



SSC FOUNDATION



सम्यान 1.0 बैच

MATHS

MENSURATION-2D

TRIANGLE

CONCEPT FORMULAS & TRICKS



LIVE 11:00 AM-BY SHASHI SIR

WELCOME TO



Preparing Bharat, Empowering Futures

airGurukul Institute for Career Growth

www.airgurukul.com

Powered by Prince Edutech Private Limited

Disclaimer

This presentation, lecture, and all related study materials have been created and published by **airGurukul Institute for Career Growth**, a unit of **Prince Edutech Private Limited**, for **educational and informational purposes only**. While every effort has been made to ensure the accuracy and reliability of the content, **airGurukul** does not guarantee that the information is absolutely current or free from error. Examination patterns, syllabus, and official notifications are subject to change by respective authorities, and students are strongly advised to **verify details from official sources before making any decisions**.

All third-party materials including logos, questions, references, or data used within this content are **solely for educational illustration and fair-use academic discussion**. Their ownership and copyrights remain with their respective owners. **airGurukul** shall not be held liable for any loss, damage, or consequence arising directly or indirectly from the use of this information.

By attending this session, viewing this content, or using the provided materials, the viewer acknowledges and agrees to this disclaimer. **Unauthorized recording, copying, or redistribution of this content in any form is strictly prohibited**.

Triangle (त्रिभुज)

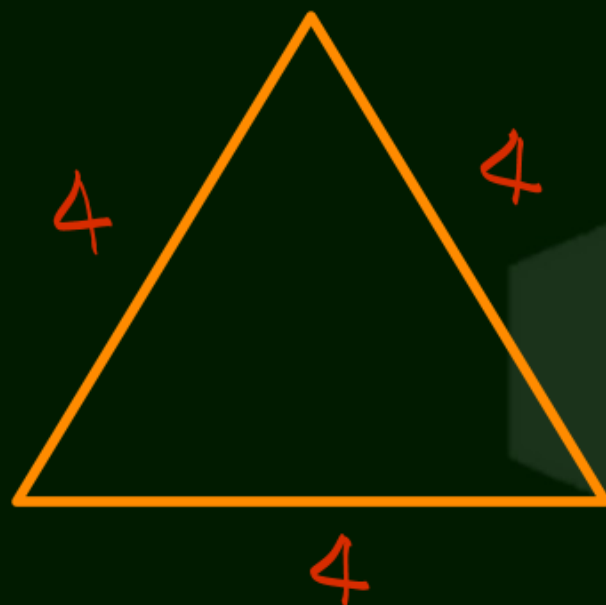
Side

- ✓ (I) ~~(Scalane)~~ विषमबाहु Δ ✗
- ✓ (II) ~~(Isosceles)~~ समद्विबाहु Δ
- ✓ (III) ~~(Equilateral)~~ समबाहु Δ

Angle

- ✗ (I) Acute Angled Triangle (न्यूनकोण Δ)
- ✓ (II) Right Angled Triangle (समकोण Δ)
- ✗ (III) Obtuse Angled Triangle (अधिककोण Δ)

$$\begin{aligned} \longrightarrow 12 &= 12 \text{ unit} \\ P &= 12 \text{ unit} = 3Q \\ Q &= 4 \text{ unit} \end{aligned}$$



$$\begin{aligned} \text{Area} &= \frac{\sqrt{3}}{4} \times 4^2 \\ &= 4\sqrt{3} \text{ sq. unit} \end{aligned}$$

Q. Twelve sticks, each of length one unit, are used to form an equilateral triangle. The area of the triangle is: एक इकाई लंबाई की प्रत्येक बारह छड़ों का उपयोग एक समबाहु त्रिभुज बनाने के लिए किया जाता है। त्रिभुज का क्षेत्रफल है।

(a) $3\sqrt{3}$ sq. units

(b) $2\sqrt{3}$ sq. units

(c) $4\sqrt{3}$ sq. units

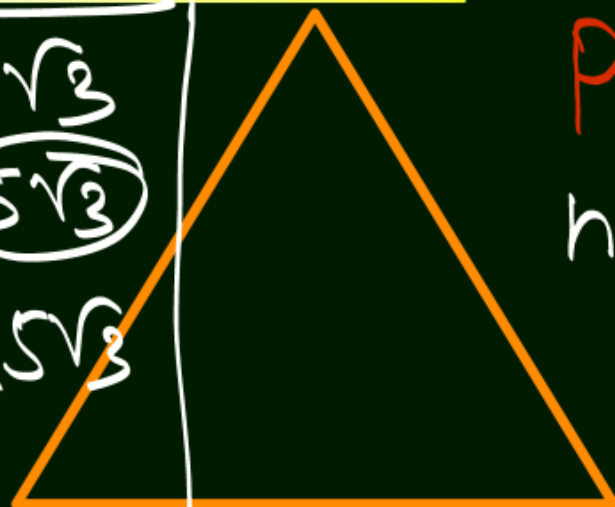
(d) $8\sqrt{3}$ sq. units

$$3a = 15\sqrt{3}$$

$$a = 5\sqrt{3}$$

$$h = \frac{\sqrt{3}}{2} \times 5\sqrt{3}$$

$$= \frac{15}{2} = 7.5$$



$$P = 15\sqrt{3} = 3a$$

$$h = \frac{\sqrt{3}}{2} \times a \times 3$$

$$= \frac{3a}{2\sqrt{3}}$$

$$h = \frac{P}{2\sqrt{3}}$$

$$h = \frac{15\sqrt{3}}{2\sqrt{3}} = 7.5 \text{ cm}$$

Q. The sum of all the three sides of an equilateral triangle is $15\sqrt{3}$ cm. The height of the triangle is: (in cm). / एक समबाहु त्रिभुज की तीनों भुजाओं का योगफल $15\sqrt{3}$ सेमी है। त्रिभुज की ऊँचाई ज्ञात करें?

