set on the number line. **(3)**

(*c*) If $A = \begin{pmatrix} 5 & 4 \\ 3 & 7 \end{pmatrix}$, $B = \begin{pmatrix} 6 \\ -1 \end{pmatrix}$ and if AX = B, find the

(*i*) order of matrix X (*ii*) the matrix X **(4)**

2. (*a*) There are 30 blue balls and x red balls in a bag. A ball is drawn at random from the bag.

(*i*) Write down in terms of x, an expression for the probability that the ball drawn is red.

(*ii*) Given that this probability is $\frac{7}{13}$, find x. **(3)**

(*b*) Kavya has a Cumulative deposit account in a bank. She deposits ₹600 per month for 3 years. If at the end of maturity period she gets ₹24,264, find the rate of interest. **(3)**

(*c*) Find the points of trisection P and Q of the line segment joining A(–6, 3) and B(9, 12) (i.e., AP = PQ = QB). **(4)**

3. (*a*) The radius and height of a cylindrical tank are 3.5 m and 4 m respectively. How much water can the tank hold? If a person needs 70 litres of water per day, how many people can use the water in a day? [$1m^3$ = 1000 litres] **(3)**

(*b*) When the polynomials $ax^3 + 5x^2 - 11x - 14$ and $3x^3 + ax^2 - 4x + 20$ are divided by $(x + 2)$, the remainders are same. Find the value of a. **(3)**

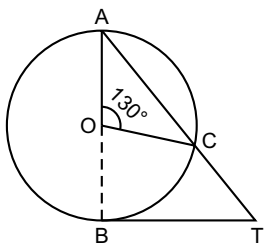
(*c*) If $\frac{a^5 + b^5}{a^5 - b^5} = \frac{122}{121}$, using properties of proportions find the value of $a : b$. **(4)**

4. (*a*) The following numbers are arranged in ascending order. If their median is 10, find the value of x. Hence, find their mean.

$$4, 7, x + 1, x + 5, 15, 20$$ **(3)**

(*b*) In the figure, O is the centre of the circle and $\angle AOC = 130°$. If BT is a tangent, find $\angle ATB$. **(3)**

(*c*) Use graph paper to answer the following questions.



(*i*) Plot the points A(2, 3) and B(6, 0).

(*ii*) A is reflected in the x-axis onto A′. Plot it on a graph and write the co-ordinates of A′.

(*iii*) B′ is the image of B when reflected in the line AA′. Write the co-ordinates of B′.

(*iv*) Write the geometrical name of the figure ABA′B′.

(*v*) Name the lines of symmetry of the figure formed. **(4)**

SECTION B (40 Marks)

(Attempt any four questions from this section)

5. (*a*) A wholesaler buys a vacuum cleaner for ₹14,000 and supplies it to a shopkeeper for ₹15,000. The shopkeeper sold it to a customer at ₹16,500. The rate of GST is 28%. Find the

(*i*) amount of CGST and SGST paid by the wholesaler.

(*ii*) amount of GST paid by the shopkeeper.

(*iii*) price paid by the customer. **(3)**

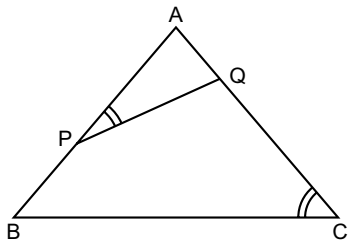
(*b*) Given matrix $A = \begin{bmatrix} 4\sin 30° & \sin 90° \\ \cos 0° & 4\cos 60° \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$

If AX = B.

(*i*) Write the order of matrix X. **(3)**

(*ii*) Find the matrix X.

(*c*) In ΔABC, ∠APQ = ∠ACB, AP = 6 cm, AQ = 5 cm and PB = 4 cm.



(*i*) Prove that ΔAPQ ~ ΔACB.

(*ii*) Find the length of QC.

(*iii*) Find the area of ΔAPQ : area of ΔABC.

(*iv*) Find the area of ΔAPQ : area of PBCQ. **(4)**

6. (*a*) Find the equation of a line through P(5, –2) and perpendicular to the line $2x - 7y = 1$. If $(k, k + 2)$ lies on that line, find the value of k. **(3)**

(*b*) Abhir buys 120 shares of face value ₹50 at ₹65.

(*i*) What is his investment?

