



MATHS

BOOKS - SELINA MATHS (ENGLISH)

MIXED PRACTICE

Set A

1. A dealer in Calcutta supplied the following goods/services to another dealer in Banaras. Find the total amount of bill



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2. Some goods/services are supplied for Rs 20,000 from Mathura (U.P.) to Ratlam (M.P.) and then from Ratlam to Indore (M.P.). If at each stage, the rate of tax under GST system is 12% and the profit made by the dealer in Ratlam is Rs 3,750, find the cost of the article (in Indore) under GST.



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3. Mr. Kumar has a recurring deposit account in a bank for 4 years at 10% p.a. rate of interest. If he gets Rs 21,560 as interest at the time of maturity, find :
the monthly instalment paid by Mr. Kumar.



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4. Mr. Kumar has a recurring deposit account in a bank for 4 years at 10% p.a. rate of interest. If he gets Rs 21,560 as interest at the time of maturity, find :
the monthly instalment paid by Mr. Kumar.



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5. The maturity value of a cumulative deposit account is Rs 1,20,400. If each monthly instalment for this account is Rs 1,600 and the rate of interest is 10% per year, find the time for which the account was held.



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6. Rajat invested Rs 24,000 in 7% hundred rupee shares at 20% discount. After one year, he sold these shares at Rs 75 each and invested the proceeds (including dividend of first year) in 18% twenty five rupee shares at 64% premium. Find :
his gain or loss after one year.



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premium. Find :

his gain or loss after one year.



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his gain or loss after one year.



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9. A man sold some Rs 20 shares, paying 8% dividend, at 10% discount and invested the proceeds in 10 Rs shares, paying 12% dividend, at 50% premium. If the change in his annual income is Rs 600, find the number of shares sold by the man.



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10. Find the value of x which satisfies the inequation :

$$-2 \leq \frac{1}{2} - \frac{2x}{3} \leq \frac{15}{6}, x \in W$$

Also , graph the solution on a number line.



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11. Solve (using formula) the equation :

$$\frac{x}{x+1} + \frac{x+1}{x} = 2\frac{4}{15}$$



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12. A dealer sells an article for Rs. 24 and gains as much percent as the cost price of the article. Find the cost price of the article.



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13. B takes 16 days less than A to do a certain piece of work. If both working together can complete the work in

15 days, in how many days will B alone complete the work ?

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14. Divide Rs1,870 into three parts in such a way that half of the first part, one-third of the second part and one-sixth of the third part are all equal.

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15. If $a + c = b e$ and $\frac{1}{b} + \frac{1}{d} = \frac{e}{c}$, Prove that : a,b,c and d are in proportion.

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16. If $\frac{4x + 3y}{4x - 3y} = \frac{7}{4}$ use the properties to find the value of $\frac{2x^2 - 11y^2}{2x^2 + 11y^2}$

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17. Use the properties of proportionality to solve :

$$\frac{\sqrt{12x + 1} + \sqrt{2x - 3}}{\sqrt{12x + 1} - \sqrt{2x - 3}} = \frac{3}{2}$$

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18. What number should be added to $2x^3 - 3x^2 - 8x + 3$ so that the resulting polynomial leaves the remainder 10 when divided by $2x + 1$?



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19. If

$$A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} x & 1 \\ 4 & -1 \end{bmatrix} \text{ and } A^2 + B^2 = (A + B)^2$$

find the value of x .

State, whether $A^2 + B^2$ and $(A + B)^2$ are always equal

or not.



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20. Find the 10^{th} term of the sequence 10, 8, 6,



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21. If the 5^{th} and 11^{th} terms of an A.P. are 16 and 34 respectively. Find the A.P.



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22. If p^{th} term of an A.P. is q and its q^{th} term is p , show that its r^{th} term is $(p + q - r)$



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23. If n^{th} term of an A.P. is $(2n - 1)$, find its 7^{th} term.



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24. If the sum of first n terms of an A.P. is $3n^2 + 2n$, find its r^{th} term.

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25. For an A.P., the sum of its terms is 60, common difference is 2 and last term is 18. Find the number of terms in the A.P.

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26. Find the geometric progression whose 5^{th} term is 48 and 8^{th} term is 384.

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27. How many terms of the G.P.

$\frac{2}{9}, -\frac{1}{3}, \frac{1}{2}, \dots$ must be added to get the sum equal to $\frac{55}{72}$?



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28. Find the sum of n terms of the sequence : $5 + 55 + 555$
 $+ \dots$



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29. What point on x-axis is equidistant from the points (6, 7) and (4, -3)?