(a) 7 cm

(b) 8 cm

✓ (c) 7.5 cm

(d) 9 cm



$$R = \frac{a}{\sqrt{3}}$$

$$A = \frac{\sqrt{3}}{4} \times a^2 = 36\sqrt{3}$$

$$a^2 = 36 \times 4$$

$$a = 6 \times 2$$

$$= 12$$

$$R = \frac{12}{\sqrt{3}} = 4\sqrt{3}$$

Q. ΔABC is a equilateral triangle. If the area of is $36\sqrt{3}$, then the triangle what is the radius circumscribing the triangle of circle, ΔABC ?

एक समबाहु त्रिभुज है। यदि त्रिभुज का क्षेत्रफल ΔABC $36\sqrt{3}$ है, तो ΔABC के परिगत वृत्त की त्रिज्या क्या है?

(a) $2\sqrt{3}$

(b) $3\sqrt{3}$

✓ (c) $4\sqrt{3}$

(d) $6\sqrt{3}$



Q. $\sim 14\text{cm}$

Q : r : R

a : $\frac{a}{2\sqrt{3}}$: $\frac{a}{\sqrt{3}}$

$2\sqrt{3}$: 1 : 2
14 : $\frac{14}{2\sqrt{3}}$: $\frac{14}{\sqrt{3}}$

Q. किसी समबाहु त्रिभुज की प्रत्येक भुजा 14cm हो तो इस त्रिभुज का क्षेत्रफल अंतःवृत्त का क्षेत्रफल : परिवृत्त का क्षेत्रफल = ?

If each side of an equilateral triangle is 14 cm, then the area of this triangle is Area of the incircle: Area of the circumcircle = ?

(a) 54 : 77 : 308

(b) $54\sqrt{3}$: 77 : 308

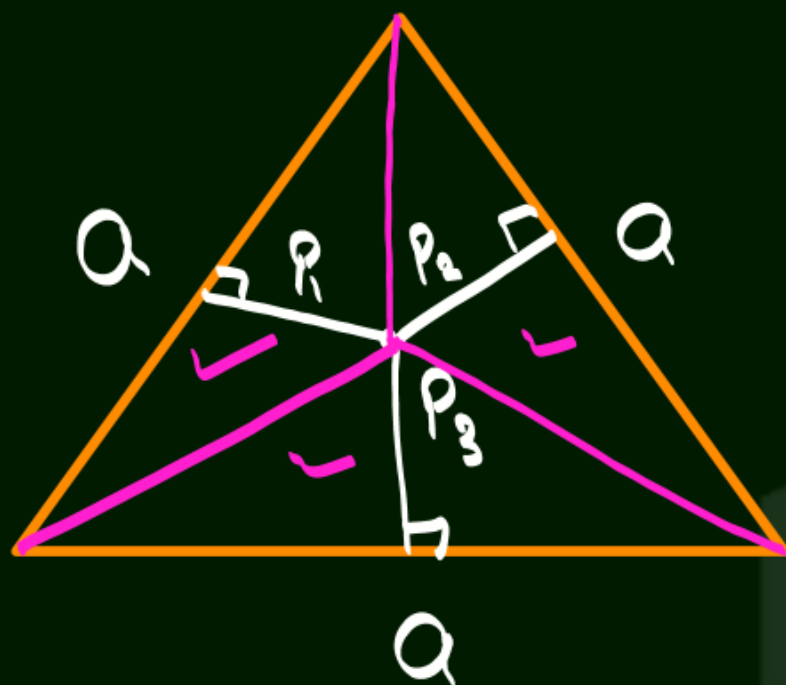
(c) $54\sqrt{3}$: 77π : 196π

(d) 18 : 11 : 14

~~None~~

$$\frac{\sqrt{3}}{4} \times 14 \times 14 : \frac{22}{7} \times \frac{14}{\sqrt{3}} \times \frac{14}{\sqrt{3}} : \frac{22}{7} \times \frac{14}{\sqrt{3}} \times \frac{14}{\sqrt{3}}$$

$$21\sqrt{3} : 22 : 88$$



- ♦ If P_1 , P_2 and P_3 are perpendicular (O) of lengths from any interior point an equilateral ABC to all its three sides respectively then,
यदि P_1 , P_2 और P_3 एक समबाहु $\triangle ABC$ के किसी आंतरिक (O) से उसकी तीनों भुजाओं पर क्रमशः लंबवत लंबाई हैं, तो

