



MATHS

BOOKS - SELINA MATHS (ENGLISH)

MATHEMATICS -2017

Section A

1. If b is the mean proportion between a and c , show

that :

$$\frac{a^4 + a^2b^2 + b^4}{b^4 + b^2c^2 + c^4} = \frac{a^2}{c^2}$$



Watch Video Solution

2. Solve the equation $4x^2 - 5x - 3 = 0$ and give your answer correct to two decimal places.



[Watch Video Solution](#)

3. AB and CD are two parallel chords of a circle on opposite sides of a diameter such that AB = 24 cm and CD = 10 cm. If the radius of the circle is 13 cm, find the distance between the two chords.



[Watch Video Solution](#)

4. Evaluate without using trigonometric tables,**

$$\sin^2 28^\circ + \sin^2 62^\circ + \tan^2 38^\circ - \cot^2 52^\circ + \frac{1}{4} \sec^2 30^\circ$$



[Watch Video Solution](#)

5. If

$$A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 1 \\ -3 & 2 \end{bmatrix} \text{ and } A^2 - 5B^2 = 5C$$

. find matrix C where C is a 2 by 2 matrix.



[Watch Video Solution](#)

6. Jaya borrowed Rs 50,000 for 2 years. The rates of interest for two successive years are 12% and 15%

respectively. She repays Rs 33,000 at the end of the first year. Find the amount she must pay at the end of the second year to clear her debt.**



Watch Video Solution

7. The catalogue price of a computer set is Rs 42000. The shopkeeper gives a discount of 10% on the listed price. He further gives an off-season discount of 5% on the discounted price. However, sales tax at 8% is charged after successive discounts. Find :

- (i) the amount of sales tax a customer has to pay
- (ii) the total price to be paid by the customer for the computer set.



[Watch Video Solution](#)

8. $P(1, -2)$ is a point on the line segment $A(3, -6)$ and $B(x, y)$ such that $AP:PB$ is equal to $2:3$. Find the coordinates of B .



[Watch Video Solution](#)

9. The marks of 10 students of a class in an examination arranged in ascending order are as follows :

13, 35, 43, 46, x , $x + 4$, 55, 61, 71, 80

If the median marks is 48, find the value of x . Hence find the mode of the given data.



[Watch Video Solution](#)

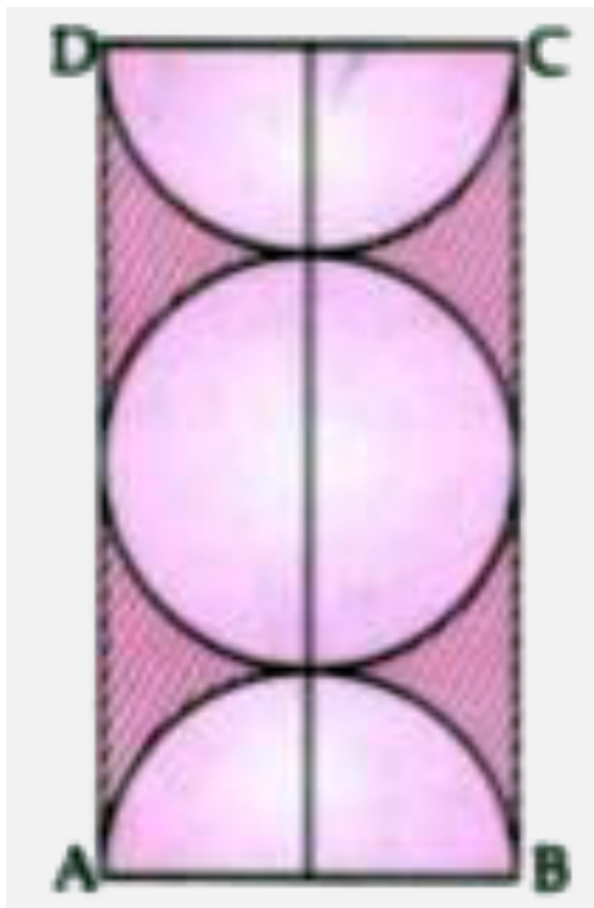
10. What must be subtracted from $16x^3 - 8x^2 + 4x + 7$ so that the resulting expression has $2x+1$ is a factor?



