

MATHS

BOOKS - ICSE

CHAPTER REVISION (STAGE 2)

Rational And Irrational Numbers

1. Simplify :

$$7\sqrt{\frac{1}{3}} - 2\frac{1}{3}\sqrt{\frac{1}{3}} + 3\sqrt{147}$$

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2. Express $3.\overline{253}$ as a fraction in the form $\frac{x}{y}$ where $x, y \in I$ and $y \neq 0$



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3. If $x = 5 - 2\sqrt{6}$, find the value of :

$$x^2 + \frac{1}{x^2}$$

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4. If $x = 5 - 2\sqrt{6}$, find the value of :

$$x^2 + \frac{1}{x^2}$$

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5. Prove that $\sqrt{5}$ and $3\sqrt{5}$ are irrational numbers.

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6. If $2x = 3 + \sqrt{7}$, find the value of : $4x^2 + \frac{1}{x^2}$



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Compound Interest

1. A man saves rupees 5000 every year and invests it at the end of the year at 10 % P.a. Compound interest. Calculate the total amount of his savings at the end of the third year.



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2. The compound interest compounded annually, on a certain sum is 29,040 in second year and is 31,944 in third year. Calculate the rate of interest.



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3. The compound interest compounded annually, on a certain sum is 29,040 in second year and is 31,944 in third year. Calculate the rate of interest.

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4. The compound interest compounded annually, on a certain sum is 29,040 in second year and is 31,944 in third year. Calculate the rate of interest.

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5. A certain sum of money amounts to 4,500 in first year, to 5,175 in second year and to 6,210 in third year. Find the rate of interest for the second year

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6. A certain sum of money amounts to 4,500 in first year, to 5,175 in second year and to 6,210 in third year. Find the rate of interest for the third year

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7. Without using formula , find the difference between the compound interest and the simple interest on rupees 16,000 at 9% per annum in 2 years.

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8. Amit borrowed 20,000 at 12% per annum compound interest. If he pays 40% of the sum borrowed at the end of the first year and 40% of the sum borrowed at the end of the second year, find the amount of loan outstanding at the beginning of the third year.

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9. Garima borrowed 40,000 at 10% p.a. simple interest. She immediately inverted this money at 10% p.a., compounded half-yearly. Calculate Garima's gain in 18 months.

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10. At the beginning of year 2011, a man had 22,000 in his bank account. He saved some money by the end of this year and deposited it in the bank. The bank pays 10% per annum compound interest and at the end of year 2012 he had 39,820 in his bank account. Find, what amount of money he had saved and deposited in his account at the end of year 2011.

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11. A sum of 16,000, invested at simple interest, amounts to 22,400 in 4 years at a certain rate of interest. If the same sum of money is invested for 2 years at the same rate of interest, compounded p.a., find the compound interest earned.

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12. If the amounts of two consecutive years on a sum of money are in the ratio 20 : 21, find the rate of interest.

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13. The cost of a car, purchased 2 years ago, depreciates at the rate of 20% every year. If its present value is 2,52,480, find :
its purchase price.

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14. The cost of a car, purchased 2 years ago, depreciates at the rate of 20% every year. If its present value is 2,52,480, find :
its value after 1 year.

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15. If $x^2 + y^2 = 37$ and $xy = 6$, find

$x + y$

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16. If $x^2 + y^2 = 37$ and $xy = 6$: find

$x - y$

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17. If $x^2 + y^2 = 37$ and $xy = 6$, find

$$x^2 - y^2$$

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18. If $3a + \frac{1}{3a} = 2\sqrt{3}$, evaluate:

$$3a - \frac{1}{3a}$$

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19. If $3a + \frac{1}{3a} = 2\sqrt{3}$, evaluate:

$$9a^2 + \frac{1}{9a^2}$$

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20. If $3a + \frac{1}{3a} = 2\sqrt{3}$, evaluate:

$$81a^4 + \frac{1}{81a^4}$$

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21. Expand : $(2x - y + 2)^3$

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22. Expand : $(x - 2y + 6)(x - 2y - 6)$.

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23. Expand $(2a - 4b + 7)(2a + 4b + 7)$

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24. If $a + b = 1$ and $a - b = 7$, find :

$$a^2 + b^2$$

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25. If $a + b = 1$ and $a - b = 7$, find :

$$ab$$

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26. If $x \neq 0$ and $3x + \frac{1}{3x} = 8$, find the value of : $27x^3 + \frac{1}{27x^3}$

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27. If $x - y + z = 5$ and $x^2 + y^2 + z^2 = 49$, find the value of
: $zx - xy - yz$.

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Factorisations

1. Factorise :

$$x(a - 5) + y(5 - a)$$



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2. Factorise :

$$x^2 + \frac{1}{x^2} - 2 - 3x + \frac{3}{x}$$



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3. Factorise :

$$x^2 - 2x - 9$$



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4. Factorise :

$$\frac{1}{3}x^2 - \frac{8}{x}$$

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5. Factorise :

$$7\sqrt{2}x^2 - 10x - 4\sqrt{2}$$

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6. Factorise :

$$(a^2 + 3a - 5)(a^2 + 3a + 2) + 6.$$

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7. Factorise :

$$50x^2 - 2(x - 2)^2$$

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8. By factorising $x^2 - 22x + 117$, evaluate

$$(x^2 - 22x + 117) + (x - 13)$$

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9. The expression $(a - b)^3 + (b - c)^3 + (c - a)^3$ can be factorized

as

(a) $(a - b)(b - c)(c - a)$

(b) $3(a - b)(b - c)(c - a)$

(c) $-3(a - b)(b - c)(c - a)$

(d) $(a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

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10. Evaluate : and write the answer in factors form :

$$(3a - 2b)^3 + (2b - 5c)^3 + (5c - 3a)^3$$

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Simultaneous Equations

1. Find the value of x and y: $ax + by = a - b$

$$bx - ay = a + b$$

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2. $ax + by = c$

$$bx + ay = 1 + c$$

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3. Solve : $0.04x + 0.02y = 5$

and $0.5(x - 2) - 0.4y = 29$

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4. The expressions $ax + by$ has value 7 when $x=2$ and $y=1$. It has value 1 when $x=-1$ and $y=1$. Find a and b.