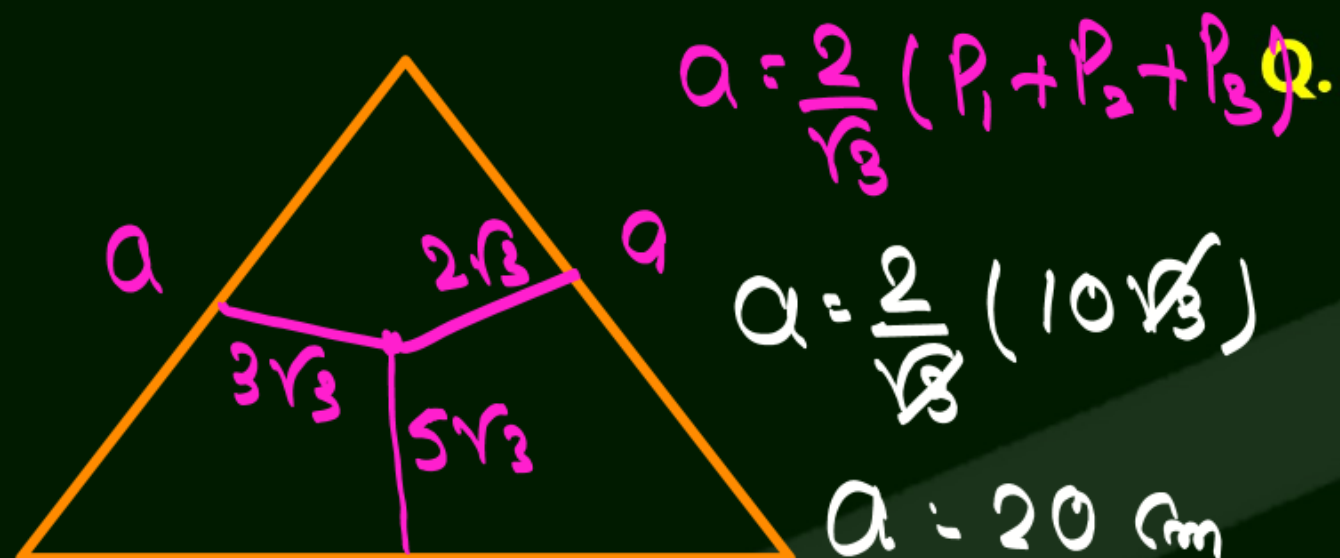
$$P_1 + P_2 + P_3 = \frac{\sqrt{3}}{2} a, a = \frac{2}{\sqrt{3}} (P_1 + P_2 + P_3)$$

Where, a is side of Δ

$$\frac{1}{2} \times a \times P_1 + \frac{1}{2} \times a \times P_3 + \frac{1}{2} \times a \times P_2 = \frac{\sqrt{3}}{4} \times a^2$$

$$\frac{1}{2} a (P_1 + P_2 + P_3) = \frac{\sqrt{3}}{4} \times a^2$$

$$a = \frac{2}{\sqrt{3}} (P_1 + P_2 + P_3)$$



$$P = 3a = 3 \times 20 = 60$$

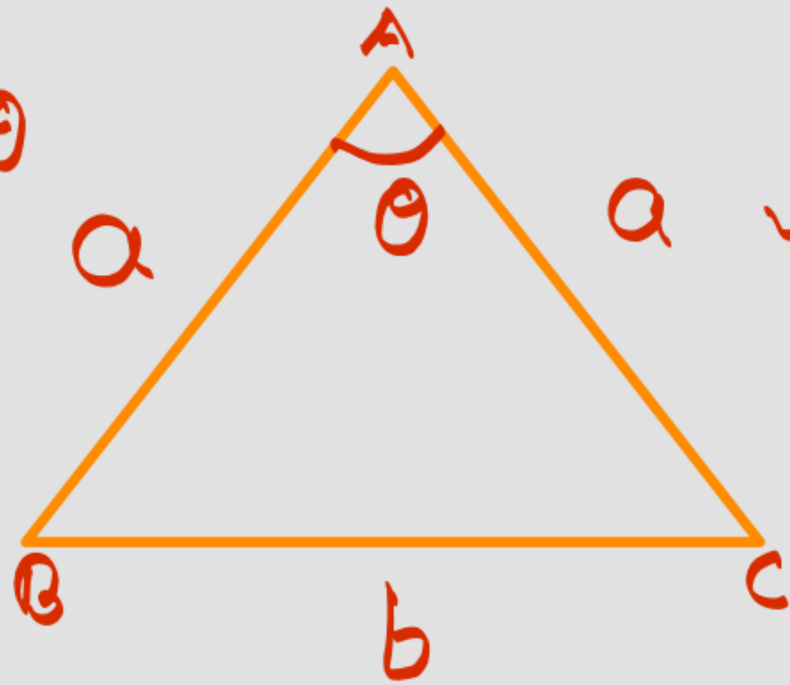
Q. किसी समबाहु त्रिभुज के अन्तर्गत एक बिंदु से तीनों भुजा पर डाले गए लंब की लंबाई क्रमशः $3\sqrt{3}$, $2\sqrt{3}$, $5\sqrt{3}$ cm हो तो इस त्रिभुज का परिमाण ज्ञात करें।

If the lengths of the perpendiculars drawn from a point in the interior of an equilateral triangle to its three sides are $3\sqrt{3}$ cm, $2\sqrt{3}$ cm, and $5\sqrt{3}$ cm respectively, find the perimeter of the triangle.

- (a) 60 cm
- (b) 54 cm
- (c) $18\sqrt{3}$ cm
- (d) 120 cm

* समक्षिणानु Δ (I.T) *

$$A = \frac{1}{2} \times a^2 \times \sin \theta$$



$$P = 2a + b \Rightarrow S = \frac{P}{2} = \left(a + \frac{b}{2}\right)$$

$$A = \sqrt{S(S-a)(S-a)(S-b)}$$

$$= \sqrt{\left(a + \frac{b}{2}\right) \left(a + \frac{b}{2} - a\right) \left(a + \frac{b}{2} - a\right) \left(a + \frac{b}{2} - b\right)}$$