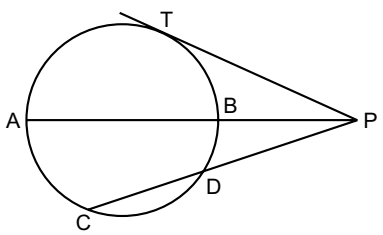
(*ii*) If the dividend is 12.5%, what will be his annual income?

(*iii*) If he wants to increase his income by ₹250, how many extra shares should he buy? **(3)**

(*c*) A cylindrical can of radius 9 cm and height 12 cm is full of ice-cream. The can was emptied completely when each child who attended a party was given a cone full of ice-cream with a hemispherical topping. How many children attended the party, if the base radius of the cone is 3 cm and height 6 cm? **(4)**

7. (*a*) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, find the value of $5A - A^2$. **(3)**

(*b*) In the given figure, diameter AB and chord CD of a circle meet at P. PT is a tangent to the circle at T. If CD = 3.5 cm, DP = 4.5 cm and BP = 3 cm, find:



(*i*) the radius (*ii*) the length of tangent PT. **(3)**

(*c*) If the mean of the following distribution is 30, find the value of a.

Marks	0–10	10–20	20–30	30–40	40–50	50–60
No. of students	4	a	12	15	7	4

(4)

8. (*a*) Without solving the quadratic equation, find the value of 'p' for which the given equation has real and equal roots.

$x^2 + 2(p - 1)\,x + (p + 5) = 0$. **(3)**

(*b*) Construct a ΔABC in which AB = 4.5 cm, BC = 7 cm and median AM = 4 cm. Inscribe a circle in it and record its radius. **(3)**

(*c*) A man repays a loan of ₹3250 by paying ₹20 in the first month and then increases the payment by ₹15 every month. How long will it take to clear the loan? **(4)**

9. (*a*) If *a, b, c, d* are in proportion, prove that

$$\frac{\sqrt{a^4 + c^4}}{\sqrt{b^4 + d^4}} = \frac{ma^2 + nc^2}{mb^2 + nd^2}$$ **(3)**

(*b*) Solve for x using the quadratic formula. Write your answer correct to three significant figures.

$2x^2 - 13x + 17 = 0$ **(3)**

(*c*) In an amphitheatre, there were 38 seats in the front row, 42 in the second row, 46 in the third row and so on. There were 4 more seats in each succeeding row. If there were 2016 seats in all, calculate the number of rows and the number of seats in the last row. **(4)**

10. (*a*) A building and a tower are on the same level ground. From the top of the building, the angle of elevation of the top of the tower is 60° and the angle of depression of the foot of the tower is 30°. If the building is 40 m high, find the height of the tower. **(4)**

(*b*) The following table shows the daily expenditure on food of 100 families in a colony.

Daily Expenditure (in ₹)	100–150	150–200	200–250	250–300	300–350	350–400	400–450	450–500
No. of families	3	8	14	20	22	18	12	3

Draw an ogive for the given distribution on a graph sheet. Use a scale of 2 cm = ₹50 on one axis and 2 cm = 10 families on the other. Use the ogive to estimate the:

(*i*) median

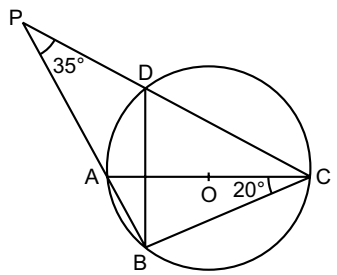
(*ii*) the upper quartile

(*iii*) the number of families who spend less than ₹175

(*iv*) the number of families who spend more than ₹425. **(6)**

11. (*a*) In the figure, AC is a diameter of the circle, with centre O. Chords BA and CD extended meet at point P. If ∠P = 35° and ∠ACB = 20°, calculate

(*i*) ∠BDC (*ii*) ∠ABD (*iii*) ∠AOB **(3)**



(*b*) Prove that $\frac{(\cos A - \sin A)(1 + \tan A)}{2\cos^2 A - 1} = \sec A$. **(3)**

(*c*) A passenger train covers a distance of 360 km at a certain speed. An express train which is 8 km/h faster covers the same distance in 1 hour 30 minutes less. Find the speed of the express train. **(4)**

REVISION PAPER 3

SECTION A (40 Marks)

(Attempt all questions from this section)

1. (*a*) The sum of n terms of an AP is $3n^2 + 5n$. Find the AP and its tenth term. **(3)**

(*b*) Find the values of x, which satisfy the inequation.

$$\frac{3x}{4} - 1 < \frac{x}{4} + 5 \leq x - \frac{1}{4},\ x \in W$$

Graph the solution set on the number line. **(3)**

(*c*) There are two dice, one red and the other black. Both are rolled simultaneously. Calculate the probability that

(*i*) the number on the red dice is 3.