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5. Solve the following system of equations:

$$\frac{1}{2(x + 2y)} + \frac{5}{3(3x - 2y)} = \frac{-3}{2}, \quad \frac{5}{4(x + 2y)} - \frac{3}{5(3x - 2y)} = \frac{61}{60}$$

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6. Susan invested certain amount of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. She received Rs. 1860 as annual interest. However, had she interchanged the amount of investments in the two schemes, she would have received Rs. 20 more as annual interest. How much money did she invest in each scheme ?

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7. Some money is to be distributed equally among children of a locality. If there are 8 children less, every one will get 10 more and if there are 16 children more, every one will get 10 less. What is the total amount of money to be distributed ?

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8. 3 men and 4 boys can do a piece of work in 14 days, while 4 men and 6 boys can do it in 10 days. How long would it take 1 boy to finish the work?

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9. A train leaves New Delhi for Ludhiana, 324 km away, at 9 a.m. One hour later, another train leaves Ludhiana for New Delhi. They meet at noon. If the second train had started at 9 a.m. and the first train at 10.30 a.m., they both would still have met at noon. Find the speed of each train.

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10. Beaker A contains sugar solution with 18 percent sugar. beaker B contains sugar solution with 12 percent sugar. How much of each

must he mixed together to get solution of 16 percent sugar weighing

240 gm of it?

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Indices

1. Solve for x : $\sqrt{32^0 + \frac{2}{3}} = (0.6)^{2-3x}$

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2. Solve : $\left\{ \left(625^{-\frac{1}{2}} \right)^{-\frac{1}{4}} \right\} = (0.2)^{4-3x}$

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3. Evaluate : $\sqrt{x^{a-b}} \times \sqrt{x^{b-c}} \times \sqrt{x^{c-a}}$

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4. Simplify :

$$\frac{\left(x + \frac{1}{y}\right)^a \left(x - \frac{1}{y}\right)^b}{\left(y + \frac{1}{x}\right)^a \left(y - \frac{1}{x}\right)^b}$$

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5. Solve for m :

$$15^{27} + 15^2 = 15^2 + 15^{5m+2}$$

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6. If $a = 2^x$ and $b = 2^{x+1}$,

Show that, $\frac{8a^3}{b^2} = 2^{x+1}$

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1. Show that $\log_3 9 + \log_3 3 = \log_5 125$

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2. Express as a single logarithm and simplify :

$$3 \log 5 - \log 50 + 2 \log 2 + 1$$

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3. Solve for x:

$$\log_{\sqrt{3}}(x + 1) = 2$$

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4. Solve for x:

$$\log_4(2x + 3) = \frac{3}{2}$$

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5. If $\log_3 y = x$ and $\log_2 z = x$, find 72^x in terms of y and z.

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6. If $\log 7 - \log 2 + \log 16 - 2 \log 3 - \log \frac{7}{45} = 1 + \log k$, find the value of k.

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7. Evaluate :

$$\frac{\log 8 \times \log 9}{\log 27}$$



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8. Evaluate :

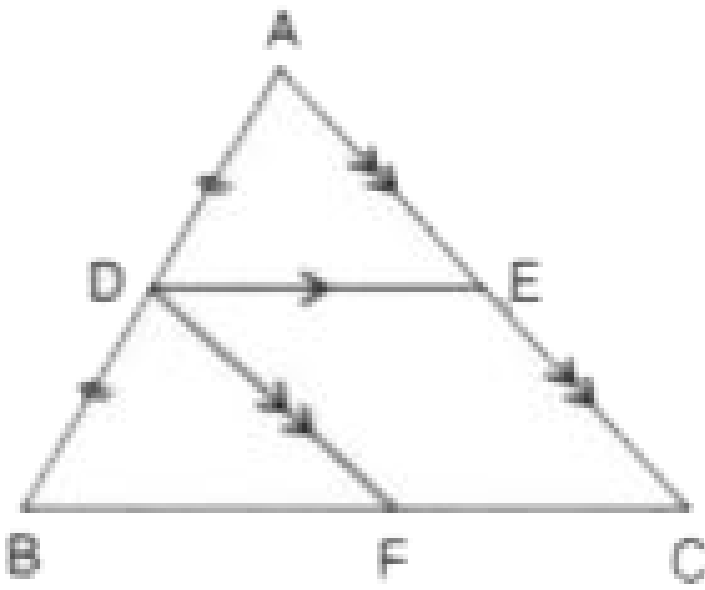
$$\frac{\log 27}{\log \sqrt{3}}$$



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Triangles

1. In the given figure D is mid-point of AB. $DE \parallel BC$ and $DF \parallel AC$. Prove that : $DE = BF$



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2. If the areas of two similar triangles are equal, prove that they are congruent.

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3. If two sides of a right triangles containing right angle , are equal to corresponding sides of another right angle triangle , the triangle are

congruent.

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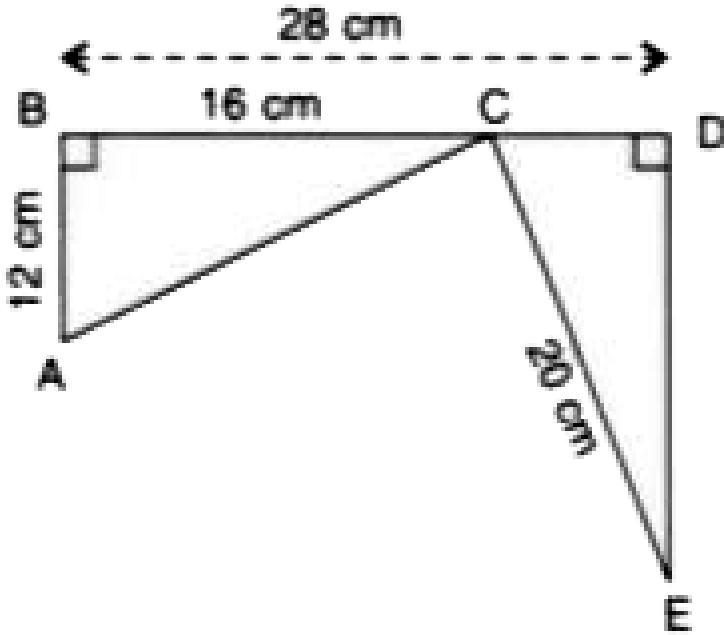
4. If two triangles are congruent , then the corresponding angles are equal

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5. If two angles and a side of one triangles are equal to two angles and a side of another triangles , the triangles are congruent.

