



MATHS

BOOKS - SELINA MATHS (ENGLISH)

MATHEMATICS- 2015

Section A

1. A shopkeeper bought an article for Rs 3,450. He marks the price of the article 16% above the cost price. The rate of sale tax charged on the article is 10%. Find the :

(i) marked price of the article.

(ii) price paid by a customer who buys the article.



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2. Solve the following inequation and write the solution set :

$$13x - 5 < 15x + 4 < 7x + 12, x \in R$$

Represent the solution on a real number line



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3. Without using trigonometric tables evaluate.

$$\frac{\sin 65^\circ}{\cos 25^\circ} + \frac{\cos 32^\circ}{\sin 58^\circ} - \sin 28^\circ \cdot \sec 62^\circ + \operatorname{cosec}^2 30^\circ$$



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4. If $A = \begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 16 \\ 0 & -y \end{bmatrix}$ find x and y when $A^2 = B$.



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5. The present population of a town is 2,00,000. Its population increase by 10% in the first year and 15% in the second year. Find the population of the town at the end of the two years.



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6. Three vertices of a parallelogram ABCD taken in order are A (3, 6), B (5, 10) and C (3, 2) find :

(i) the coordinates of the fourth vertex D.



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7. Three vertices of a parallelogram ABCD taken in order are A (3, 6), B (5, 10) and C (3, 2) find :

(ii) length of diagonal BD.



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8. Three vertices of a parallelogram ABCD taken in order are A (3, 6), B (5, 10) and C (3, 2) find :

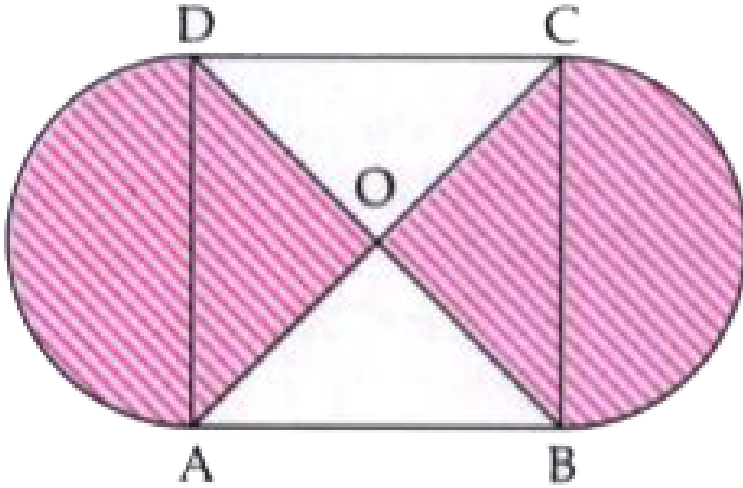
(iii) equation of side AB of the parallelogram ABCD.



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9. In the given figure, ABCD is a square of side 21 cm. AC and BD are two diagonals of the square. Two semi circles are drawn with AD and BC as diameters. Find the area of the shaded region

(Take $\pi = \frac{22}{7}$)



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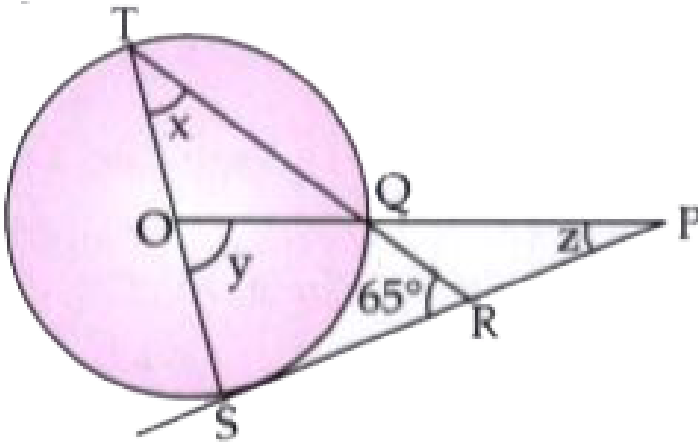
10. The marks obtained by 30 students in a class assessment of 5 subjects is given below :

Marks	0	1	2	3	4	5
No. of Students	1	3	6	10	5	5

Calculate the mean, median and mode of the above distribution.

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11. In the figure given below, O is the centre of the circle and SP is a tangent. If $\angle SRT = 65^\circ$, find the value of x , y and z .