(*ii*) each dice shows 5.

(*iii*) the number on the black dice is either 2 or 4.

(*iv*) the product of two numbers is odd. **(4)**

2. (*a*) Evaluate: $\begin{bmatrix} 4\sin 30° & 2\cos 60° \\ \sin 90° & 2\cos 0° \end{bmatrix} \begin{bmatrix} 6 & 7 \\ 7 & 6 \end{bmatrix}$ **(3)**

(*b*) $ax^3 + bx^2 - 24x + 45$ has $(x + 3)$ as a factor and leaves a remainder –15 when divided by $(x - 2)$. Find a and b. **(3)**

(*c*) Find the sum upto n terms of the GP.

$x^3, x^5, x^7, \ldots. (x \neq \pm 1)$ **(4)**

3. (*a*) If the 4^{th} and 9^{th} terms of a GP are 108 and 26244 respectively, find the GP. **(3)**

(*b*) Ravi deposits a certain sum of money every month in a Recurring deposit account for 2 years at 6% p.a. If he receives ₹10,200 at the time of maturity, how much is his monthly deposit? **(3)**

(*c*) (*i*) Write down the coordinates of the point P that divides the line joining A(7, 14) and B(–3, 4) in the ratio 1 : 4.

(*ii*) Find the mid-point of AB. **(4)**

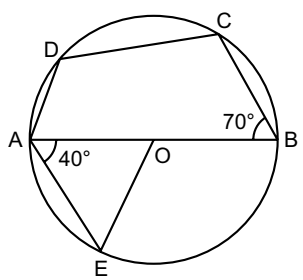
4. (*a*) The following numbers are arranged in ascending order:

13, 15, $x - 5$, $x + 1$, $x + 5$, 30, 32

If the mean of the observations is equal to the median, find the value of x. **(3)**

(*b*) In the figure, O is the centre and $\angle ABC = 70°$, $\angle OAE = 40°$. Calculate

(*i*) $\angle ADC$ (*ii*) $\angle CAB$ (*iii*) $\angle EOB$. **(3)**



(*c*) Use graph paper to answer the following questions.

(*i*) Plot the points A(2, 0), C(1, 4) and D(5, 4).

(*ii*) B is the image of A when reflected in y-axis.

(*iii*) Give a geometrical name to ABCD.

(*iv*) Find its area and perimeter. **(4)**

SECTION B (40 Marks)

(Attempt any four questions from this section)

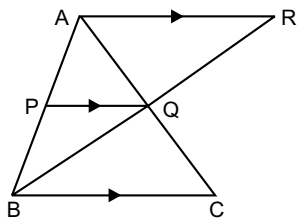
5. (*a*) An article is marked at ₹5000 and the rate of GST is 5%. A trader buys it at a discount and sells it to a customer at the MP. If the trader pays ₹60 as GST to the Government, find

(*i*) what per cent of discount does the trader get?

(*ii*) the total money paid by the trader including tax to buy the article. **(3)**

(*b*) If a, b, c are in continued proportion , prove that $\frac{(a-b)^2}{ab} = \frac{(b-c)^2}{bc}$. **(3)**

(*c*) In the figure, AR ∥ PQ ∥ BC.



(*i*) Prove that ΔAQR ~ ΔCQB.

(*ii*) If AQ : QC = 2 : 3, find BC if PQ is 3 cm.

(*iii*) Find the area of ΔAPQ : the area of ΔABC.

(*iv*) Find the area of ΔAQR : the area of ΔCQB. **(4)**

6. (*a*) Harsh invests ₹15000 in 8%, ₹100 shares at ₹125. At the end of one year, when the price rises to ₹140, he sells the shares and invests the proceeds in 12% ₹50 shares at ₹60. Calculate

(*i*) the number of ₹60 shares he buys.

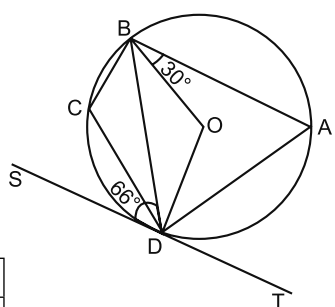
(*ii*) the change in his income.