[Watch Video Solution](#)

11. In the given figure ABCD is a rectangle. It consists of a circle and two semi-circles each of which are of

radius 5 cm. Find the area of the shaded region. Give your answer correct to three significant figures.**



[Watch Video Solution](#)

12. Solve the following inequation and represent the solution set on a number line.

$$-8\frac{1}{2} < -\frac{1}{2} - 4x \leq 7\frac{1}{2}, x \in I$$



Watch Video Solution

Section B

1. Given matrix $B = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$. Find the matrix X if,

$X = B^2 - 4B$. Hence, solve for a and b given

$$X \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 5 \\ 50 \end{bmatrix}.$$



Watch Video Solution

Section B

1. How much should a man invest in Rs 50 shares selling at Rs 60 to obtain an income of Rs 450, if the rate of dividend declared is 10%. Also find his yield percent, to the nearest whole number.



[Watch Video Solution](#)

2. Sixteen cards are labelled as a, b, c,..... m, n. o,p. They are put in a box and shuffled. A boy is asked to draw a card from the box. What is the probability

that the card drawn is :

(i) a vowel



Watch Video Solution

3. Sixteen cards are labelled as a, b, c,..... m, n. o,p.

They are put in a box and shuffled. A boy is asked to

draw a card from the box. What is the probability

that the card drawn is :

(ii) a consonant



Watch Video Solution

4. Sixteen cards are labelled as a, b, c,..... m, n. o,p. They are put in a box and shuffled. A boy is asked to draw a card from the box. What is the probability that the card drawn is :

(iii) none of the letters of the word 'median'.



[Watch Video Solution](#)

5. Using a ruler and a compass, construct a triangle ABC in which $AB = 7\text{cm}$, $\angle CAB = 60^\circ$ and $AC=5\text{cm}$. construct the locus of points equidistant from BA and BC. Hence construct

a circle touching the three sides of the triangle internally.



[Watch Video Solution](#)

6. Using a ruler and a compass, construct a triangle ABC in which $AB = 7\text{cm}$, $\angle CAB = 60^\circ$ and $AC = 5\text{cm}$. construct the locus of:

points equidistant from BA and BC. Hence construct a circle touching the three sides of the triangle internally.



[Watch Video Solution](#)

7. A conical tent has to accommodate 77 persons. Each person must have 16 m^3 of air to breathe. Given the radius of the tent as 7 m, find the height of the tent and also its curved surface area.



[Watch Video Solution](#)

8. If $\frac{7m + 2n}{7m - 2n} = \frac{5}{3}$ use properties of proportion to find

(i) $m : n$

(ii) $\frac{m^2 + n^2}{m^2 - n^2}$



[Watch Video Solution](#)

9. A page from a savings bank account passbook as given below : **

(i) Calculate the interest for the 6 months from January to June 2016, at 6% per annum.

(ii) If the account is closed on 1st July 2016, find the amount received by the account holder.



[Watch Video Solution](#)

10. Use a graph paper for this question.

(Take 2 cm = 1 unit on both x and y axes)

Plot the following points :

A(0, 4), B(2, 3), C(1, 1) and D(2, 0).



[Watch Video Solution](#)

11. Use a graph paper for this question.

(Take 2 cm = 1 unit on both x and y axes) where A (0, 4), B (2, 3), C (1, 1) and D (2, 0) and reflect points B', C', D' on y-axis

Join the points A, B, C, D, D', C', B' and A in order, so as to form a closed figure. Write down the equation of the line about which if this closed figure obtained is folded, the two parts of the figure exactly coincide.



Watch Video Solution

12. Use a graph paper for this question.

(Take 2 cm = 1 unit on both x and y axes) where A (0, 4), B (2, 3), C (1, 1) and D (2, 0) and reflect points B', C', D' on y-axis

Join the points A, B, C, D, D', C', B' and A in order, so as to form a closed figure. Write down the equation of the line about which if this closed figure obtained is folded, the two parts of the figure exactly coincide.



