



MATHS

BOOKS - SELINA MATHS (ENGLISH)

QUESTION PAPER 2019

Section A

1. Solve the following inequation and write down the solution set:

$$11x - 4 < 15x + 4 \leq 13x + 14, x \in W .$$



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2. A man invests Rs. 4,500 in shares of a company which is paying 7.5% dividend. If Rs. 100 shares are available at a discount of 10%

Find :

(i) number of shares he purchases. (ii) his annual income.



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3. Using the factor theorem, show that $(x - 2)$ is a factor of $x^3 + x^2 - 4x - 4$. Hence factorise the

polynomial completely.



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4. Prove that :

$$(\operatorname{cosec}\theta - \sin\theta)(\sec\theta - \cos\theta)(\tan\theta + \cot\theta) = 1$$



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5. In an Arithmetic Progression (A.P.) the fourth and sixth terms are 8 and 14 respectively. Find the :

(i) first term

(ii) common difference

(iii) sum of the first 20 terms



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6. Simplify :

$$\sin A \begin{bmatrix} \sin A & -\cos A \\ \cos A & \sin A \end{bmatrix} + \cos A \begin{bmatrix} \cos A & \sin A \\ -\sin A & \cos A \end{bmatrix}$$



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7. M and N are two points on the X-axis and Y-axis respectively. P(3, 2) divides the line segment MN in

the ratio 2: 3.

Find :

slope of the line MN.



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8. A solid metalli sphere of radius 6 cm is melted and made into a solid cylinder of height 32 cm. Find the :

(i) radius of the cylinder

(ii) curved surface area of the cylinder. (Take

$$\pi = 3.1)$$



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9. The following numbers, $K + 3$, $K + 2$, $3K - 7$ and $2K - 3$ are in proportion. Find K .



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10. Solve for x the quadratic equation $x^2 - 4x - 8 = 0$. Give your answer correct to three significant figures.



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11. Draw a circle of radius 4 cm. From the point 7 cm away from its centre, construct the pair of tangents to the circle.



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Section B

1. There are 25 disc numbered 1 to 25. They are put in a closed box and shaken thoroughly. A disc is drawn at random from the box.

Find the probability that the number on the disc is

:

- (i) an odd number
- (ii) divisible by 2 and 3 both
- (iii) a number less than 16.



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2. Rekha opened a recurring deposite account for 20 months. The rate of interest is 9% per annum and Rekha receives Rs 441 as interest at the time of maturity.

Find the amount Rekha deposited each month.



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3. Use a graph sheet for this question. Take 1 cm = 1 unit along both x and y axes.

(i) Plot the points : A (0, 5), B(3, 0), C(1, 0) and D(1, -5).

(ii) Reflect the point B, C and D on the y-axis and name them as B', C' and D' respectively.

(iii) Write down the co-ordinates of B', C' and D'.

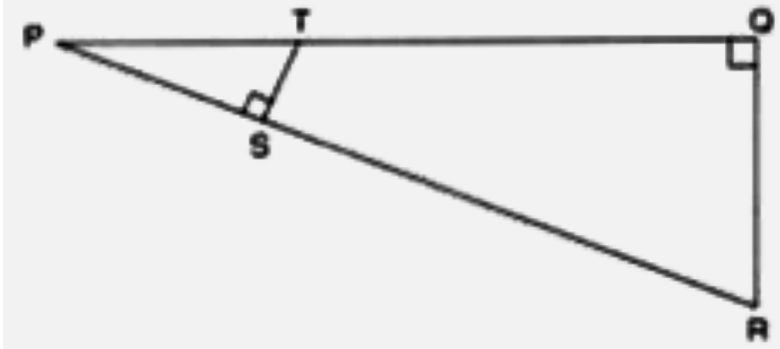
(iv) Join the points A, B, C, D, D', C', B', A in order and give a name to the closed figure ABCDD'C'B'.



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4. In the given figure,

$\angle PQR = \angle PST = 90^\circ$, $PQ = 5\text{cm}$ and $PS = 2\text{cm}$.