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30. Calculate the ratio in which the line segment A(6, 5) and B(4, -3) is divided by the line $y = 2$.

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31. Find the equations of the diagonals of a rectangle whose sides are $x + 1 = 0$, $x - 4 = 0$, $y + 1 = 0$ and $y - 2 = 0$.

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32. The line $4x + 5y + 20 = 0$ meets x-axis at point A and y-axis at point B. Find :

the co-ordinates of points A and B.



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33. The line $4x + 5y + 20 = 0$ meets x-axis at point A and y-axis at point B Find :

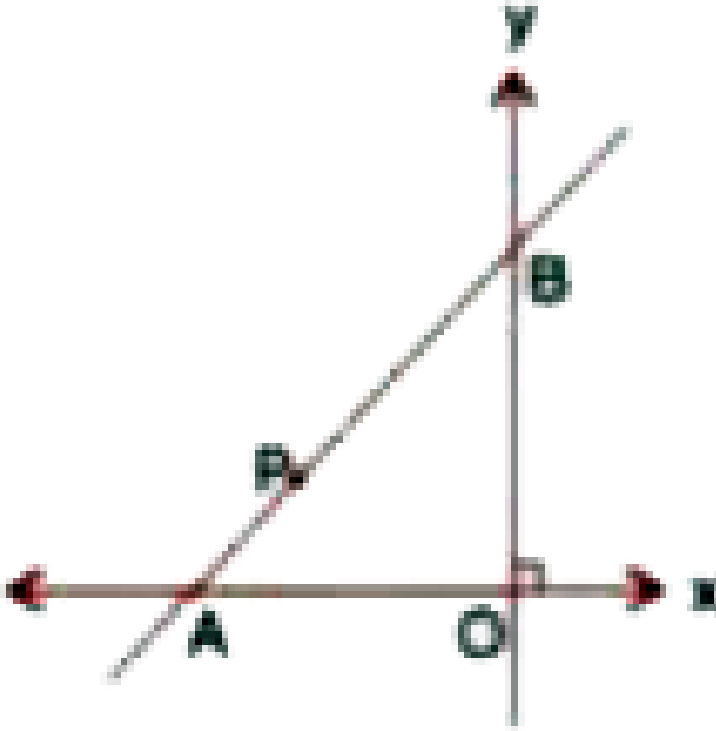
the co-ordinates of point P in AB such that $AB : BP = 5:3$.



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34. In the given figure, line APB meets the x-axis at point A and y-axis at point B. P is the point $(-4, 2)$ and $AP : PB = 1$

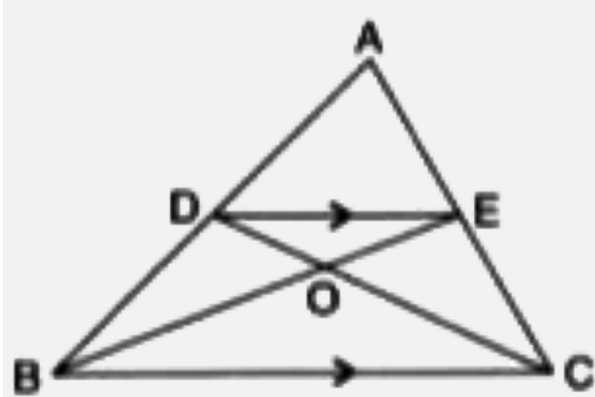
: 2. Find the co-ordinates A and B .



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35. In the given figure, $DE \parallel BC$ and $AE : EC = 5 : 4$. Find :