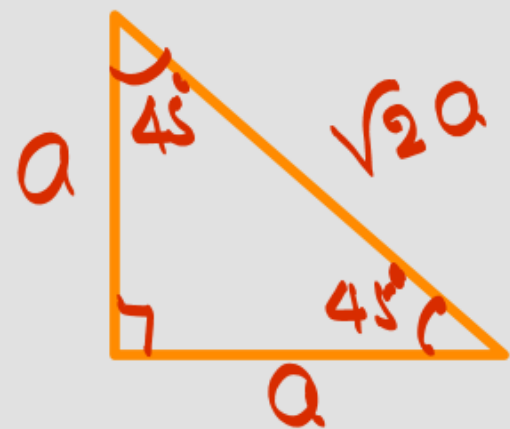
$$= \sqrt{\left(a + \frac{b}{2}\right) \left(a - \frac{b}{2}\right) \left(\frac{b}{2}\right)^2}$$

$$= \boxed{\frac{b}{2} \sqrt{a^2 - \frac{b^2}{4}}}$$

$$= \frac{b}{2 \times 2} \sqrt{4a^2 - b^2}$$

$$= \boxed{\frac{b}{4} \sqrt{4a^2 - b^2}}$$

समकोण समद्विबाहु Δ

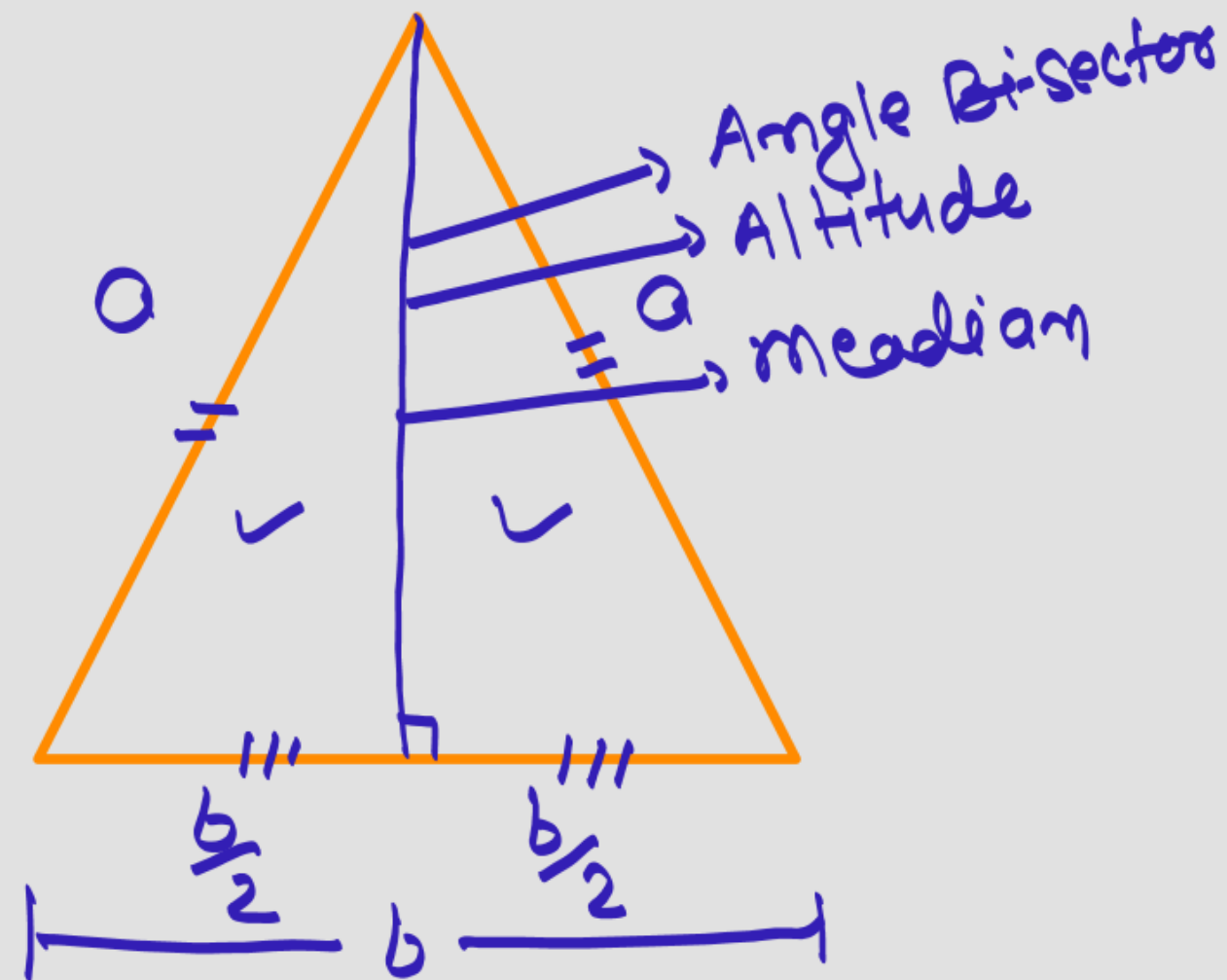


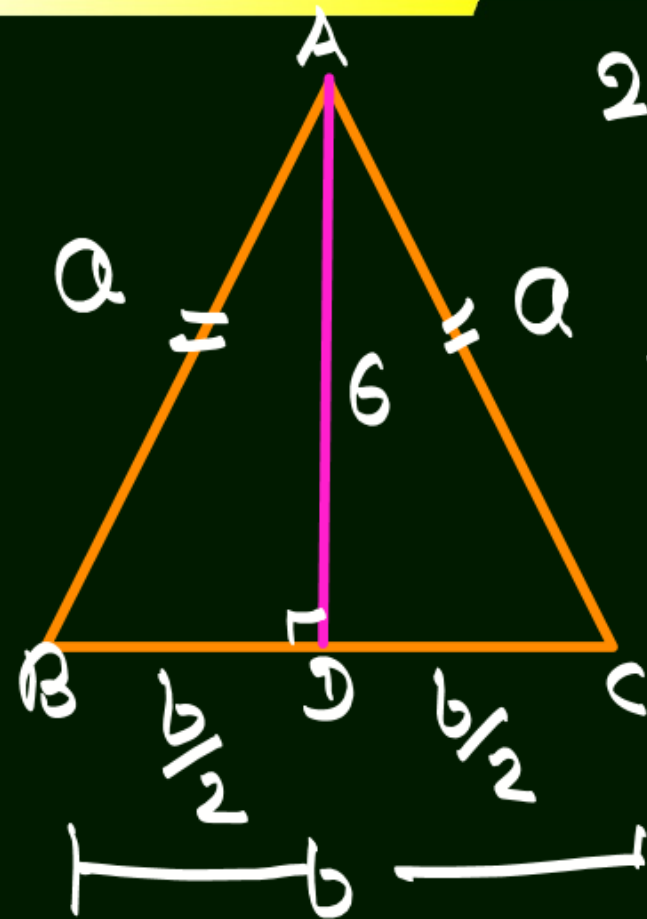
$$A = \frac{1}{2} \times a^2$$

$$P = 2a + \sqrt{2}a$$

$$= \sqrt{2}a(\sqrt{2}+1)$$

✓





$$2Q + b = 36$$

$$b = 36 - 2Q$$

$$b = 18 - Q$$

$$\frac{b}{2} = 8$$

$$b = 16$$

$$A = \frac{1}{2} \times 16 \times 6$$

$$= 48 \text{ cm}^2$$

Q. In an isosceles triangle ABC with AB = AC and AD is perpendicular to BC, if AD = 6 cm and the perimeter of $\triangle ABC$ is 36 cm, then the area of $\triangle ABC$ is: एक समद्विबाहु $\triangle ABC$ में, जिसमें AB = AC और AD, BC पर लंबवत है, यदि AD = 6 सेमी और $\triangle ABC$ का परिमाप 36 सेमी है, तो $\triangle ABC$ का क्षेत्रफल ज्ञात करें?