(i) Prove that $\Delta PQR \sim \Delta PST$.

(ii) Find area of ΔPQR : Area of quadrilateral SRQT.



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5. The first and last term of a geometrical Progression (G.P.) are 3 and 96 respectively. If the common ratio is 2, find :

(i) 'n' the number of terms of the G.P.

(ii) Sum of the n terms.



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6. A hemispherical and a conical hole are scooped out of a solid wooden cylinder. Find the volume of the remaining solid where the measurements are as as given alongside :

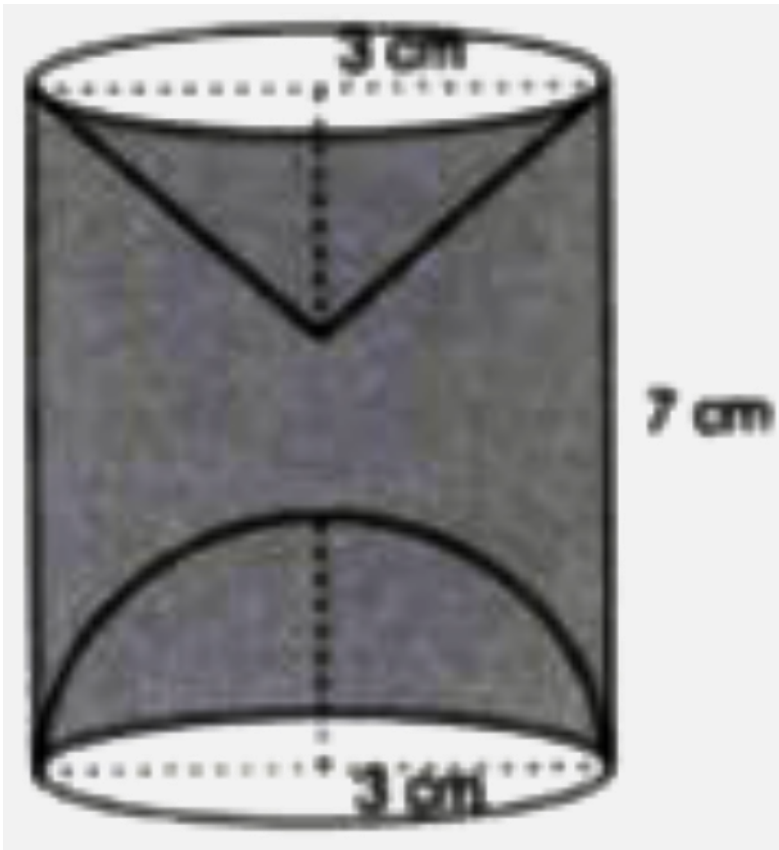
The height of the solid cylinder is 7 cm, radius of

each of hemisphere, cone and cylinder is 3 cm.

Height of cone is 3 cm.

Give your answer correct to the nearest whole

number. Take $\pi = \frac{22}{7}$.



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7. In the given figure AC is a tangent to the circle with centre O. If $\angle ADB = 55^\circ$, find x and y. Give reasons for your answer.



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8. The model of a building is constructed with the scale factor 1 : 30.

(i) If the height of the model is 80 cm, find the actual height of the building in metres.



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9. The model of a building is constructed with the scale factor 1 : 30.

If the actual volume of a tank at the top of the building is $27m^3$, find the volume of the tank on the top of the model.



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10. Given $\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} M = 6 I$, where M is a matrix and I is the unit matrix or order 2×2 .

(i) State the order of matrix M .



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11. The sum of the first three terms of an Arithmetic Progression (A.P.) is 42 and the product of the first and third term is 52. Find the first term and the common difference.



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12. The vertices of a $\triangle ABC$ are $A(3, 8)$, $B(-1, 2)$ and $C(6, 6)$. Find :

(i) Slope of BC.

(ii) Equation of a line perpendicular to BC and passing through A.