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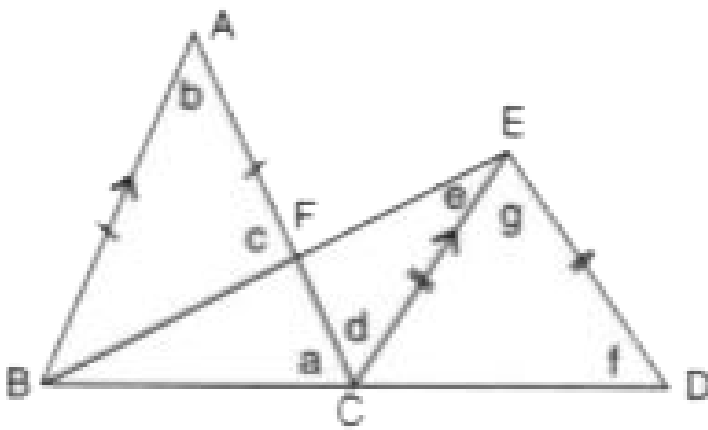
6. Show that the two triangles given the following figure are congruent.



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Isosceles Triangles

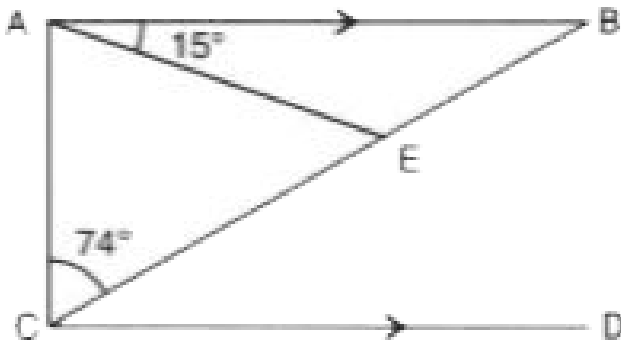
- In the following figure , $AB = AC$, $EC = ED$
 $\angle ABF = 45^\circ$ and $\angle ABC = 70^\circ$



Find the angles represented by letters a,b,c,d,e,f and g.

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2. In the given below AB is parallel to CD and $CA = CE$.



If angle $ACE = 74^\circ$ and $\angle EAB = 15^\circ$ find the angles AEB and BCD.

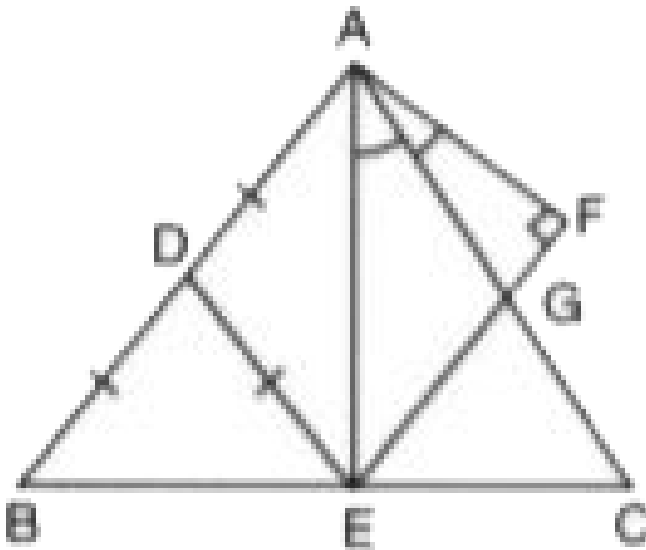
3. In the given figure, $AD = DB = DE$, $\angle EAC = \angle FAC$ and $\angle F = 90^\circ$

Prove that

(i) $\angle AEB = 90^\circ$

(ii) $\triangle CEG$ is isosceles.

(iii) $\angle CEG = \angle EAF$



4. In an isosceles triangles the angles are in the ratio 7: 4: 7 Find each base angle of the triangles.

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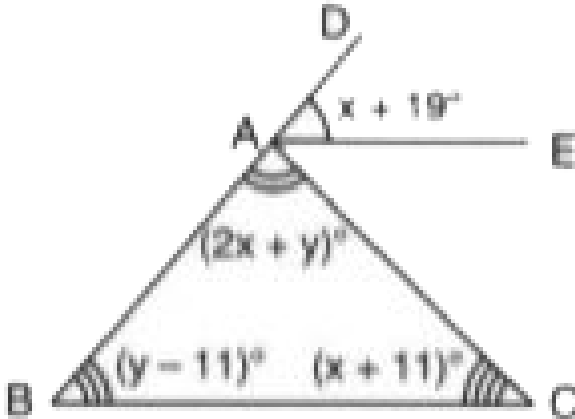
5. Find the angles of an isoscles triangles, if the ratio of the base angle to the vertical angle is 2: 5

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6. ABC is an equilateral triangle .If AD bisects angle A, Prove that AD is perpendicular bisector of BC .

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1. In the following figure, $AE \parallel BC$. Find values of x and y .



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2. Two sides of a triangles are 8 cm and 11 cm . The length of its third side lies between a cm b cm, find the values of a and b if $a < b$.

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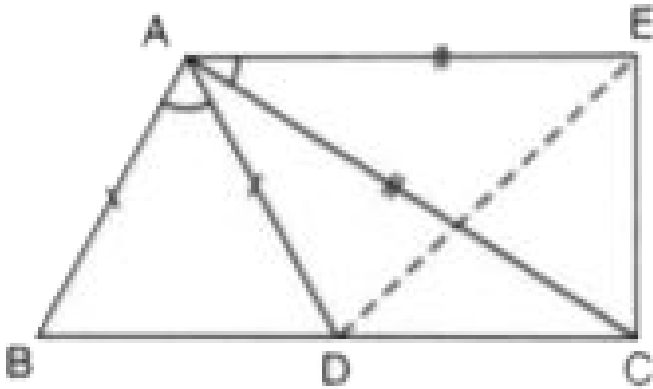
3. Prove that in a quadrilateral the sum of all the sides is greater than the sum of its diagonals.