(a) 45 cm²

☒ (b) 48 cm²

(c) 54 cm²

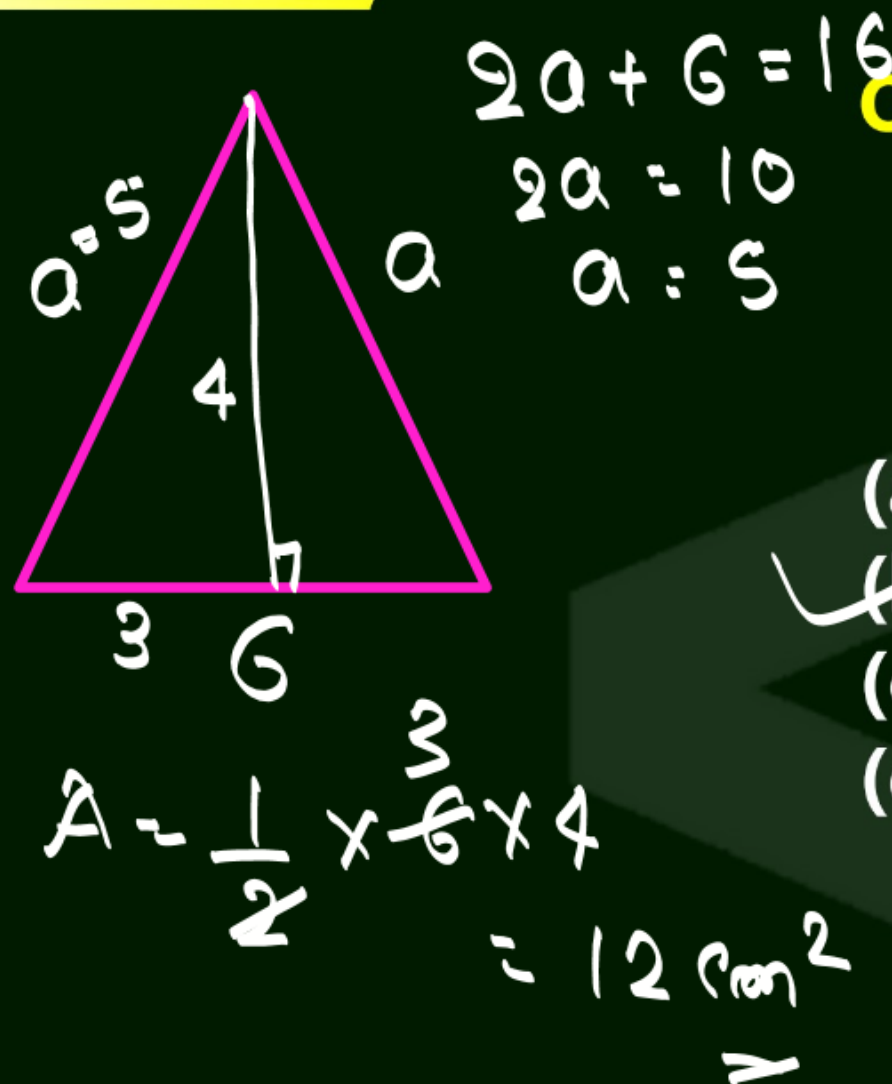
(d) 64 cm²

$$Q^2 = 6^2 + (18 - Q)^2$$

$$Q^2 = 36 + 324 - 36Q + Q^2$$

$$36Q = 360$$

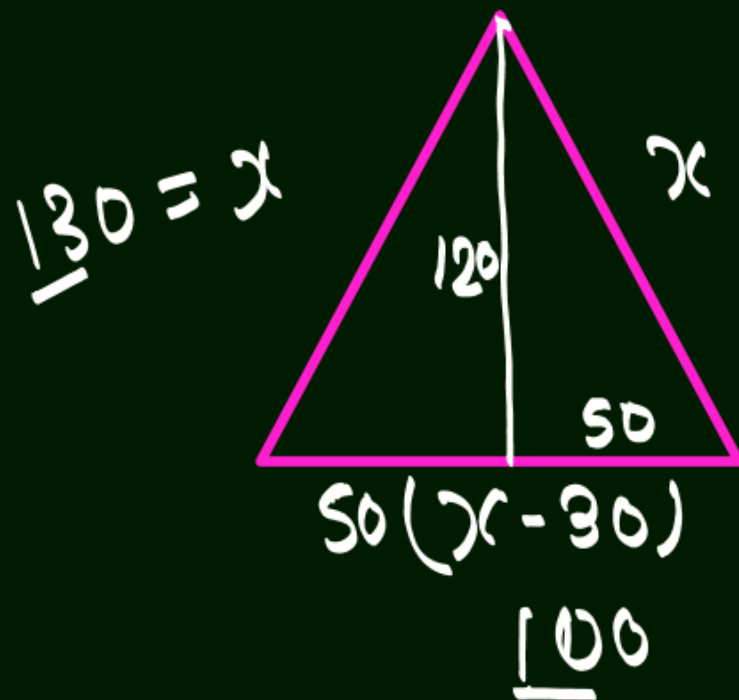
$$Q = 10$$



Q. The base of an isosceles triangle is 6 cm and its perimeter is 16 cm. Its area is:

समद्विबाहु त्रिभुज का आधार 6 सेमी है और इसका परिमाप 16 सेमी है। इसका क्षेत्रफल है।

- (a) 11 cm^2
- ☒ (b) 12 cm^2
- (c) 9 cm^2
- (d) 10 cm^2



$$3x - 30 = 360 \text{ cm}$$

$$3x = 390$$

$$x = 130$$

SD

$$A = \frac{1}{2} \times 100 \times 120$$

$$= 6000 \text{ cm}^2$$

Q. The perimeter of an isosceles triangle is 3.6 m and its base is 30 cm shorter than each of the equal sides. What is the area (in m^2) of the triangle ?/समद्विबाहु त्रिभुज का परिमाप 3.6 मी है और इसका आधार प्रत्येक समान भुजाओं से 30 सेमी छोटा है। त्रिभुज का क्षेत्रफल (मी^2 में) क्या होगा ?

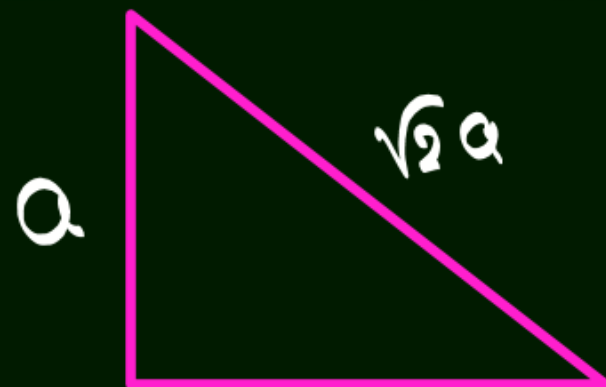
(a) 0.6