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13. Using ruler and a compass only, construct a semi-circle with diameter $BC = 7$ cm. Locate a point A on the circumference of the semi-circle such that A is equidistant from B and C . Complete the cyclic quadrilateral $ABCD$, such that D is equidistant from AB and BC . Measure $\angle ADC$ and write it down.



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14. The data on the number of patients attending a hospital in a month are given below. Find the

average (mean) number of patients attending the hospital in a month by using the shortcut method.

No. of patients	10-20	20-30	30-40	40-50	50-60	60-70
No. of days	5	2	7	9	2	5



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15. Using properties of proportion solve for x, given

$$\frac{\sqrt{5x} + \sqrt{2x - 6}}{\sqrt{5x} - \sqrt{2x - 6}} = 4.$$



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16. Sachin invests Rs. 8,500 in 10%, Rs. 100 shares at Rs. 170. He sells the shares when the price of each share rises by Rs. 30. He invests the proceeds in 12% Rs. 100 shares at 125. Find :

(i) the sale proceeds.

(ii) the number of Rs. 125 shares he buys.

(iii) the change in his annual income.



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17. A man observes the angle of elevation of the top of the tower to be 45° . He walks towards it in a horizontal line through its base. On covering 20 m

the angle of elevation change to 60° . Find the height of the tower correct to 2 significant figures.



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18. Using the Remainder Theorem find the remainders obtained when

$x^3 + (kx + 8)x + k$ is divided by $x + 1$ and $x - 2$.

Hence, find k if the sum of the two remainders is 1.



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19. The product of two consecutive natural numbers which are multiples of 3 is equal to 810. Find the two numbers.



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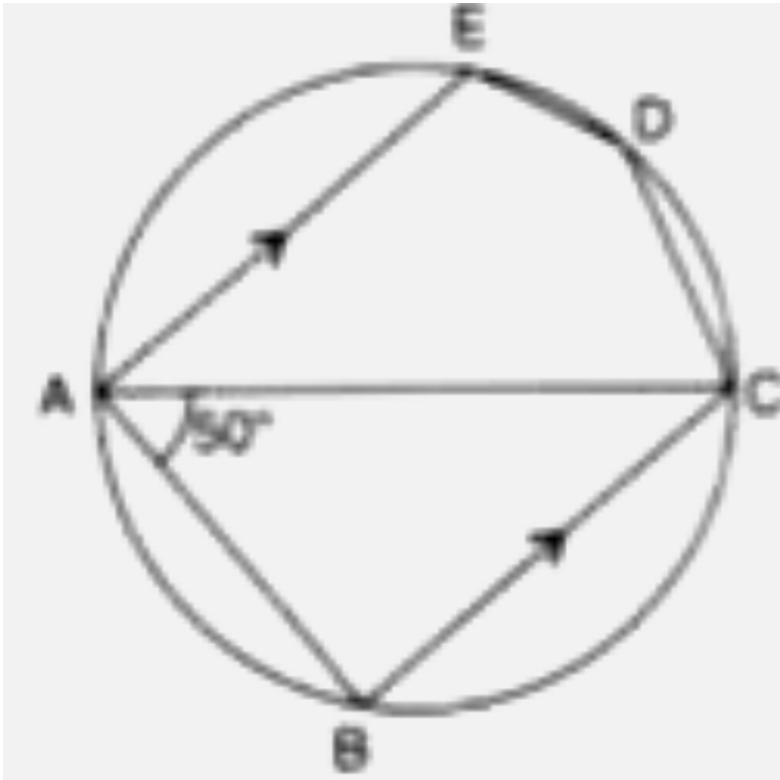
20. In the given figure, ABCDE is a pentagone inscribed in a circle such that AC is a diameter and side $BC \parallel AE$. If $\angle BAC = 50^\circ$, find giving reasons :

(i) $\angle ACB$

(ii) $\angle EDC$

(iii) $\angle BEC$

Hence prove that BE is also a diameter.



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