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4. The side BC of triangles ABC is produced to D so that $CD = AC$. If the angle $BAD = 109^\circ$ and the $ACB = 72^\circ$ prove that BD is greater than AD.

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5. In the following figure $AB = AD$, $AC = AE$ and $\angle BAD = \angle CAE$,



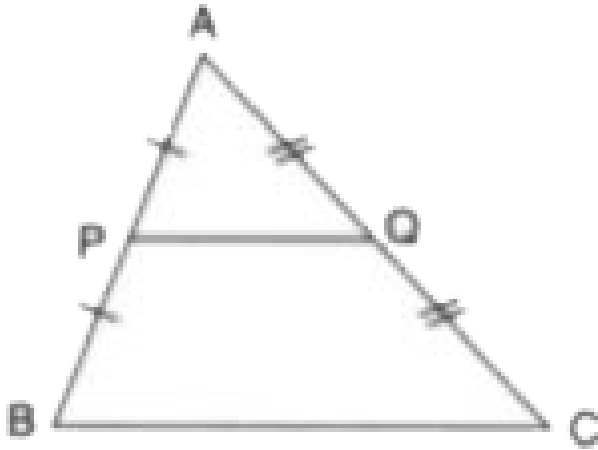
Prove that $BC = ED$

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Mid Point Theorem

1. In triangle ABC, P is mid-point of AB and Q is mid-point of AC. If $AB = 9.6$ cm, $BC = 11$ cm and $AC = 11.2$, find the perimeter of the trapezium

PBCQ.



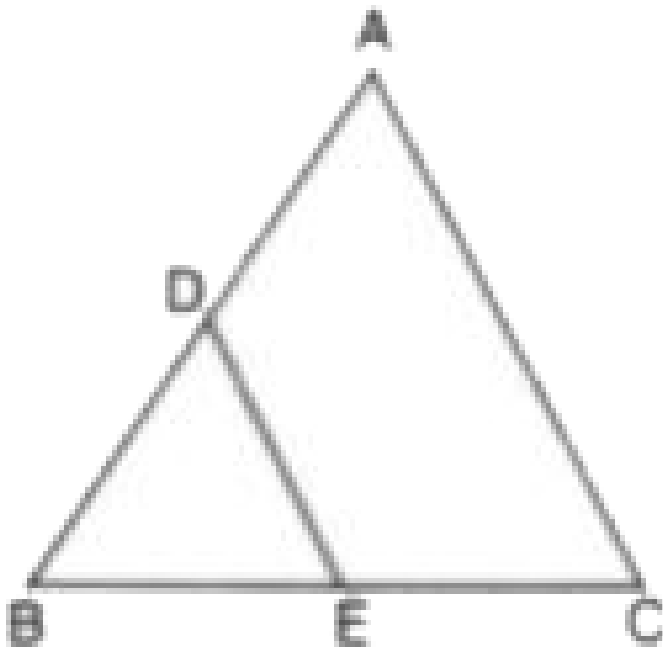
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2. In $\triangle ABC$, D is mid-point of AB and E is

mid -point of BC . Calculate

(i) DE if $AC = 6.4$ cm,

(ii) $\angle DEB$ if $\angle ACB = 63^\circ$



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3. In $\triangle ABC$, D , E and F are mid-point of sides AB , BC and AC respectively, Prove that AE and DF bisect each other.

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4. In a kite shaped figure ABCD , $AB = AD$ and $CB = CD$, point P,Q and r are mid-point of sides AB,BC and CD respectively . Prove that:

(i) $\angle PQR = 90^\circ$

(ii) Line through P and parallel to QR bisects side AD.

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5. P,Q,R and S are the mid points of sides AB,BC , CD and DA respectively of rhombus ABCD. Show that PQRS is a rectangle.

Under what conditions will PQRS be a square ?

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6. In a scalene triangle ABC ,AD and BE are medians F is a point in AC so that $DF \parallel BE$. Show that : $AC = 4 \times EF$.

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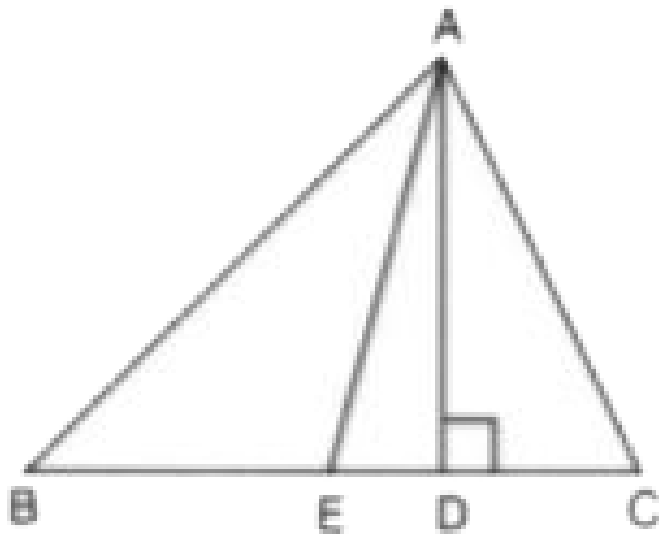
7. Show that the quadrilateral, formed by joining the mid-points of the sides of a square, is also a square.

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8. ABC is an isosceles triangle with $AB = AC = 13$ cm and $BC = 10$ cm. Calculate the length of the perpendicular from A to BC.