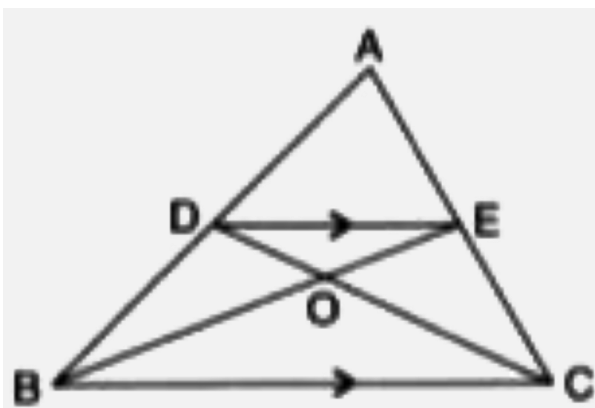
$DE : BC$



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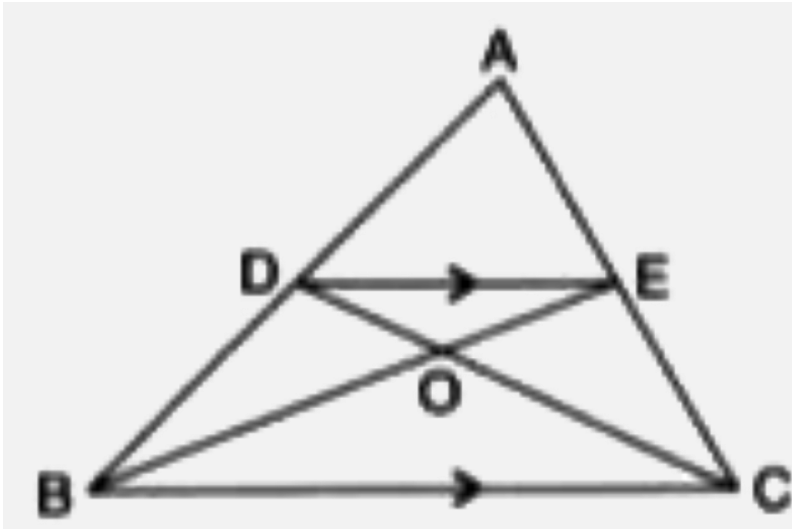
36. In the given figure, $DE \parallel BC$ and $AE : EC = 5 : 4$. Find :

$DO : DC$



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37. In the given figure, $DE \parallel BC$ and $AE : EC = 5 : 4$. Find :
area of $\triangle DOE$: area of $\triangle OCB$



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38. If chords AB and CD of a circle intersect each other at a point inside the circle, prove that :

$$PA \times PB = PC \times PD.$$



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39. P and Q are centres of circles of radii 9 cm and 2 cm respectively. $PQ = 17$ cm. R is the centre of a circle of radius x cm which touches the above circles externally. Given that $\angle PRQ = 90^\circ$, write an equation in x and solve it.



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40. Use ruler and a pair of compasses only in this question :

Draw a circle on $AB = 6.4$ cm as diameter.



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41. The internal and external diameters of a hollow hemispherical vessel are 14 cm and 21 cm respectively. The cost of silver plating of 1cm^2 of its surface is Rs 32. Find the total cost of silver plating the vessel all over.



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42. Prove that :

$$\frac{\operatorname{cosec} A + 1}{\operatorname{cosec} A - 1} = \sec A + \tan A$$



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43. Prove that :

$$\cot A - \tan A = \frac{2 \cos^2 A - 1}{\sin A \cos A}$$

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44. Prove that :

$$\sqrt{\frac{1 + \cos A}{1 - \cos A}} + \sqrt{\frac{1 - \cos A}{1 + \cos A}} = 2 \operatorname{cosec} A$$

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45. Prove that :

$$\frac{\cos A}{\operatorname{cosec} A + 1} + \frac{\cos A}{\operatorname{cosec} A - 1} = 2 \tan A$$

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46. Solve for x , $0^\circ \leq x \leq 90^\circ$

$$4 \cos^2 2x - 3 = 0$$



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47. Solve for x , $0^\circ \leq x \leq 90^\circ$

$$2 \sin^2 x - \sin x = 0$$



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48. about to only mathematics



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49. Find the probability of drawing an ace or a jack from a pack of 52 cards.

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50. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, determine the number of blue balls in the bag.

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51. In a single throw of two dice , what is the probability of obtaining a total of 9 or 11 ?

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52. In a single throw of two dice , what is the probability of two aces



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53. In a single throw of two dice , what is the probability of at least one ace



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54. In a single throw of two dice, find the probability of a doublet .



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55. In a single throw of two dice, what is the probability of getting five on one die and six on the other



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56. Two dice are thrown simultaneously. Find the probability of getting: an even number as the sum the sum as a prime number a total of at least 10 (iv) a

doublet of even number a multiple of 2 on one die and a multiple of 3 on the other same number on both dice i.e. a doublet a multiple of 3 as the sum.



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Set B

1. A dealer sells goods/services, worth Rs 30,000 to some other dealer in the same town at a discount of 25%. If the rate of GST is 12%, find the amount of bill.



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2. The monthly instalment of a recurring deposit account is Rs 2,400. If the account is held for 1 year 6 months and its maturity value is Rs 47,304, find the rate of interest.