(*iii*) the percentage increase in his return on the original investment. **(3)**

(*b*) $2x - 5y + 18 = 0$ meets x-axis at A. Write the co-ordinates of A. Find the equation of a line passing through A and perpendicular to the line $2x - 5y + 18 = 0$. **(3)**

(*c*) The surface area of a sphere is 5544 cm^2. Find its radius. If this sphere is melted and formed into solid cones of radius 7 cm and height 14 cm, find the number of cones formed. **(4)**

7. (*a*) In the figure, O is the centre of the circle, ST is a tangent to the circle at D, ∠ABO = 30° and ∠BDS = 66°. Find ∠A, ∠C and ∠ADT. **(3)**



(*b*) Given $A = \begin{bmatrix} 2 & -1 \\ 2 & 6 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 1 & 3 \\ 0 & -4 \end{bmatrix}$, find the matrix X such that A + 2X = 3B + C. **(3)**

(*c*) Calculate the mean of the distribution by Step-deviation method.

Marks	11–20	21–30	31–40	41–50	51–60	61–70	71–80
No. of students	4	7	9	12	9	6	3

Also state the modal class. **(4)**

8. (*a*) Construct a regular hexagon of side 4.5 cm. Circumscribe a circle about it. **(3)**

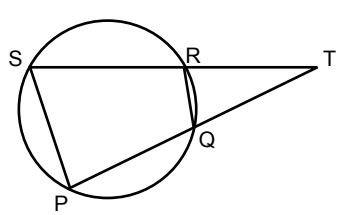
(*b*) From the top of a church spire which is 84 m high, the angles of depression of two cars on the same side of church are α° and β° such that $\tan\alpha = \frac{1}{3}$ and $\tan\beta = \frac{3}{5}$. Calculate the distance between the cars. **(3)**

(*c*) In the given figure PQRS is a cyclic quadrilateral PQ and SR produced meet at T.

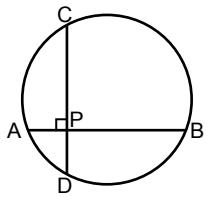
(*i*) Prove ΔTPS ~ ΔTRQ

(*ii*) Find SP if TP = 18 cm, QR = 4 cm and TR = 6 cm.

(*iii*) Find the area of quadrilateral PQRS if area of ΔTPS = 27 cm^2 **(4)**



9. (*a*) In the given figure AB ⊥ CD, AP = 8 cm, CP = 16 cm and AD = 10 cm. Find the length of PB. **(3)**



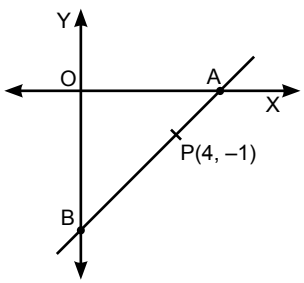
(*b*) Solve the following equation and write your answer correct to two significant figures.

$$2x - \frac{1}{x} = 7$$ **(3)**

(*c*) A line AB meets X-axis at A and Y axis at B. P(4, –1) divides AB in the ratio 1 : 2. Find the

(*i*) co-ordinates of A and B.

(*ii*) equation of the line through P and perpendicular to AB. **(4)**



10. (*a*) A wire which is 48 cm long is shaped to form a right triangle of hypotenuse 20 cm. Take one of the other two sides as x cm and frame an equation in x and solve. Find the other two sides. **(4)**

(*b*) The following table gives the daily wages of 20 workers in a small factory.

Wages in ₹	50–100	100–150	150–200	200–250	250–300	300–350	350–400	400–450	450–500
No. of workers	14	13	26	18	15	12	9	7	6

Draw an ogive for the given data on a graph sheet.

Use a scale of 2 cm = ₹50 on one axis and 2 cm = 10 workers on the other axis. Use the ogive to estimate the:

(*i*) median

(*ii*) lower quartile

(*iii*) number of workers earning more than ₹325

(*iv*) number who earn between ₹175 and ₹325. **(6)**

11. (*a*) Prove the identity

$$\frac{1 + (\sec A - \tan A)^2}{\text{cosec } A (\sec A - \tan A)} = 2 \tan A.$$ **(3)**

(*b*) If $y = \dfrac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}}$, show that $x = \dfrac{2ay}{y^2 + 1}$. **(3)**

(*c*) The daily pocket expenses of some students in a class are given below.

Pocket expenses in ₹	0–50	50–100	100–150	150–200	200–250
No. of students	8	10	24	18	6

On a graph paper, draw a histogram for the given distribution and estimate the mode. **(4)**