Watch Video Solution

13. Calculate the mean of the following distribution using step deviation method.

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of Students	10	9	25	30	16	10



[Watch Video Solution](#)

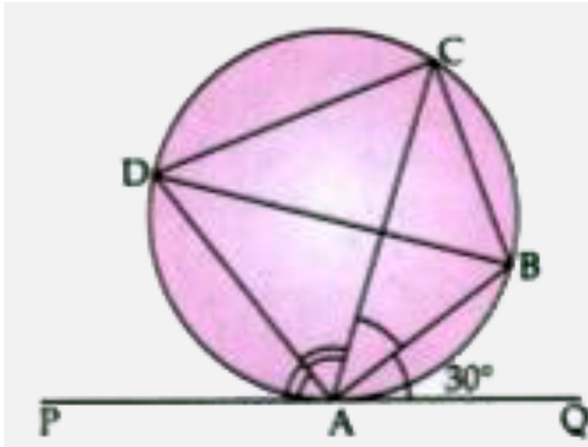
14. In the given figure PQ is a tangent to the circle at

A. AB and AD are bisectors of $\angle CAQ$ and $\angle PAC$. If

$\angle BAQ = 30^\circ$, prove that :

(i) BD is a diameter of the circle.

(ii) ABC is an isosceles triangle



[▶ Watch Video Solution](#)

15. The printed of an air conditioner is Rs 45,000. The wholesaler allows of 10% to the shopkeeper. The shopkeeper sells the article to the customer at a discount of 5% of the marked price. Sales tax (under VAT) is charged at the rate of 12% at every stage.

Find :**

(i) VAT paid by the shopkeeper to the government.



[Watch Video Solution](#)

16. The printed of an air conditioner is Rs 45,000. The wholesaler allows of 10% to ther shopkeeper. The shopkeeper sells the article to the customer at a discount of 5% of the marked price. Sales tax (under VAT) is charged at the rate of 12% at every stage.

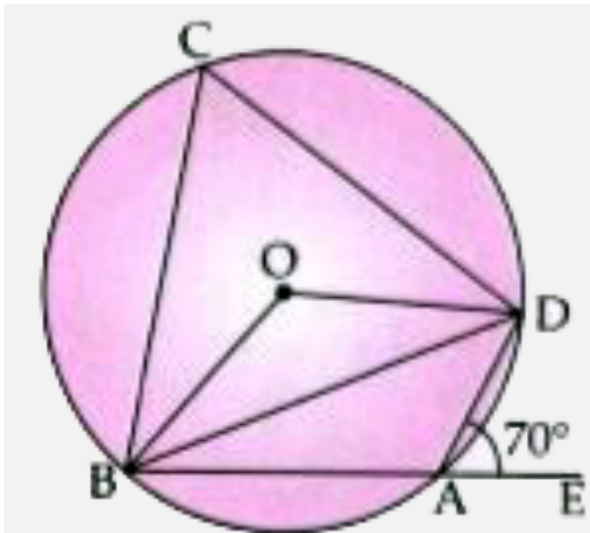
Find :**

(ii) The total amount paid by the customer inclusive of tax.



[Watch Video Solution](#)

17. In the figure given, O is the centre of the circle. $\angle DAE = 70^\circ$. Find, giving suitable reason, the measure of : (i) $\angle BCD$ (ii) $\angle BOD$ (iii) $\angle OBD$



Watch Video Solution

18. $A(-1, 3)$, $B(4, 2)$ and $C(3, -2)$ are the vertices of a triangle.

Find the coordinates of the centroid G of the triangle.



Watch Video Solution

19. $A(-1, 3)$, $B(4, 2)$ and $C(3, -2)$ are the vertices of a triangle.

Find the equation of the line through G and parallel to AC .



Watch Video Solution

20. Prove that

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$$



Watch Video Solution

21. The sum of the age of Vivek and his younger brother Amit is 47 years. The product of their ages in years is 550. Find their ages.



Watch Video Solution

22. The daily wages of 80 workers in a project are given below.

Wages(in Rs.)	400-450	450-500	500-550	550-600	600-650	650-700	700-750
No.of workers	2	6	12	18	24	13	5

Use a graph paper to draw an ogive for the above distribution. (Use a scale of 2 cm = Rs 50 on X-axis and 2 cm = 10 workers on Y-axis). Use your ogive to estimate :

the median wage of the workers.