(b) 0.72

(c) 0.54

(d) 0.08

12, 5, 13



$$A = \frac{1}{2} \times \frac{75}{12} \times \frac{150}{12}$$

$$= \frac{11250}{289} = 38.83 \text{ m}^2$$

$$2a + \sqrt{2}a = 30 \text{ m}$$

$$2a + 1.4a = 30$$

$$3.4a = 30$$

$$a = \frac{30}{3.4}$$

$$= \frac{150}{17}$$

Q. In an isosceles right angled triangle, the perimeter is 30 m. Find its area. (Approximate) ?

एक समद्विबाहु समकोण त्रिभुज में, परिमाप 30 मी है। इसका क्षेत्रफल (लगभग) ज्ञात करें।

✓ (a) 38.83 m²

(b) 39.60 m²

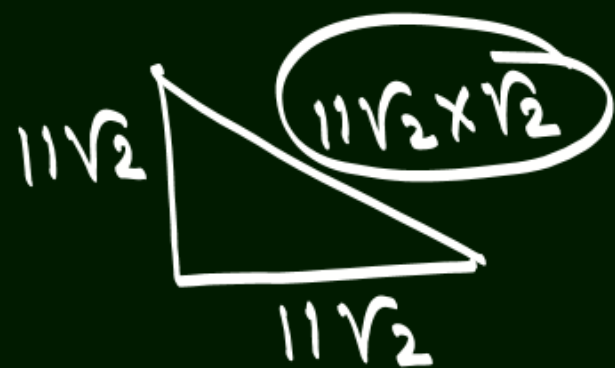
(c) 37.86 m²

(d) 40 m²

$$\frac{1}{2} \times a^2 = 121$$

$$a^2 = 121 \times 2$$

$$a = 11\sqrt{2}$$



$$1 : 1 : \sqrt{2}$$

$$11 : 11 : 11\sqrt{2}$$

$$11\sqrt{2} \times 2 = 22\text{ cm}$$

Q. The area of an isosceles right angled triangle is 121 cm^2 . Find its hypotenuse.

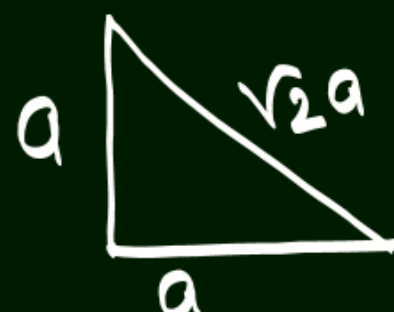
एक समद्विबाहु समकोण त्रिभुज का क्षेत्रफल 121 सेमी² है। इसके कर्ण की लंबाई ज्ञात करें?