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9. In triangle ABC, $AB > AC$. E is the mid-point of BC and AD is perpendicular to BC. Prove that : $AB^2 + AC^2 = 2AE^2 + 2BE^2$

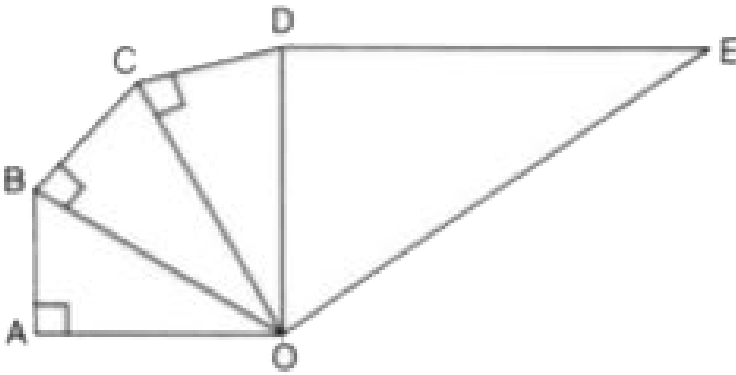


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10. In the following figure:

$$OA = 2\text{cm}$$

$$= AB = 2BC = \frac{1}{2}CD = \frac{1}{6}DE \text{ Find the length of OE.}$$



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11. ABC is a triangle in which $AB = AC$ and D is any point on BC. Prove that:

$$AB^2 - AD^2 = BD \cdot CD$$

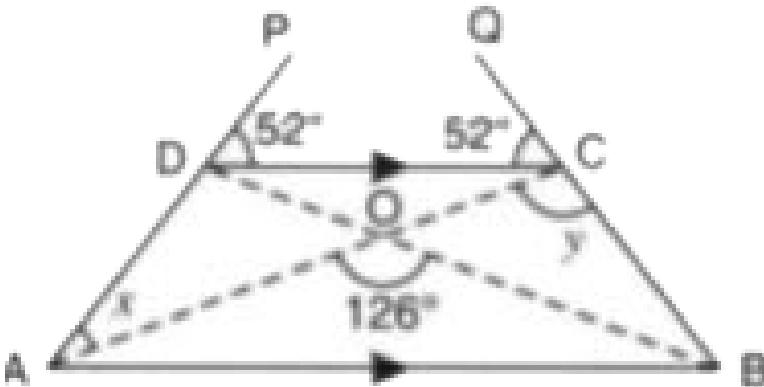
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12. ABC is an isosceles triangle with $AB = AC = 2a$ and $BC = a$. If $AD \perp BC$, find the length of AD.

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Rectilinear Figures

1. In the given figures ABCD is a trapezium with $DC \parallel AB$,
 $\angle AOB = 126^\circ$ and $\angle DCQ = \angle CDP = 52^\circ$

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2. The perimeter of a parallelogram ABCD = 40 cm , $AB = 3x$ cm, $BC = 2x$ cm and $CD = 2(y+1)$ cm . Find the values of x and y.

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3. ABCDE is a pentagon in which $AB = AE$, $BC = ED$ and $\angle ABC = \angle AED$.

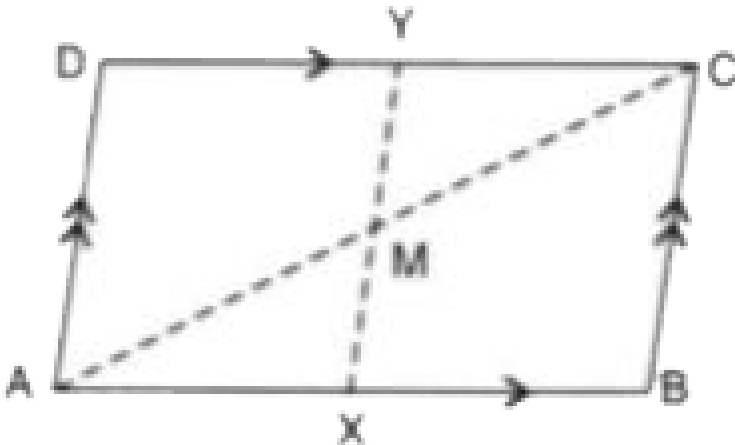
Prove that

$AC = AD$

(ii) $\angle BCD = \angle EDC$

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4. In the parallelogram ABCD, M is mid-point of AC and X, Y are points on AB and DC respectively such that $AX = CY$.



Prove that :

- (i) Triangle AXM is congruent to triangle
- (ii) XMY is a straight line.

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Constructions Of Polygons

1. Construct a parallelogram in which diagonals are 6.5 cm and 4 cm long and angle between them is 60°

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2. Construct a square ABCD in which each side = 5 cm

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3. Construct a square ABCD in which

diagonals $AC = 9$ cm



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4. Construct a rhombus ABCD in which

each side = 6 cm $\angle B = 45^\circ$



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5. Construct a rhombus ABCD in which

$AC = 5.6$ cm and $BD = 6.3$ cm



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6. Construct a rectangle ABCD with diagonal $AC = 6.6$ cm , side $BC = 5.2$

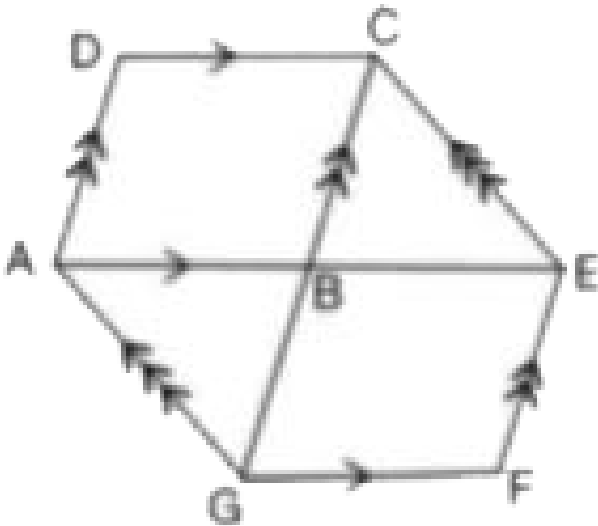
cm and $\angle B = 60^\circ$

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7. The following diagram shows two parallelogram ABCD and BEFG

Prove that :

Area of ABCD = Area of BEFG.



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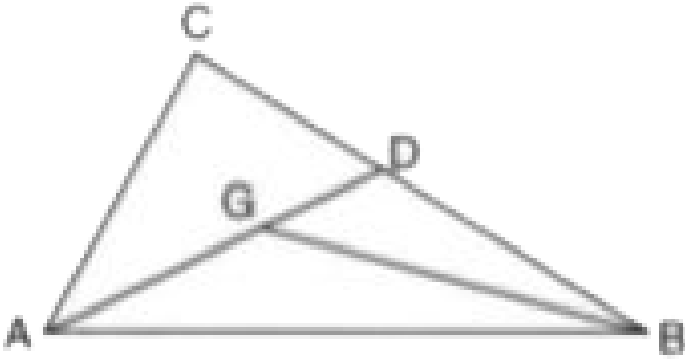
8. In the parallelogram ABCD , the side AB is produced to the point X.so that $BX= AB$. The line DX cuts BC at E. Prove that :
DBXC is a parallelogram.

