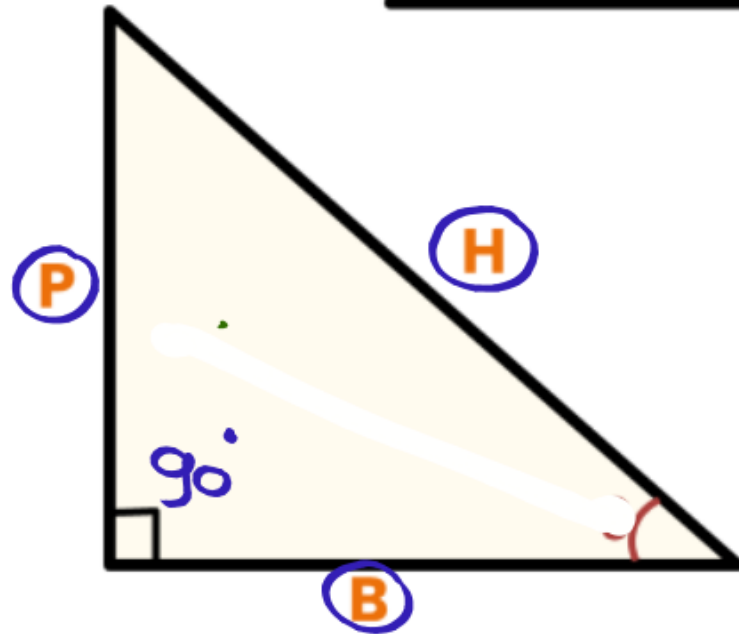


Pythagorean Triplets

पाइथागोरस त्रिक



H → Hypotenuse (कर्ण)

P → Perpendicular (लंब)

B → Base (आधार)

$$H^2 = P^2 + B^2$$

$$P = \sqrt{H^2 - B^2}$$

$$B = \sqrt{H^2 - P^2}$$

A Pythagoras triplet is a set of of +ve integers a, b, c that fits the rule $c^2 = a^2 + b^2$.
पाइथागोरस त्रिक धनात्मक पूर्णाकों a, b, c का एक ऐसा समूह है जो $c^2 = a^2 + b^2$ का अनुरूप है।

$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = 5^2$$

∴ 3, 4, 5 are triplets

- Triangle made by triplets will be right Angle Triangle .
त्रिक द्वारा बना त्रिभुज समकोण होता है।
- In a triplet largest side is Hypotenuse (कर्ण)
त्रिक में सबसे बड़ी भुजा कर्ण होती है।



Pythagorean Triplets (पाइथागोरस त्रिक)



(3, 4, 5)

(9, 40, 41)

(16, 63, 65)

(36, 77, 85)

(20, 99, 101)

(5, 12, 13)

(11, 60, 61)

(20, 21, 29)

(39, 80, 89)

(15, 112, 113)

(7, 24, 25)

(12, 35, 37)

(28, 45, 53)

(48, 55, 73)