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3. The maturity value of a recurring deposit account is Rs 42,400. If the account is held for 2 years and the rate of interest is 10% per annum, find the amount of each monthly instalment.



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4. A man invests equal amounts of money in two companies A and B. Company A pays a dividend of 15% and its Rs100 shares are available at 20% discount. The shares of company B has a nominal value of Rs25 and are available at 20% premium. If at the end of one year, the man gets equal dividends from both the companies, find the rate of dividend paid by company B.



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5. A sum of Rs54,000 is invested partly in shares paying 6% dividend at 40% premium and partly in 5% shares at 25% premium. If the nominal value of one share in each

company is Rs100 and the total income of the man is Rs 2,240, find the money invested in the second company.

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6. Solve and graph the solution set of :

$$2x - 9 < 7 \text{ and } 3x + 9 \leq 25, x \in R$$

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7. Solve :

$$3x - 2 > 19 \text{ or } 3 - 2x \geq 7, x \in R$$

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8. Use formula to solve the quadratic equation :

$$x^2 + x - (a + 1)(a + 2) = 0.$$



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9. By selling an article for Rs96, a man gains as much percent as its cost price. Find the cost price of the article.



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10. A trader bought a number of articles for Rs900, five were damaged and he sold each of the rest at Rs2 more than what he paid for it. If on the whole he gains Rs80, find the number of articles bought.

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11. 1077 boxes of oranges were loaded in three trucks. While unloading them 7, 12 and 8 boxes were found rotten in the trucks respectively. If the number of remaining boxes in the three trucks are in the ratio 4:6: 5, find the number of boxes loaded originally in each truck

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12. If $a \neq b$ and $a : b$ is the duplicate ratio of $(a + c)$ and $(b + c)$. show that a, c and b are in continued proportion.

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13. If $16\left(\frac{a-x}{a+x}\right)^3 = \left(\frac{a+x}{a-x}\right)$, show that : $a = 3x$.

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14. Solve for x , using the properties of proportionality

$$\frac{1+x+x^2}{1-x+x^2} = \frac{62(1+x)}{63(1-x)}$$

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15. Show that $2x + 7$ is a factor of $2x^3 + 7x^2 - 4x - 14$

Hence, solve the equation: $2x^3 + 7x^2 - 4x - 14 = 0$.

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16. What number should be subtracted from $2x^3 - 5x^2 + 5x + 8$ so that the resulting polynomial has a factor $2x - 3$?



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17. The expression $4x^3 - bx^2 + x - c$ leaves remainders 0 and 30 when divided by $x+1$ and $2x-3$ respectively. Calculate the values of b and c . Hence factorise the expression completely.



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18. If for two matrices M and N , $N = \begin{bmatrix} 3 & 2 \\ 2 & -1 \end{bmatrix}$ and product $M \times N = [- 14]$, find matrix M .



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19. If the sum of first 20 terms of an A.P. is same as the sum of its first 28 terms, find the sum of its 48 terms.



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20. If a, b, c are in A.P., show that: $(b + c)$, $(c + a)$ and $(a + b)$ are also in A.P.



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21. If a, b, c are in G.P. and also a, b, c are in A.P.

Prove that: $\frac{1}{a} + \frac{1}{c} = \frac{2}{b}$

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22. Evaluate : $9 + 99 + 999 + \dots$ upto n terms.

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23. Find the point on the y-axis whose distances from the points (3, 2) and (-1, 1.5) are in the ratio 2:1.

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24. In what ratio does the point P (a, 2) divide the line segment joining the points A(5,-3) and B(-9, 4) ? Also, find the value of 'a'.



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25. A straight line makes on the co-ordinate axes positive intercepts whose sum is 5. If the line passes through the point P(-3, 4), find its equation.



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26. The line $3x - 4y + 12 = 0$ meets x-axis at point A and y-axis at point B. Find :

the co-ordinates of A and B.



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27. The line $3x - 4y + 12 = 0$ meets x-axis at point A and y-axis at point B. Find :

equation of perpendicular bisector of line segment AB



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28. In a triangle PQR, L and M are two points on the base QR, such that $\angle LPQ = \angle QRP$ and $\angle RPM = \angle RQP$.

Prove that:

$$\Delta PQL \sim \Delta RPM$$



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29. In a triangle PQR , L and M are two points on the base QR , such that $\angle LPQ = \angle QRP$ and $\angle RPM = \angle RQP$.

Prove that:

$$QL \times RM = PL \times PM$$



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30. In a triangle PQR , L and M are two points on the base QR , such that $\angle LPQ = \angle QRP$ and $\angle RPM = \angle RQP$.