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9. In the parallelogram ABCD , the side AB is produced to the point X.so that $BX= AB$. The line DX cuts BC at E. Prove that :
 $\text{Area } (\triangle AED) = 2 \times \text{area } (\triangle CEX)$.

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10. In the following figure G, is centroid of the triangles ABC.



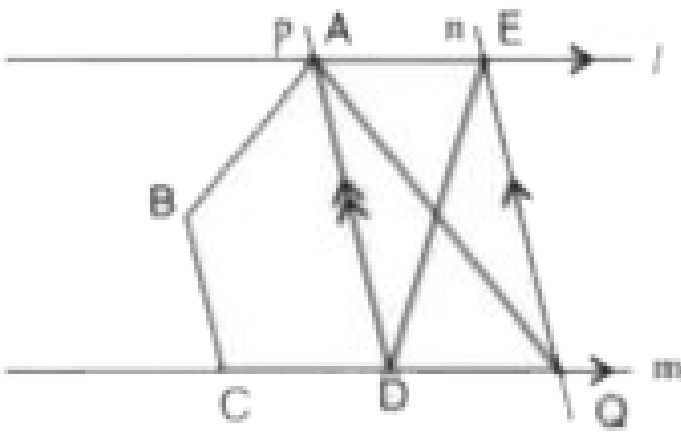
Prove that

$$\text{Area} (\Delta \text{ AGB}) = \frac{1}{3} \times \text{Area} (\Delta ABC)$$

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11. Use the informations given in the following figure to show that ar.

$$(\text{ABCQ}) = \text{ar} (\text{ABCDE})$$



[Given : $l \parallel m$ and $p \parallel n$]

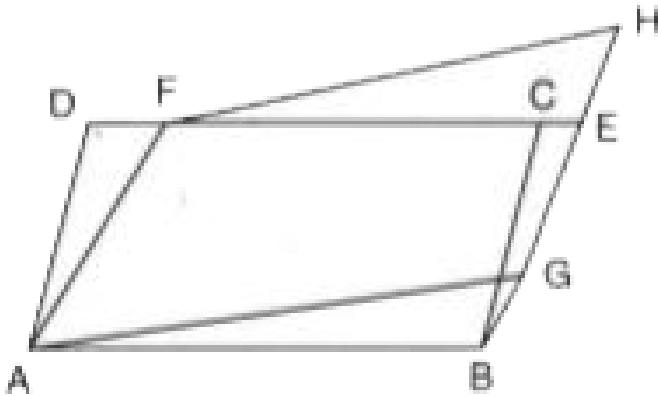
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12. If each diagonals of a quadrilateral separates it into two triangles of equal area then show that the quadrilateral is a parallelogram.

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13. ABCD , ABEF and AGHF are parallelogram

Prove that the area of parallelogram ABCD = area of parallelogram



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14. The area of the parallelogram ADFE is 275 cm^2 and $AD = 12.5 \text{ cm}$. Find the distances between point D and side EF.

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15. Prove Equal chords of a circle subtend equal angles at the centre.

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16. A line segment AB is length 8 cm . Draw a circle of radius 5 cm that passes through A and B .

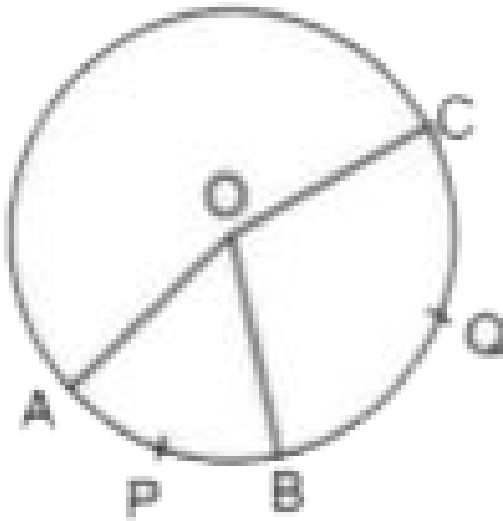
Can you draw a circle of radius 3 cm passing through A and B ? Give reason in support of your answer.

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17. Two circles of radii 10 cm and 17 cm . Intersecting each other at two points and the distance between their centres is 21 cm . Find the length of the common chord.

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18. In the given circle. Arc APB and arc BQC are in the ratio 2: 5 and O is centre of the circle.



If angle $AOB = 44^\circ$: Find angle AOC .

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19. In the given figures , O is the centre of the given circle. AB is a side of a square , BC is a side of regular pentagon and CD is a side of regular hexagon.

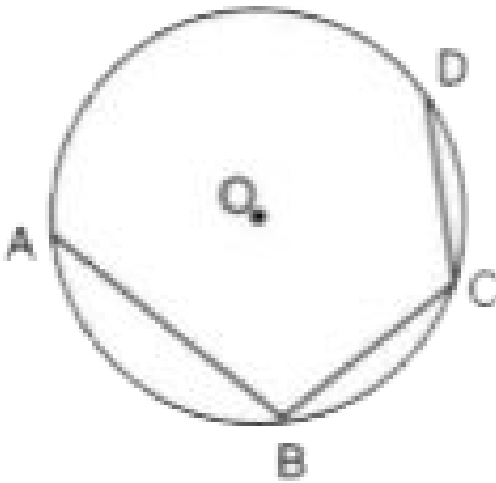
Find:

(i) $\angle AOB$

(ii) $\angle AOC$

(iii) $\angle AOD$

(iv) $\angle BCD$



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Statistics

1. Construct a cumulative frequency distributions table from the following frequency table:

C.I.	Frequency
0-12	12
12-24	16
24-36	15
36-48	10
48-60	18

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2. Construct a cumulative frequency distributions table from the following frequency table:

Class interval	Cumulative frequency
1-10	7
11-20	15
21-30	30
31-40	42
41-50	60
51-60	75

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1. Find the mean of the following numbers :

62,58,84,71,68,70,53,63,56 and 65.

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2. Find the median for the following data :

50 59 27 78 54 72

58 57 31 65 42 60

22 37 40 and 28

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3. The mean of 20 numbers is 20. if 2 is added to each of the first 10 numbers. Find the mean of the new set of 20 numbers.