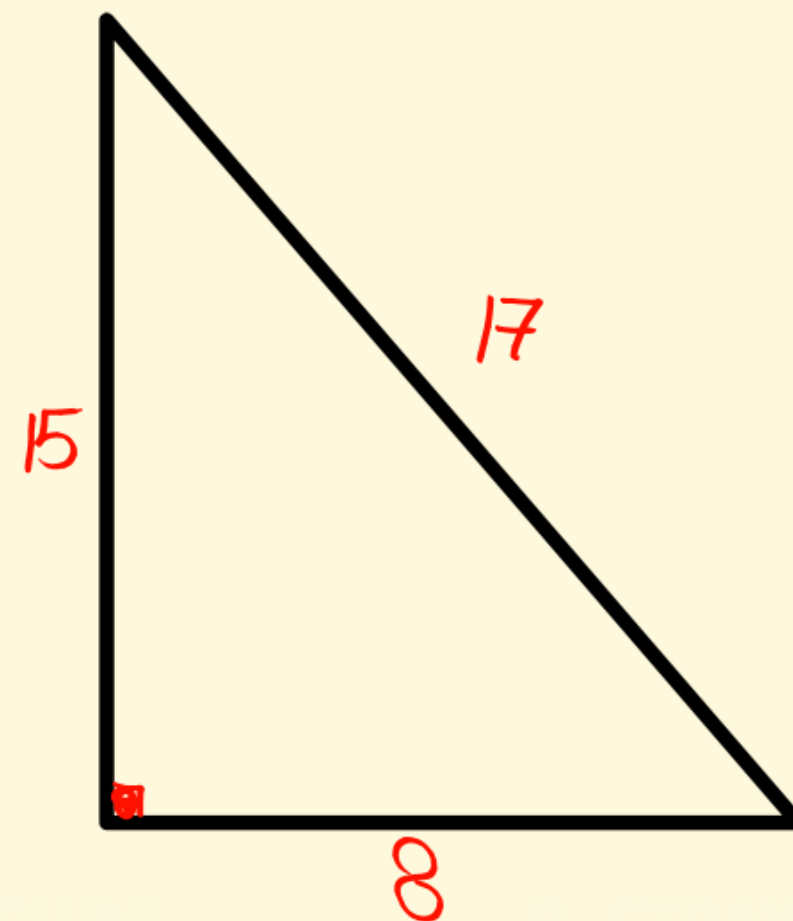
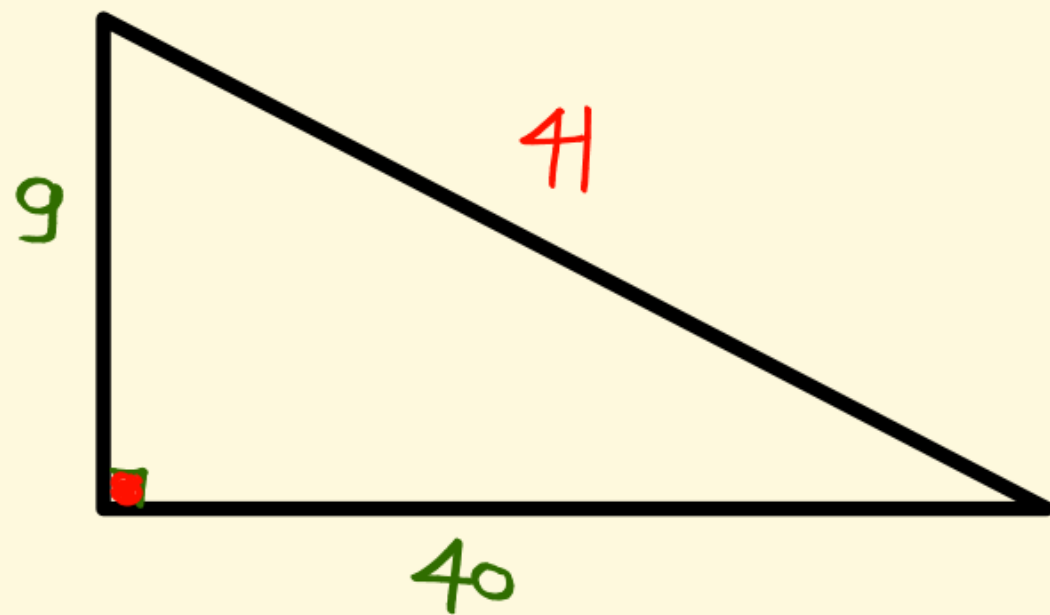
(8, 15, 17)