Prove that:

$$PQ^2 = QR \times QL$$



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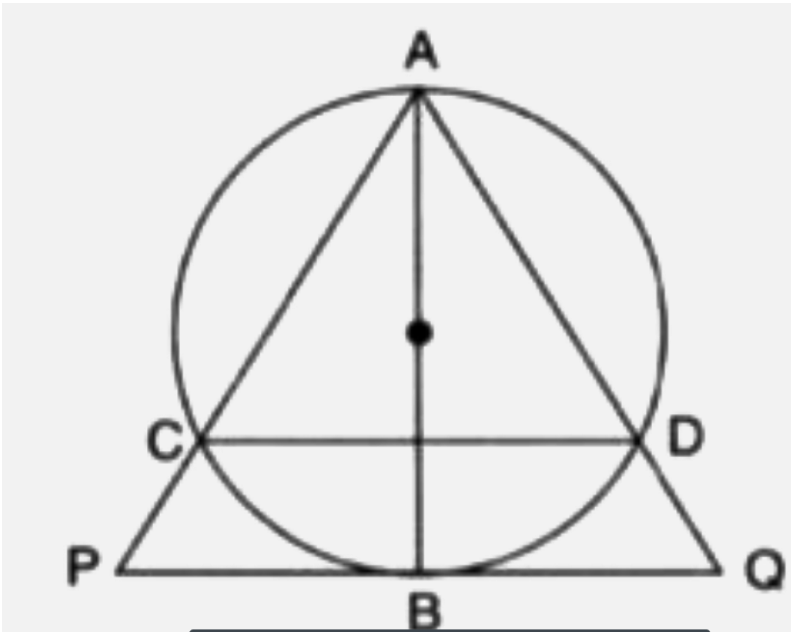
31. In a rectangle ABCD, its diagonal AC = 15 cm and $\angle ACD = \alpha$ If $\cot \alpha = \frac{3}{2}$, find the perimeter and the area of the rectangle.



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32. The given figure shows, AB is a diameter of the circle. Chords AC and AD produced meet the tangent to the circle at point B in points P and Q respectively. Prove that:

$$AB^2 = AC \times AP$$



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33. Use ruler and compasses for this question.

Construct an isosceles triangle ABC in which $AB = AC = 7.5$ cm and $BC = 6$ cm.

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34. Use ruler and compasses for this question.

Draw AD, the perpendicular from vertex A to side BC.



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35. Use ruler and compasses for this question.

Draw a circle with centre A and radius 2.8 cm, cutting AD at E.



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36. In triangle ABC , $\angle BAC = 90^\circ$, $AB = 6$ cm and $BC = 10$ cm. A circle is drawn inside the triangle which

touches all the sides of the triangle (i.e., an incircle of $\triangle ABC$ is drawn). Find the area of the triangle excluding the circle.

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37. A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A sphere is lowered into the water and its size is such that when it touches the sides it is just immersed. What fraction of water overflows ?

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38. Prove that :

$$\frac{1 + \cot A}{\cos A} + \frac{1 + \tan A}{\sin A} = 2(\sec A + \operatorname{cosec} A)$$



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39. Prove that :

$$\sqrt{\frac{1 + \sin A}{1 - \sin A}} - \sqrt{\frac{1 - \sin A}{1 + \sin A}} = 2 \tan A$$



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40. Solve for $0^\circ \leq x \leq 90^\circ$

$$3 \tan^2(2x - 20^\circ) = 1$$



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41. Solve for $x \in W, 0^\circ \leq x \leq 90^\circ$

$$\tan^2 x = 3(\sec x - 1)$$



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42. The angle of elevation of the top of a tower as observed from a point on the ground is ' α ' and on moving ' a ' metre towards the tower, the angle of elevation is ' β '

Prove that the height of the tower is : $\frac{a \tan \alpha \tan \beta}{\tan \beta - \tan \alpha}$



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43. The mean of the following frequency distribution is 50, but the frequencies f_1 and f_2 in class 20-40 and 60-

80 respectively are not known. Find these frequencies.



Given that the sum of frequencies is 120.

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44. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
an ace

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45. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
a jack of hearts



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46. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
a three of clubs or a six of diamonds



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47. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
a heart



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48. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
any suit except heart



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49. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
a ten or a spade



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50. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :

neither a four nor a club



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51. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
a picture card



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52. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that it is :
a spade or a picture card



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