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4. The mean of 2,12,4,9, 5 and 16 is x . The median of 4,3, x , $x-1$, 12 and 16 is y . Find the value of x and y .

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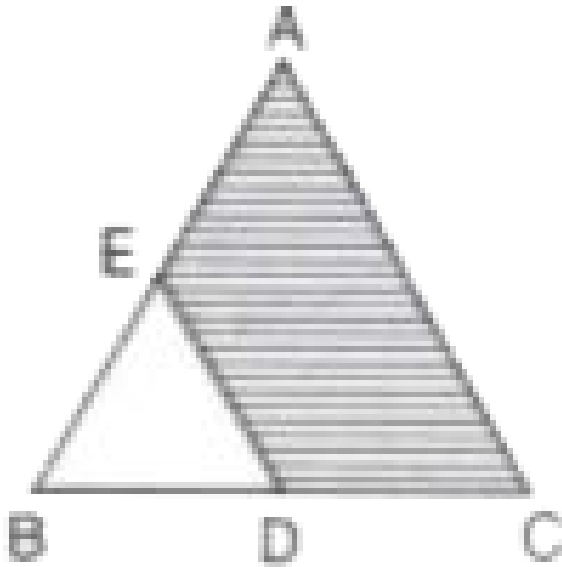
Area And Perimeter Of Plane Figures

1. The base of a triangular field is 2.4 times its height. If the cost of leveling the field at the rate of rupees 20 per square metre is rupees 9,600 find its base and height.

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2. ABC and BDE are two equilateral triangles such that D is the midpoint of BC. If $AB = 20$ cm . Find the area of the shaded portions [Take

$$\sqrt{3} = 1.73]$$



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3. Find the perimeter of the adjoining figure.

Given : $AB = 12$ cm, $AC = 13$ cm . $DE = FG = 5$ cm , $EF = 10$ cm and $GD = 4$ cm .

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4. Each side of a square ABCD is 12 cm. A point P lies on side DC such that area of $\triangle ADP$: area of trapezium ABCP = 2 : 3. Find DP.

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5. In a pentagon ABCDE, DP is drawn perpendicular to AB and is perpendicular to CE also at point Q. If AP = BP = 12 cm, EQ = CQ = 8 cm, DE = DC = 10 cm and DP = 18 cm. Find the area of the pentagon ABCDE.

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6. A rectangular park has dimensions 240 m by 200 m. A circular lawn is made inside the park. If the area of the park excluding the lawn is 32600 sq m, find the circumference of the lawn.

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7. How many circular discs, each of 4 cm radius , can be cut from the rectangular metal sheet with dimensions :

75 cm and 48 cm

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8. How many circular discs, each of 4 cm radius , can be cut from the rectangular metal sheet with dimensions :

64 cm and 60 cm

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Solids

1. A box 3 m long. 62.5 cm wide and 65 cm deep is to be made . It is to be open at the top. Ignoring the thickness of the sheet of which box is

made. Determine :

area of the sheet required to make the box.

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2. A box 3 m long, 62.5 cm wide and 65 cm deep is to be made . It is to be open at the top. Ignoring the thickness of the sheet of which box is made. Determine :

the cost of sheet used at the rate of rupees 200 per m^2

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3. The paint in a certain container is sufficient to paint an area equal to $9.375 m^2$. How many bricks of dimensions $22.5 cm \times 10 cm \times 7.5 cm$ can be painted out of this container?

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4. A rectangular container has base of length 12 cm and width 9 cm . A cube of edge 6 cm is placed in the container and then sufficient water is filled into it so that the cube is just submerged . Find the fall in level of the water. In the container , when the cube is removed.

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5. A rectangular container has base is a square of side 12 cm . Contains sufficient water to submerge a rectangular solid $8\text{cm} \times 6\text{cm} \times 3\text{cm}$. find the rise in level of the water in the container when the solid is completely immersed in it.

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6. A field is 120 m. long and 50 m broad. A tank 24 m long, 10 m broad and 6 m deep is dug any where in the field and the earth taken out of

the tank is evenly spread over the remaining part of the field . Find the rise in level of the field.

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7. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring $20m \times 15m \times 6m$. For how many days will the water of this tank last?

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Trigonometry

1. If $6 \tan A - 5 = 0$, find the value of :

$$\frac{3 \sin A - \cos A}{5 \cos A + 9 \sin A}$$

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2. If $2 \cot A = 3$, find the value of

$$\frac{5 \sin A - 2 \cos A}{6 \cos A + \sin A}$$

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3. If $\cot \theta = \frac{x}{y}$, find the value of:

$$\frac{x \cos \theta + y \sin \theta}{y \sin \theta - x \cos \theta}$$

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4. In $\triangle ABC$, $\angle B = 90^\circ$ and $\sin A = \frac{8}{11}$

Show that :

$$\sec^2 A - \tan^2 A = 1$$

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5. In $\triangle ABC$, $\angle B = 90^\circ$ and $\sin A = \frac{8}{11}$

Show that :

$$\cot^2 A - \cos ec^2 A + 1 = 0$$

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6. If $A = 60^\circ$ and $B = 30^\circ$, find the value of

$$(\sin A \cos B + \cos A \sin B)^2 + (\cos A \cos B - \sin A \sin B)^2$$

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7. If $x = 15^\circ$, evaluate :

$$4 \cos 2x \cdot \sin 4x \cdot \tan 3x - 1$$

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8. If $x = 30^\circ$, verify that : $\tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$ (ii)

$$\sin x = \sqrt{\frac{1 - \cos 2x}{2}}$$

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9. Find the value of : $\sqrt{\frac{1 - \sin^2 60^\circ}{1 - \cos^2 60^\circ}}$

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10. If $\cos 3x = 0$ and x is acute find the value of :

$$\sin x$$

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11. If $\cos 3x = 0$ and x is acute find the value of :

$$\cos 2x$$

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12. If $\cos 3x = 0$ and x is acute find the value of :

$$\cot^2 x - \cos ec^2 x$$

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13. If $\cot^2 A - 3 = 0$ find :

$$\sin 2A$$

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14. If $\cot^2 A - 3 = 0$ find :

$$\cos 3A$$

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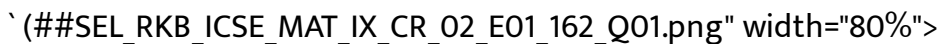
15. The length of a string between a kite and a point on the ground is 90 metres. If the string makes an angle θ with the ground level such that $\tan \theta = \frac{15}{8}$, how high is the kite? Assume that there is no slack in the string.