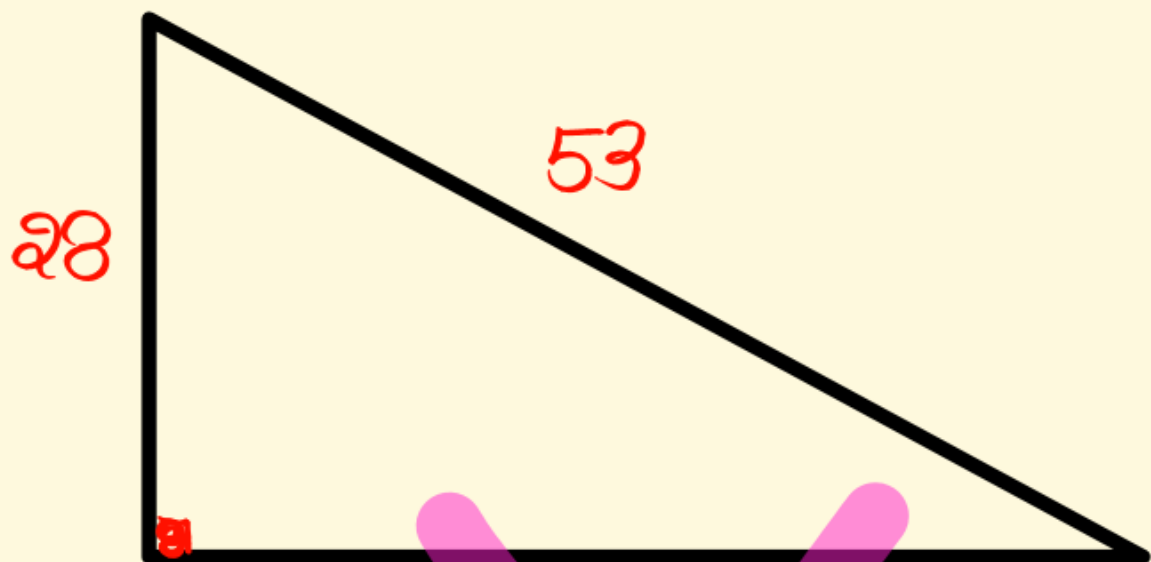
(13, 84, 85)

(33, 56, 65)

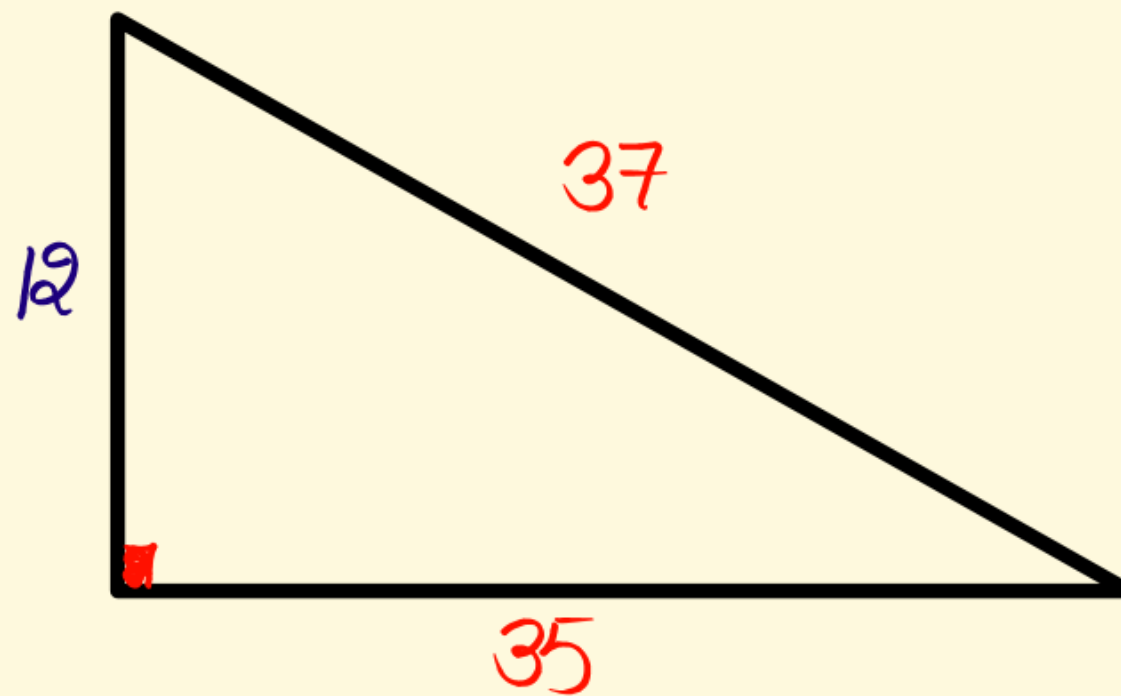
(65, 72, 97)