(a) 23 cm

(b) 22 cm

(c) 21 cm

(d) 20 cm



$$P = \sqrt{2}a(\sqrt{2} + 1)$$

$$\sqrt{2}a(\sqrt{2} + 1) = 16(\sqrt{2} + 1)$$

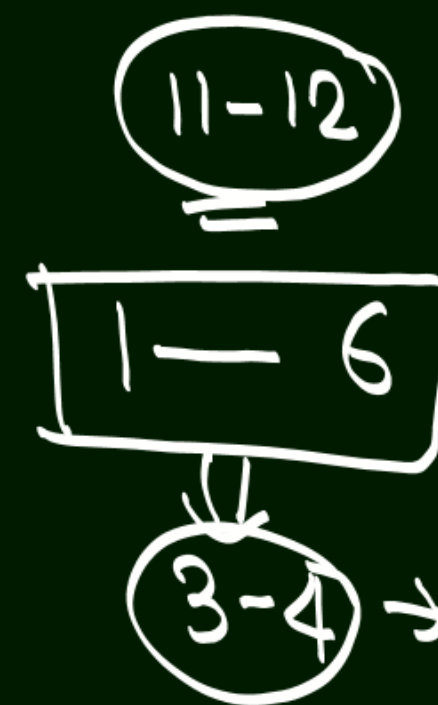
$$a = \frac{16}{\sqrt{2}} = 8\sqrt{2}$$

$$A = \frac{1}{2} \times a^2 = \frac{1}{2} \times 8\sqrt{2} \times 8\sqrt{2}$$

$$= 64 \text{ cm}^2$$

Q. The perimeter of an isosceles right triangle is $(16\sqrt{2} + 16)\text{cm}$, then the area of the triangle is: यदि एक समद्विबाहु समकोणीय त्रिभुज का परिमाप $(16\sqrt{2} + 16)$ सेमी है तो त्रिभुज का क्षेत्रफल कितना होगा?

- (a) 64 cm^2
- (b) 76 cm^2
- (c) 66 cm^2
- (d) 58 cm^2



Right Angle Triangle/समकोण त्रिभुज
Right Angles Triangle/ समकोण त्रिभुज

$$P^2 + b^2 = h^2 \text{ i.e. } AB^2 + BC^2 = AC^2$$

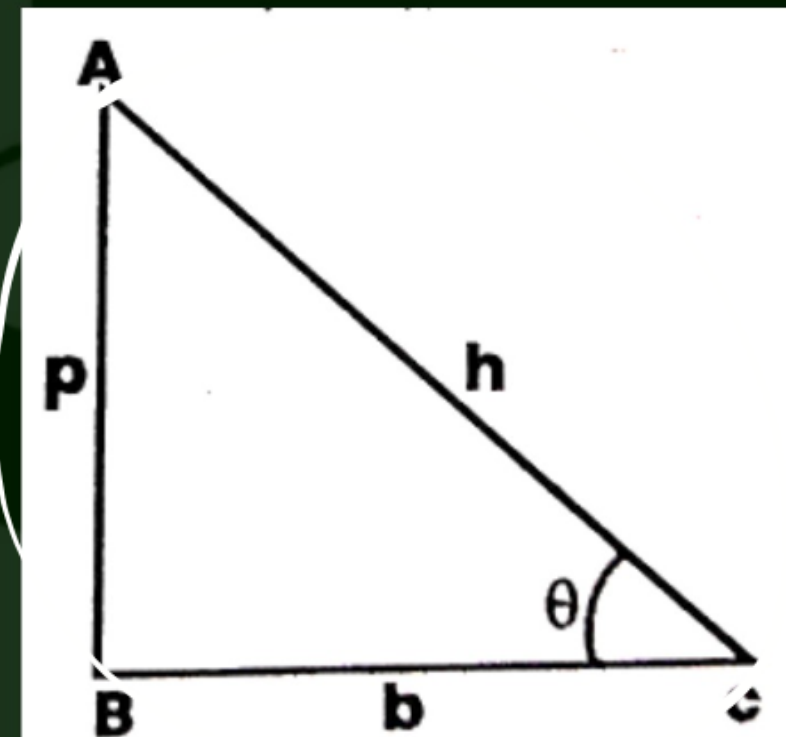
$$P = \sqrt{h^2 - b^2}, b = \sqrt{h^2 - p^2}, h = \sqrt{p^2 + b^2}$$

$$P^2 + b^2 = h^2 \text{ i.e. } AB^2 + BC^2 = AC^2$$

Area of triangle/त्रिभुज का क्षेत्रफल = $\frac{1}{2} \times p \times b$

Area of triangle/समकोण त्रिभुज का क्षेत्रफल

$$\frac{\text{Hypoteneous}}{4} \times \sin 2\theta$$



$$R = \frac{h}{2}$$

$$\theta = \frac{p+b-h}{2}$$

Inradius/अंतःत्रिज्या

$$r = \frac{p + b - h}{2} \text{ 'or' } \left[\frac{\text{Perpendicular} + \text{Base} - \text{Hypotenuse}}{2} \right]$$

Circumradius/बाह्य त्रिज्या

$$R = \frac{h'}{2} \text{ or } \left[\frac{\text{Hypotenuse}}{2} \right]$$

Some Pythagorean Triplets

(3, 4, 5)	(5, 12, 13)	(7, 24, 25)	(8, 15, 17)
(9, 40, 41)	(11, 60, 61)	(12, 35, 37)	(13, 84, 85)
(16, 63, 65)	(20, 21, 29)	(28, 45, 53)	(33, 56, 65)
(36, 77, 85)	(39, 80, 89)	(48, 55, 73)	(65, 72, 97)
(20, 99, 101)			