Watch Video Solution

23. The daily wages of 80 workers in a project are given below.

Wages(in Rs.)	400-450	450-500	500-550	550-600	600-650	650-700	700-750
No.of workers	2	6	12	18	24	13	5

Use a graph paper to draw an ogive for the above distribution. (Use a scale of 2 cm = Rs 50 on X-axis and 2 cm = 10 workers on Y-axis). Use your ogive to estimate :

the lower quartile wage of workers.



[Watch Video Solution](#)

24. The daily wages of 80 workers in a project are given below.

Wages(in Rs.)	400-450	450-500	500-550	550-600	600-650	650-700	700-750
No.of workers	2	6	12	18	24	13	5

Use a graph paper to draw an ogive for the above distribution. (Use a scale of 2 cm = Rs 50 on X-axis

and 2 cm = 10 workers on Y-axis). Use your ogive to estimate :

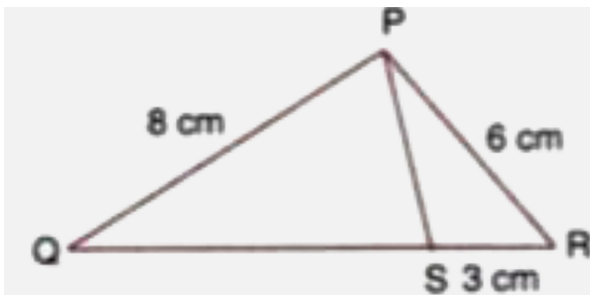
the number of workers who earn more than Rs 625 daily.

 [Watch Video Solution](#)

25. The angles of depression of two ships a A and B as observed from the top of a light house 60 m high are 60° and 45° respectively. If the two ships are on the opposite sides of the light house, find the distance between the two ships. Give your answer correct to the nearest whole number.

 [Watch Video Solution](#)

26. PQR is a triangle. S is a point on the side QR of $\triangle PQR$ such that $\angle PSR = \angle QPR$. Given $QP = 8$ cm, $PR = 6$ cm and $SR = 3$ cm.



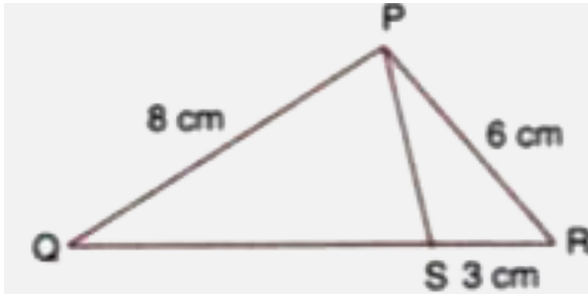
Prove $\triangle PQR \sim \triangle SPR$.



[Watch Video Solution](#)

27. PQR is a triangle. S is a point on the side QR of $\triangle PQR$ such that $\angle PSR = \angle QPR$. Given $QP = 8$

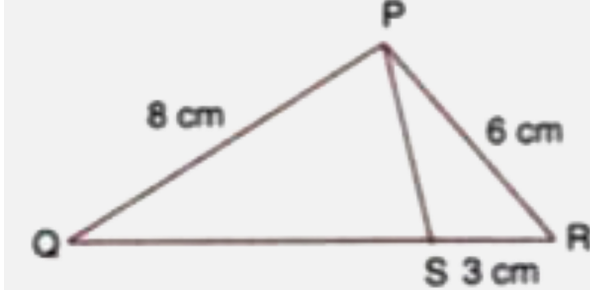
cm, $PR = 6$ cm and $SR = 3$ cm.



Find the lengths of QR and PS .

[Watch Video Solution](#)

28. PQR is a triangle. S is a point on the side QR of $\triangle PQR$ such that $\angle PSR = \angle QPR$. Given $QP = 8$ cm, $PR = 6$ cm and $SR = 3$ cm.



$$\frac{\text{area of } \triangle PQR}{\text{area of } \triangle SPR}$$

[Watch Video Solution](#)

29. Mr. Richard has a recurring deposit account in a bank for 3 years at 7.5% p.a. simple interest. If he gets Rs 8325 as interest at the time of maturity, find the monthly deposit.

[Watch Video Solution](#)

30. Mr. Richard has a recurring deposit account in a bank for 3 years at 7.5% p.a. simple interest. If he gets Rs 8325 as interest at the time of maturity, find the maturity value.



Watch Video Solution