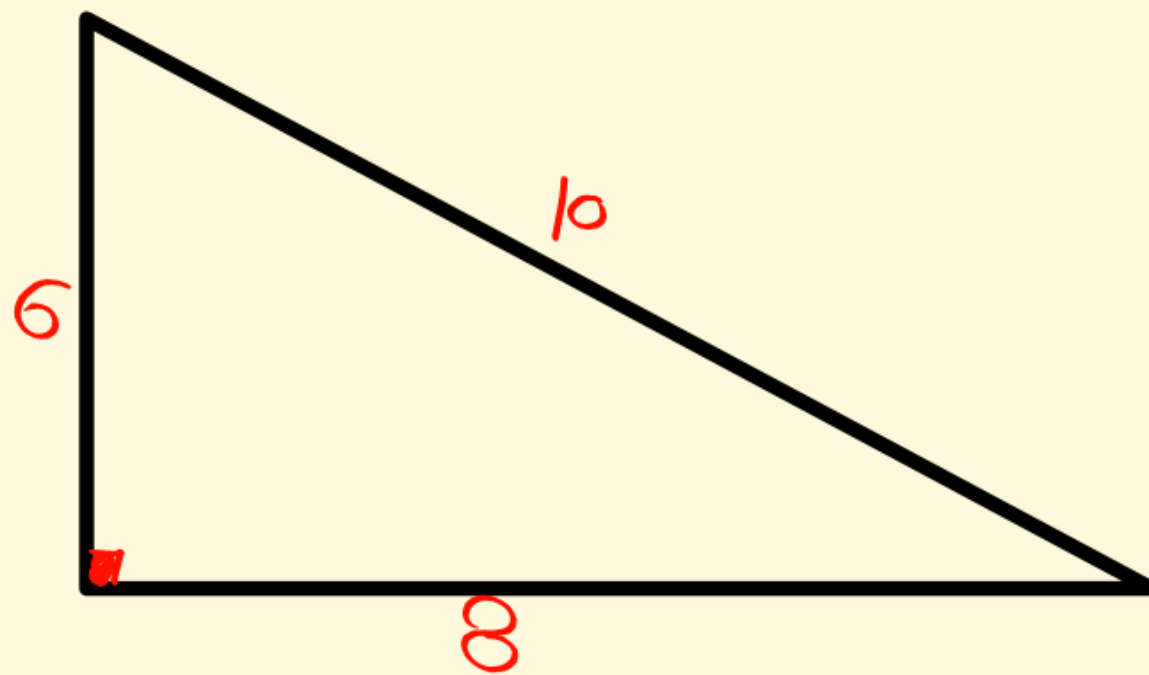
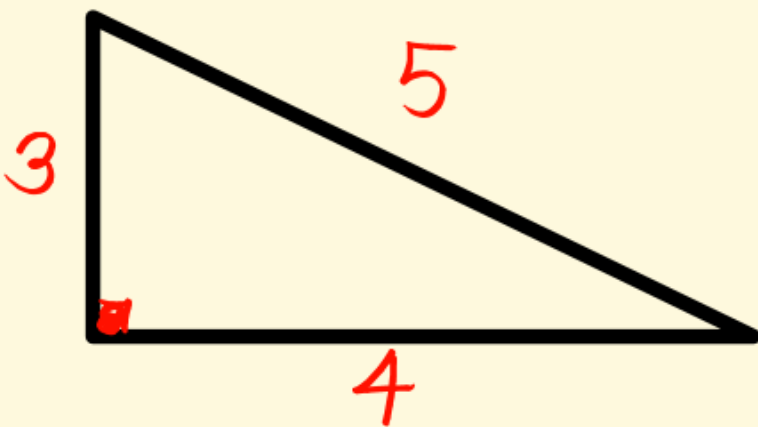






$$\begin{aligned} ? &= \sqrt{53^2 - 28^2} \\ &= \sqrt{25 \times 81} \\ &= 5 \times 9 \\ &= 45 \end{aligned}$$