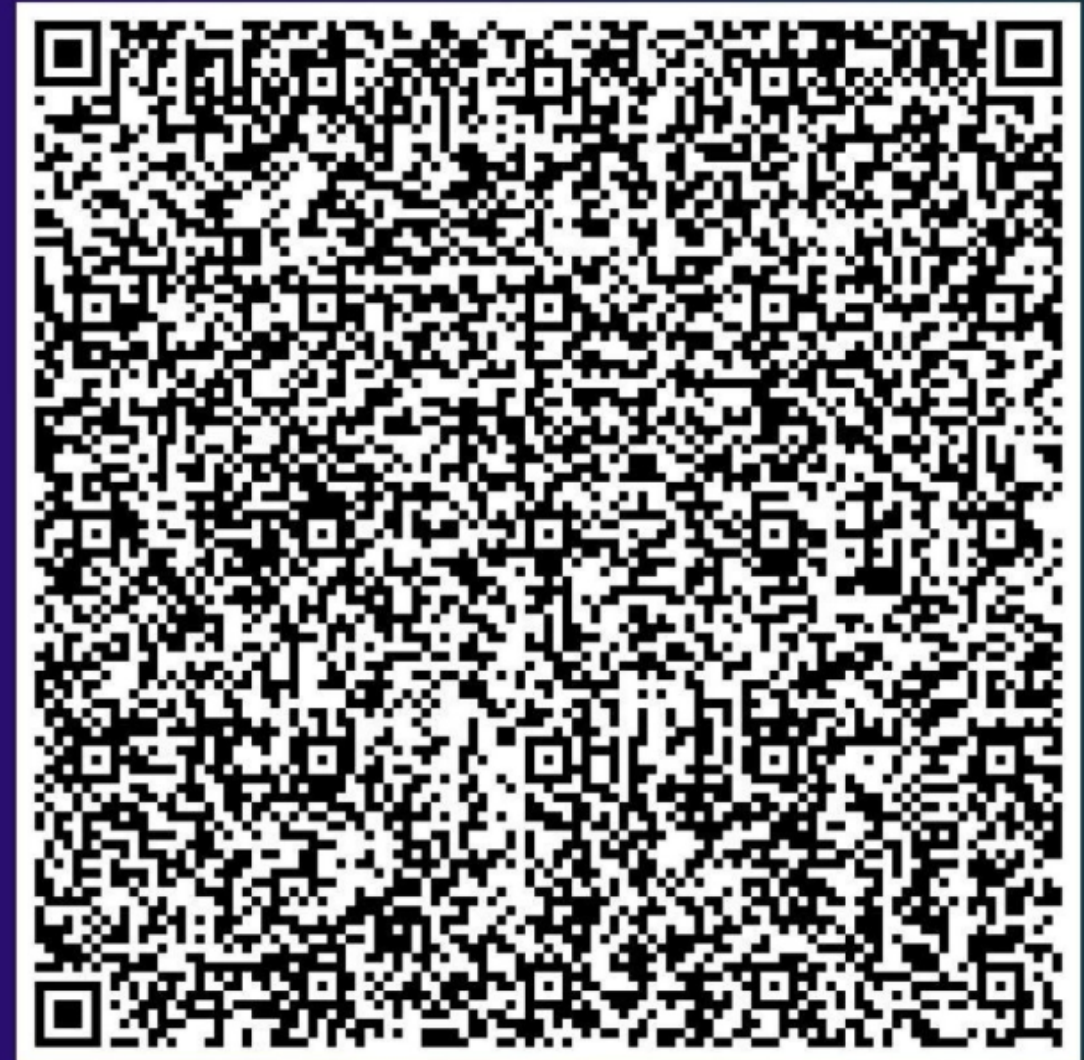
Q. The area of a triangular plot having sides 12m, 35 m and 37 m is equal to the area of a rectangular field whose sides are in the ratio 7: 3. The perimeter (in cm) of the field is:

12 मी., 35 मी., और 37 मी. भुजाओं वाले त्रिभुजाकार भूखंड का क्षेत्रफल एक आयताकार मैदान के क्षेत्रफल के बराबर है, जिसकी भुजाओं का अनुपात 7 : 3 है। मैदान का परिमाण (मी. में) ज्ञात करें?

- (a) $24\sqrt{10}$
- (b) $20\sqrt{10}$
- (c) $20\sqrt{5}$
- (d) $24\sqrt{5}$

Telegram $\Rightarrow$ PDF $\Rightarrow$

MATHS BY SHASHI SINGH RATHORE



airGurukul SSC Exams

SSC CHSL | SSC CGL | SSC MTS | SSC GD | SSC STENOGRAPHER | SSC OFFICER

New Batch Started

SHASHISIR 10%

SSC FOUNDATION

सम्यान 1.0 बैच

समय पर तैयारी, समय पर सफलता

Fee : 999/-

Offer Fee : 499/-

SSC-GD 2026

धुरंधर 1.0 बैच

फोर्स की तैयारी, फोकस के साथ

Fee : 499/-

Offer Fee : 299/-

10% Extra Discount
Use Coupon Code

COUPON

NAVRATRI

Join
Now!

OUR FEATURES

- ✔ Live + Recorded Class
- ✔ Study Material
- ✔ Bilingual Content
- ✔ Doubt Sessions
- ✔ Full Sectional/Mock
- ✔ Full Sectional/PYQs

+91-7042-559-948

Registration Open



नवरात्रि की हार्दिक
शुभकामनाएं

THANK YOU



Preparing Bharat, Empowering Futures

airGurukul Institute for Career Growth

www.airgurukul.com

Follow Us |       

Powered by **Prince Edutech Private Limited**