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12. Katrina opened a recurring deposit account with a Nationalised Bank for a period of 2 years. If the bank pays interest at the rate of 6% per annum and the monthly instalment is Rs 1,000, find the :

(i) interest earned in 2 years.



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13. Katrina opened a recurring deposit account with a Nationalised Bank for a period of 2 years. If the bank pays interest at the rate of 6% per annum and the

monthly instalment is Rs 1,000, find the :

(ii) maturity value.



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14. Find the value of 'k' for which $x = 3$ is a solution of the quadratic equation, $(k + 2)x^2 - kx + 6 = 0$

Hence, find the other root of the equation.



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15. Draw a regular hexagon of side 5 cm.



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Section B

1. Use a graph paper for this question take 1 cm = 1 unit along both the X and Y axis :

(i) Plot the points A(0, 5), B(2, 5), C(5, 2), D(5, -2), E(2, -5) and F(0, -5).



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2. Use a graph paper for this question taking 1 cm = 1 unit along both the x and y axis:

(i) Plot the points A(0, 5), B(2, 5), C(5, 2), D(5, -2), E(2, -5) and F(0, -5).

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

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3. Use a graph paper for this question taking 1 cm = 1 unit along both the x and y axis:

(i) Plot the points A(0, 5), B(2, 5), C(5, 2), D(5, -2), E(2,-5) and F(0, -5).

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

(iii) Write the coordinates of B', C', D' and E'.

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4. Use a graph paper for this question taking 1 cm = 1 unit along both the x and y axis:

(i) Plot the points A(0, 5), B(2, 5), C(5, 2), D(5, -2), E(2,-5) and F(0, -5).

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

(iii) Write the coordinates of B', C', D' and E'.

(iv) Name the figure formed by BC DEE'D'C'B'.



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5. Use a graph paper for this question taking 1 cm = 1 unit along both the x and y axis:

(i) Plot the points $A(0, 5)$, $B(2, 5)$, $C(5, 2)$, $D(5, -2)$, $E(2, -5)$ and $F(0, -5)$.

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

(iii) Write the coordinates of B' , C' , D' and E' .

(iv) Name the figure formed by $BCDEE'D'C'B'$.

(v) Name a line of symmetry for the figure formed.



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6. Virat opened a Saving Bank account in a bank on 16^{th} April, 2010. His pass book shows the following entries.

Date	Particulars	Withdrawal (₹)	Deposit (₹)	Balance (₹)
April 16, 2010	By Cash	—	2500	2500
April 28 th	By Cheque	—	3000	5500
May 9 th	To Cheque	850	—	4650
May 15 th	By Cash	—	1600	6250
May 24 th	To Cash	1000	—	5250
June 4 th	To Cash	500	—	4750
June 30 th	By Cheque	—	2400	7150
July 3 rd	By Cash	—	1800	8950

Calculate the interest Virat earned at the end of 31st July, 2010 at 4% per annum interest. What sum of money will he receive if he closes the account on 1st August, 2010 ?

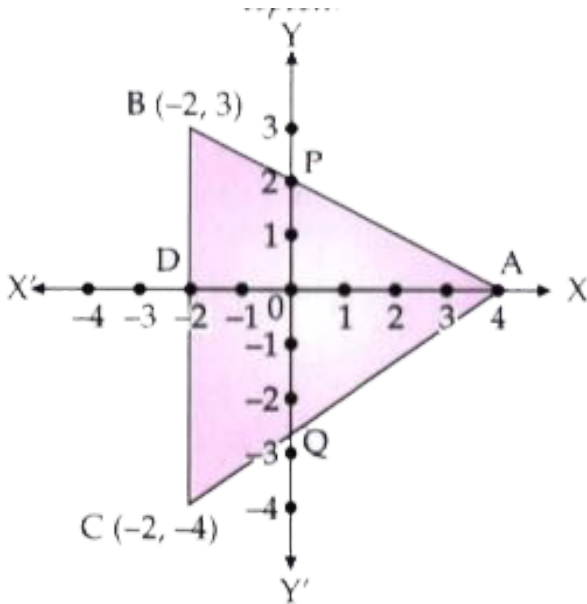
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7. If a, b, c are in continued proportion, prove that

$$(a + b + c)(a - b + c) = a^2 + b^2 + c^2.$$

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8. In the given figure ABC is a triangle and BC is parallel to the Y-axis. AB and AC intersects the y-axis at P and Q respectively.