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16. In the following figure, angle

$$B = 90^\circ \angle ADB = 30^\circ \text{ and } \angle ACB = 60^\circ$$

If $\angle CD = m$ find AB .



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17. Evaluate :

$$\frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \cos 90^\circ$$

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18. Evaluate without using trigonometric tables.

$$2\left(\frac{\tan 35^\circ}{\cot 55^\circ}\right)^2 + \left(\frac{\cot 55^\circ}{\tan 35^\circ}\right)^2 - 3\left(\frac{\sec 40^\circ}{\operatorname{cosec} 50^\circ}\right)$$

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19. Evaluate :

$$\sec 26^\circ \sin 64^\circ + \frac{\operatorname{cosec} 33^\circ}{\sec 57^\circ}$$

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20. Evaluate

$$\frac{5\sin 66^\circ}{\cos 24^\circ} - \frac{2\cot 85^\circ}{\tan 5^\circ}$$

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21. Evaluate

$$\cos 40^\circ \csc 50^\circ + \sin 50^\circ \sec 40^\circ$$



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22. Evaluate

$$\sin 27^\circ \sin 63^\circ - \cos 63^\circ \cos 27^\circ$$



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23. Evaluate :

$$3 \frac{\sin 72^\circ}{\cos 18^\circ} - \frac{\sec 32^\circ}{\csc 58^\circ}$$



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24. Evaluate

$$3\cos 80^\circ \cos 10^\circ + 2\cos 59^\circ \cos 31^\circ$$

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25. Evaluate :

$$\frac{\cos 75^\circ}{\sin 15^\circ} + \frac{\sin 12^\circ}{\cos 78^\circ} - \frac{\cos 18^\circ}{\sin 72^\circ}$$

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26. Prove that :

$$\sec^2(90^\circ - \theta) - \frac{1}{\cot^2(90^\circ - \theta)} = 1$$

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27. Find θ ; if $\sin(\theta + 36^\circ) = \cos \theta$; where $\theta + 36^\circ$ is an acute angle.



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28. If in $\triangle ABC$, $\angle C = 90^\circ$ prove that:

$$\frac{1 + \tan A}{1 - \cot B} \times \frac{1 - \tan A}{1 + \cot B} = 1.$$

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29. If $\cot A = \frac{12}{5}$, verify

$$\tan^2 A - \sin^2 A = \sin^4 A \cdot \sec^2 A.$$

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30. In a right triangle ABC, right angled at B . The ratio of AB to AC =

$$1 : \sqrt{2}, \text{ find that the value of } \frac{2 \tan A}{1 + \tan^2 A}$$

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31. If $\cot \theta = \frac{3}{4}$ find the value of :

$$\frac{\sin \theta - \cos \theta}{\sin \theta + \cos \theta}$$



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32. If $\operatorname{cosec} A = \sqrt{3}$, find the value of:

$$\frac{2 \sin^2 A + 3 \cot^2 A}{\tan^2 A + \cos^2 A}$$



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33. In an acute angled triangle ABC , if $\tan(A + B - C) = 1$ and $\sec(B + C - A) = 2$, find the value of A , B and C .



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34. Prove that $\sin 30^\circ = \frac{1}{2}$.



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35. If $\tan(A - B) = \frac{1}{\sqrt{3}}$ and $\sin A = \frac{1}{\sqrt{2}}$ find the value of B.

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36. In the following figures $AB = 4$ m and $ED = 3$ m.

If $\sin \alpha = \frac{3}{5}$ and $\cos \beta = \frac{12}{13}$ find the length of BD

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Co Ordinate Geometry

1. Write the co-ordinates of the vertices of a rectangle which is 6 units long and 4 units wide. If the rectangle is in the first quadrant. Its longer side lies on x-axis and oner vertex is at the origin.

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2. Show that the line $y = x$ bisects angle Xoy.

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3. Draw the lines $3x - 5y = 15$.

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4. Find the slope and thy y-intercept of the lines.

$$4x - 3y = 2$$

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5. Find the slope and the y-intercept of the lines.

$$3x + 2y = 6.$$

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Graphical Solutions

1. Solve equations $y=2x+ 1$ and $x+2y +3=0$.

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2. Draw graph of linear equations $4x-3y +12 =0$. Use graph drawn to find:

y when $x = - 3$

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3. Draw graph of linear equations $4x-3y +12 =0$. Use graph drawn to find:

x . when $y = 4$

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Distance Formula

1. Find the distance between the origin and the point :

$(-5, 12)$

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2. If $A = (2, -3)$, $B = (10, y)$ and $AB = 10$ units find the value of y .

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3. Find the co-ordinates of the points on x-axis which are at a distance of 5 units from the poitns. $(5, 4)$

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4. Point $P(x,y)$ is equidistant from the points $A(-2,0)$ and $B(3,-4)$

Prove that : $10x - 8y = 21$.

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5. Calculate the distance between the points $(6,-4)$ and $(3,2)$ correct to 2 decimal places.

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6. Show that the points $P(7,3)$, $Q (6,3+\sqrt{3})$ and $R (5,3)$ form an equilateral triangle.

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7. The points $A(-1,2)$, $B(x,y)$ and $C = (4,5)$ are such that $BA = BC$. Find a linear relations between x and y .

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8. Prove that the points $A(-5,4)$, $B(-1,-2)$ and $C(5,2)$ are the vertices of an isosceles right angled triangles.

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9. If the point $A(a,2)$ is equidistant from the points $B(8,-2)$ and $C(2,-2)$ find the value of a .

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10. Find the point on y-axis which is equidistant from the points A(-4,3) and B(5,2)

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11. Show that the points A(-5,6), B(3,0) and C(9,8) are vertices of an isosceles right angled triangle. Find the area of this triangle.

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12. Find the area of a rhombus ABCD whose vertices are A(3,0), B(4,5), C(-1,4) and D(-2,-1)

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