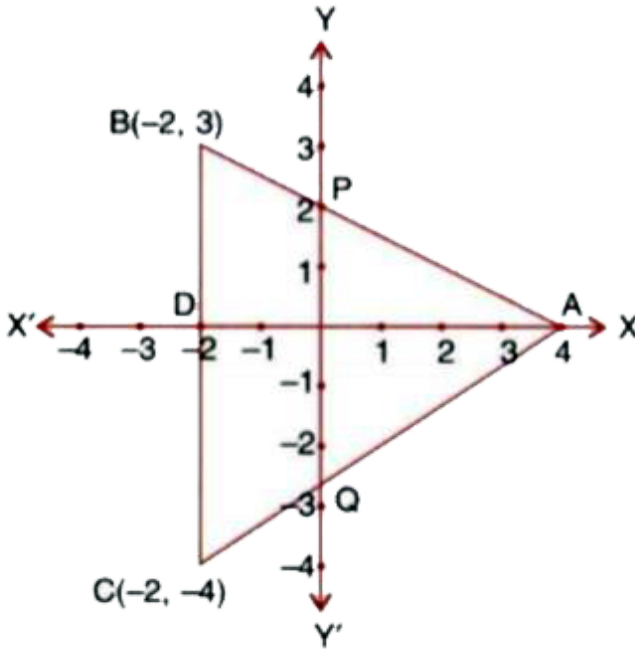


(i) Write the coordinates of A.



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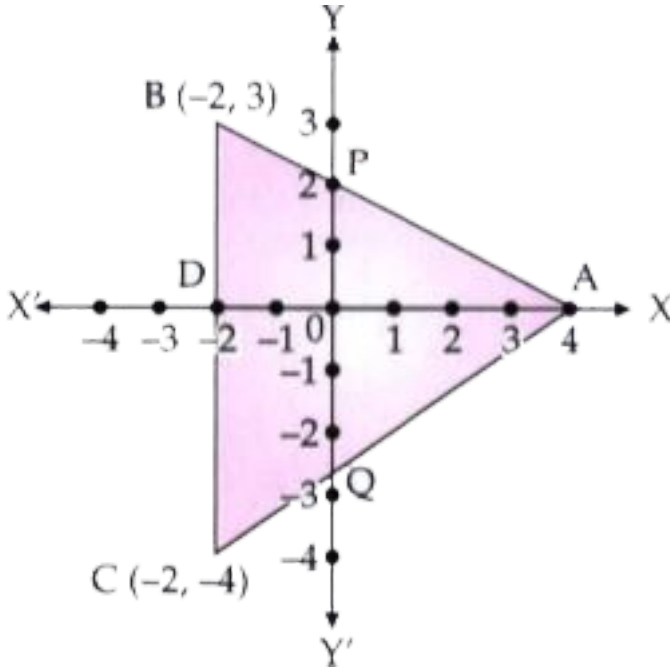
9. In the figure, given, ABC is a triangle and BC is parallel to the y-axis. AB and AC intersect the y-axis at P and Q respectively.



Find the length of AB and AC.

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10. In the given figure ABC is a triangle and BC is parallel to the Y-axis. AB and AC intersects the y-axis at Pand Q respectively.

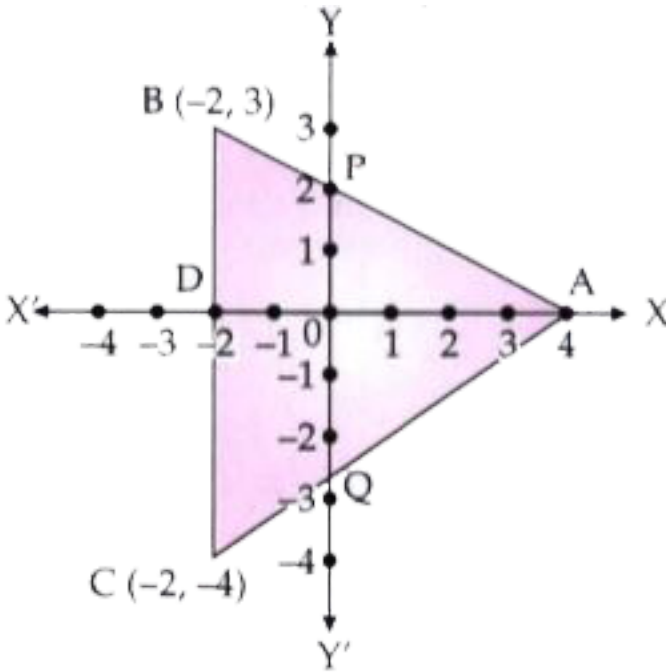


(iii) Find the ratio in which Q divides AC.



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11. In the given figure ABC is a triangle and BC is parallel to the Y-axis. AB and AC intersects the y-axis at Pand Q respectively.



(iv) Find the equation of the line AC.

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12. Calculate the mean of the following distribution :

<i>Class Interval</i>	0-10	10-20	20-30	30-40	40-50	50-60
<i>Frequency</i>	8	5	12	35	24	16

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13. Two solid spheres of radii 2 cm and 4 cm are melted and recast into a cone of height 8 cm. Find the radius of the cone so formed.

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14. Find 'a' if the two polynomials $ax^3 + 3x^2 - 9$ and $2x^3 + 4x + a$, leaves the same remainder when divided by $x + 3$.



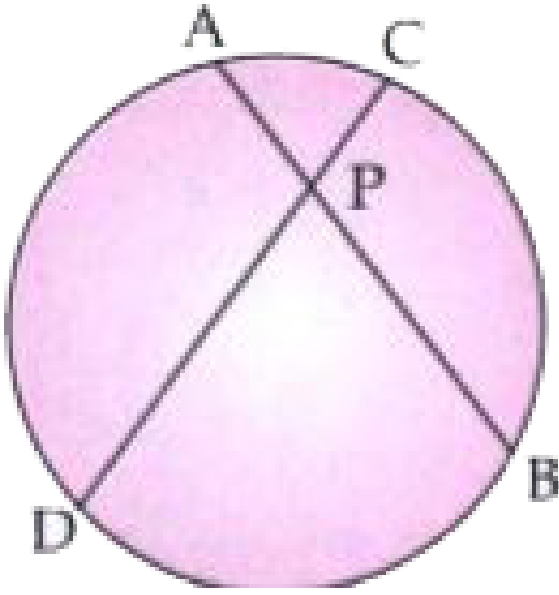
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15. Prove that $\frac{\sin\theta}{1 - \cot\theta} + \frac{\cos\theta}{1 - \tan\theta} = \cos\theta + \sin\theta$



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16. AB and CD are two chords of a circle intersecting at P. Prove that $AP \times PB = CP \times PD$



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17. A bag contains 5 white balls, 6 red balls and 9 green balls. A ball is drawn at random from the bag.

Find the probability that the ball drawn is :

(i) a green ball.

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18. A bag contains 5 white balls, 6 red balls and 9 green balls. A ball is drawn at random from the bag.

Find the probability that the ball drawn is :

(ii) a white or a red ball.



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19. A bag contains 5 white balls, 6 red balls and 9 green balls. A ball is drawn at random from the bag.

Find the probability that the ball drawn is :

(iii) neither a green ball nor a white ball.



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20. Rohit invested $9600rs$ on $100rs$ shares at $20rs$ premium paying 8% dividend. Rohit sold the shares when the price rose to $160rs$. He invested the proceeds (excluding dividend) in 10% $50rs$ shares at $40rs$ find the

(i) original number of shares

(ii) sale proceeds

(iii) new number of shares

(iv) change in the two dividends



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21. Rohit invested $9600rs$ on $100rs$ shares at $20rs$ premium paying 8% dividend. Rohit sold the shares when the price rose to $160rs$. He invested the proceeds (excluding dividend) in 10% $50rs$ shares at $40rs$ find the

(i) original number of shares

(ii) sale proceeds

(iii) new number of shares

(iv) change in the two dividends



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22. Rohit invested $9600rs$ on $100rs$ shares at $20rs$ premium paying 8% dividend. Rohit sold the shares when the price rose to $160rs$. He invested the proceeds (excluding dividend) in 10% $50rs$ shares at $40rs$ find the

(i) original number of shares

(ii) sale proceeds

(iii) new number of shares

(iv) change in the two dividends



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23. Rohit invested $9600rs$ on $100rs$ shares at $20rs$ premium paying 8% dividend. Rohit sold the shares when the price rose to $160rs$. He invested the proceeds (excluding dividend) in 10% $50rs$ shares at $40rs$ find the

(i) original number of shares

(ii) sale proceeds

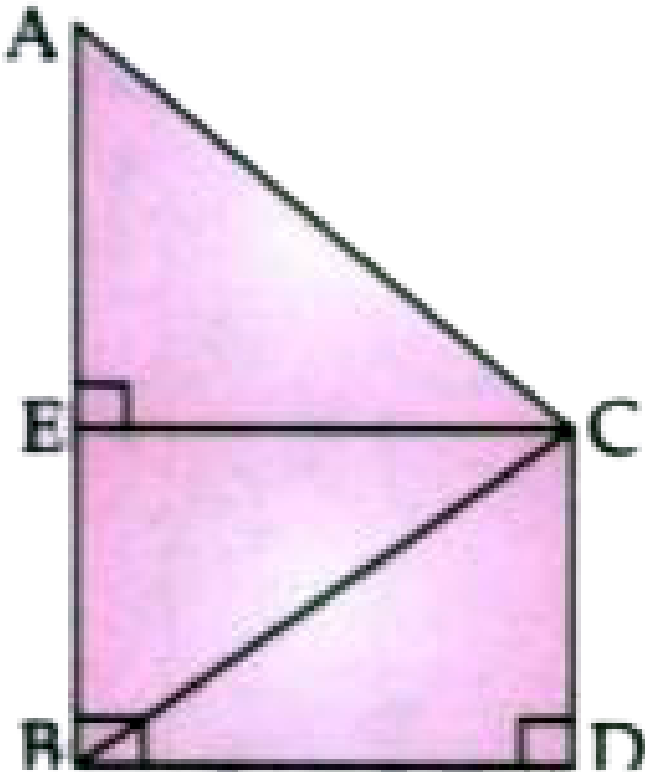
(iii) new number of shares

(iv) change in the two dividends



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24. The horizontal distance between two tower is 120 m. The angle of elevation of the top and angle of depression of the bottom of the first tower as observed from the second tower is 30° and 24° respectively.



Find the height of the two towers. Give your answer correct to 3 significant figures.

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25. The weight of 50 workers is given below :

<i>Weight in kg</i>	50- 60	60- 70	70- 80	80- 90	90- 100	100- 110	110- 120
<i>No. of Workers</i>	4	7	11	14	6	5	3

Draw an ogive of the given distribution using a graph sheet. Take 2 cm = 10 kg on one axis and 2 cm = 5 workers along the other axis. Use a graph to estimate the following the upper and lower quartiles.

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26. The weight of 50 workers is given below :

Weight in kg	50- 60	60- 70	70- 80	80- 90	90- 100	100- 110	110- 120
No. of Workers	4	7	11	14	6	5	3

Draw an ogive of the given distribution using a graph sheet. Take 2 cm = 10 kg on one axis and 2 cm = 5 workers along the other axis. Use a graph to estimate the following: if weight 95 kg and above is considered overweight find the number of workers who are overweight.



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27. A wholesaler buys a TV from the manufacturer for Rs 25,000. He marks the price of the TV 20% above his cost price and sells it to a retailer at a 10% discount on the marked price. If the rate of VAT is 8%, Find the :

(i) marked price.

(ii) retailer's cost price inclusive of tax.

(iii) VAT paid by the wholesaler.

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28.

If

$$A = \begin{bmatrix} 3 & 7 \\ 2 & 4 \end{bmatrix}, B = \begin{bmatrix} 0 & 2 \\ 5 & 3 \end{bmatrix} \text{ and } C = \begin{bmatrix} 1 & -5 \\ -4 & 6 \end{bmatrix}$$

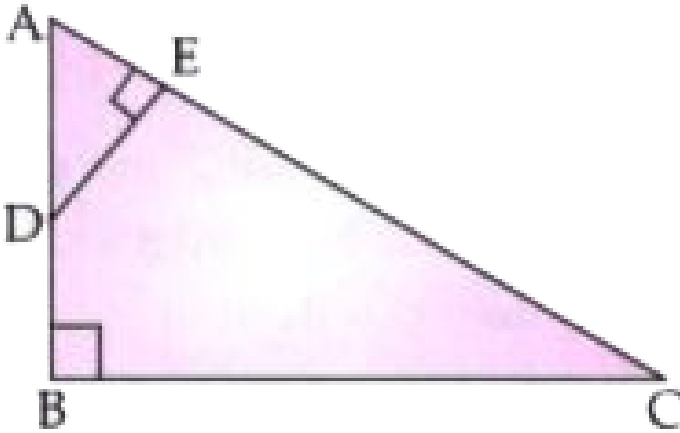
Find $AB-5C$.

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29. ABC is a right angled triangle with $\angle ABC = 90^\circ$,

D is any point on AB and DE is perpendicular to AC.

Prove that :

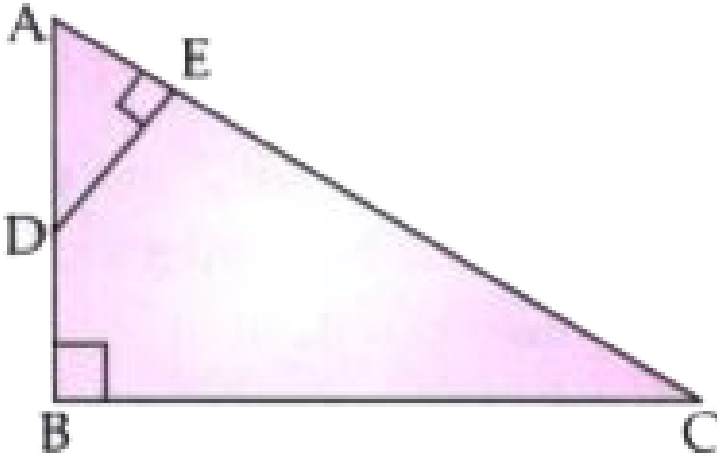


(i) $\triangle ADE \sim \triangle ACB$.

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30. ABC is a right angled triangle with $\angle ABC = 90^\circ$,

D is any point on AB and DE is perpendicular to AC.



(ii) If $AC = 13$ cm, $BC = 5$ cm and $AE = 4$ cm. Find DE and AD.

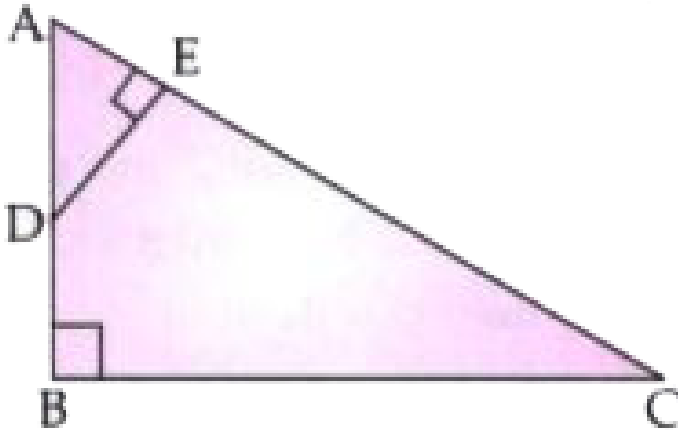


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31. ABC is a right angled triangle with $\angle ABC = 90^\circ$,

D is any point on AB and DE is perpendicular to AC.

Prove that :



(iii) Find area of $\triangle ADE$: area of quadrilateral BCED. If

AC = 13 cm, BC = 5 cm and AE = 4 cm.



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32. Sum of two natural number is 8 and the difference of their reciprocal is $\frac{2}{15}$. Find the numbers.

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33. Given $\frac{x^3 + 12x}{6x^2 + 8} = \frac{y^3 + 27y}{9y^2 + 27}$. Using componendo and devidendo find $x : y$.

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34. In a right triangle ABC, $\angle B = 90^\circ$ If AC = 5 cm, BC = 3 cm, Find AB.

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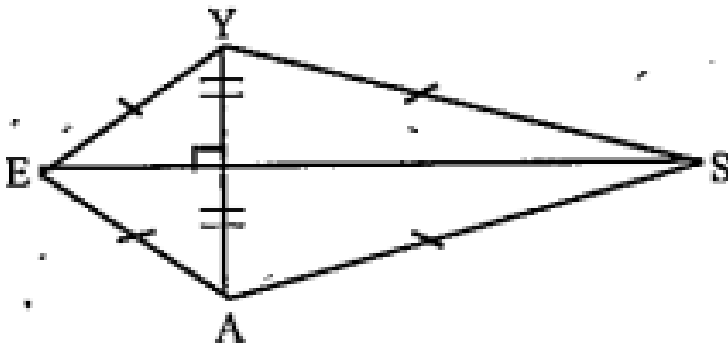
35. In a right triangle ABC , $\angle B = 90^\circ$

If $AB = 6$ cm, $BC = 8$ cm, Find AC ,



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36. Construct the kite $EASY$ if $AY = 8$ cm, $EY = 4$ cm and $SY = 6$ cm. Which properties of the kite did you use in the process?





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