$$(3, 4, 5) \xrightarrow{\times 2} (6, 8, 10)$$

$$(9, 12, 15)$$

$$(12, 16, 20)$$

$$(15, 20, 25)$$

$$(21, 28, 35)$$

$$(24, 32, 40)$$

$$(27, 36, 45)$$

$$(30, 40, 50)$$

$$(33, 44, 55)$$

$$(36, 48, 60)$$

$$(39, 52, 65)$$

$$(42, 56, 70)$$

$$(45, 60, 75)$$

$$(48, 64, 80)$$

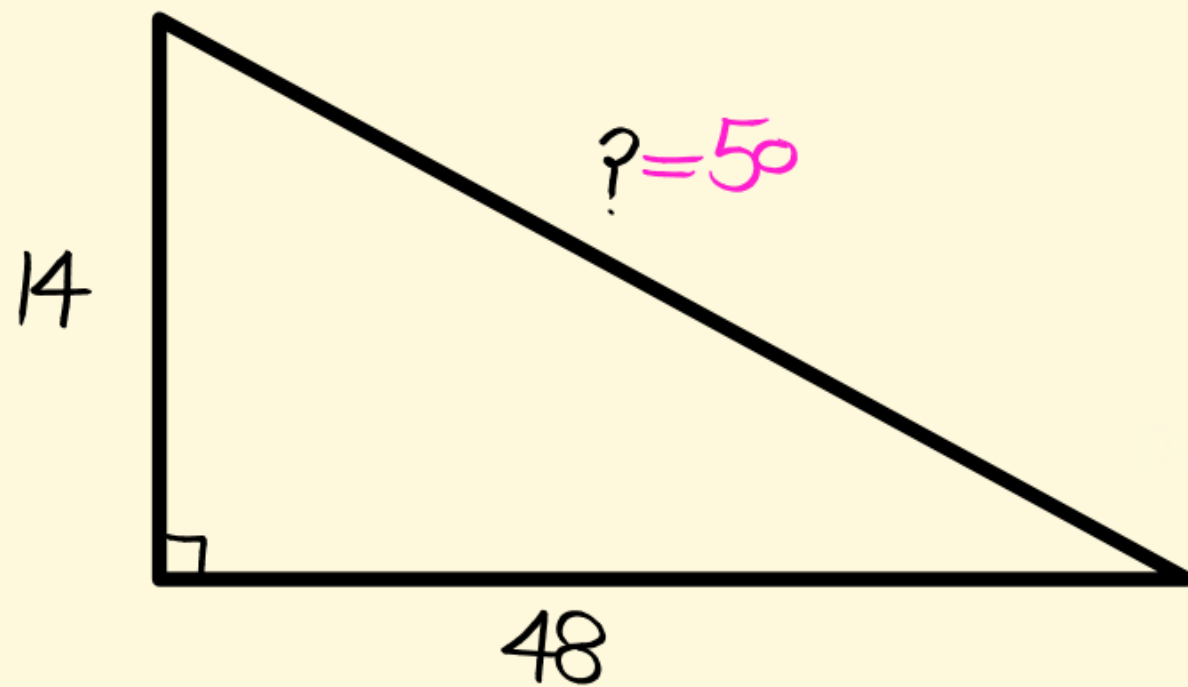
$$(51, 68, 85)$$

$$(54, 72, 90)$$

$$(57, 76, 95)$$

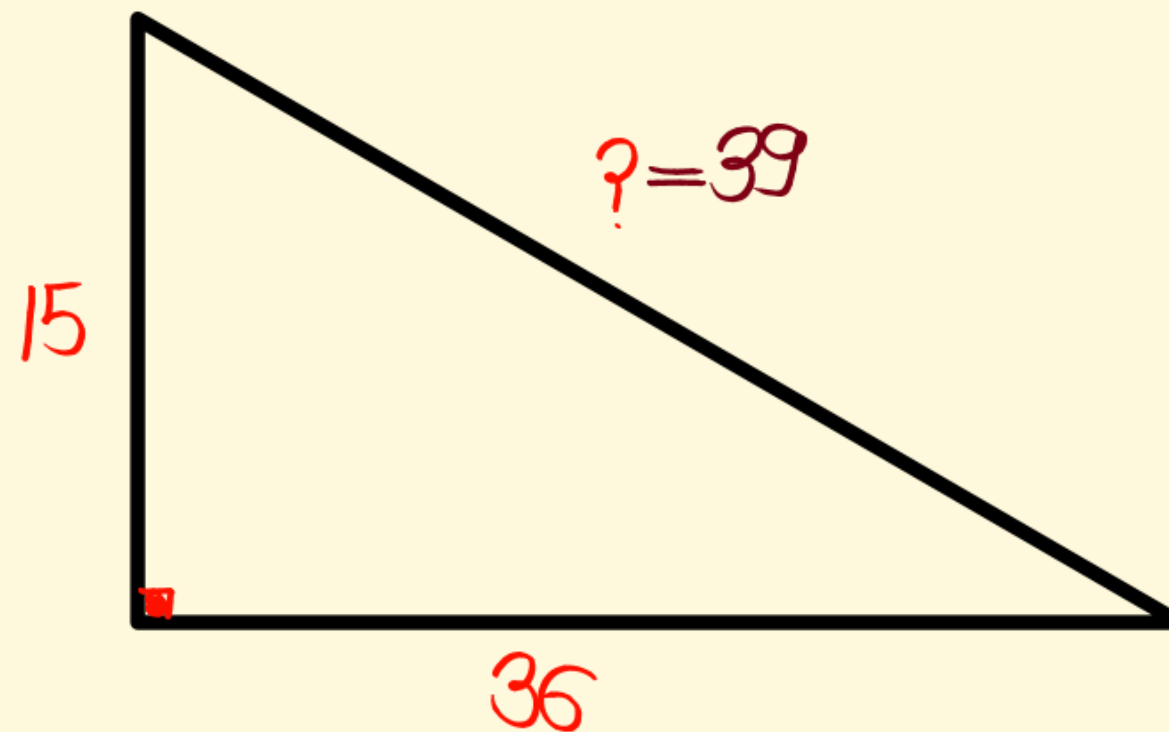
$$(60, 80, 100)$$

$\times 7/3$



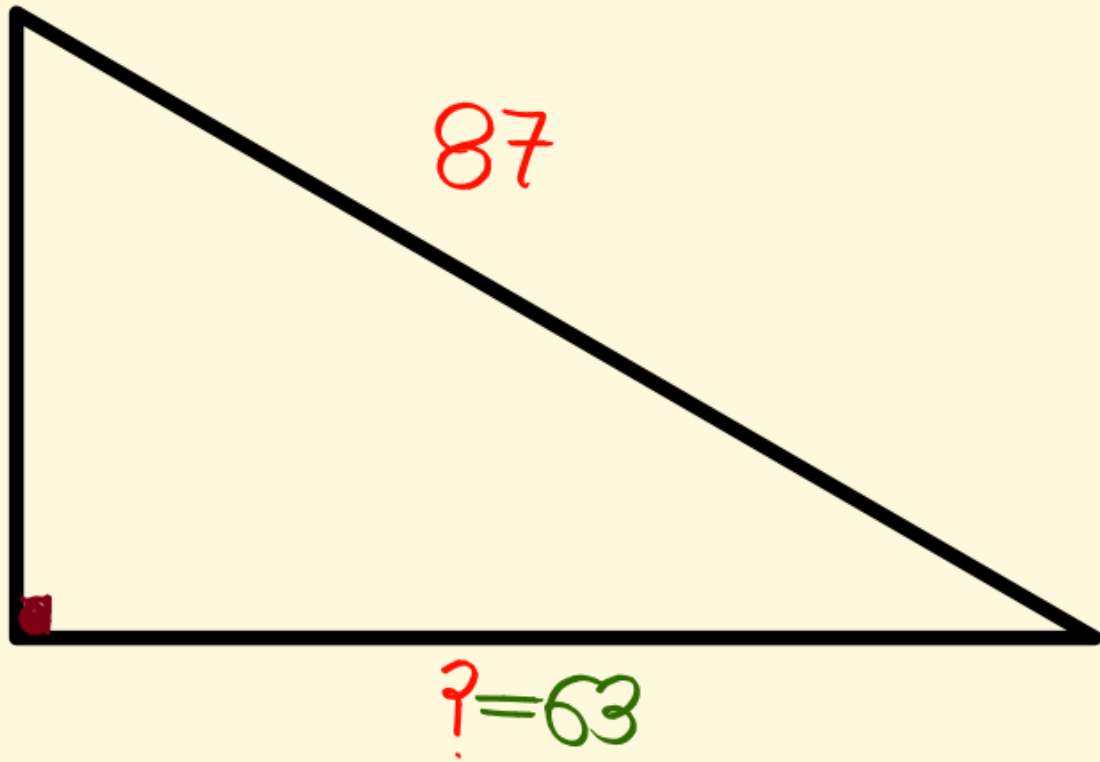
$\div 2$

$$(7, 24, 25) \times 2$$



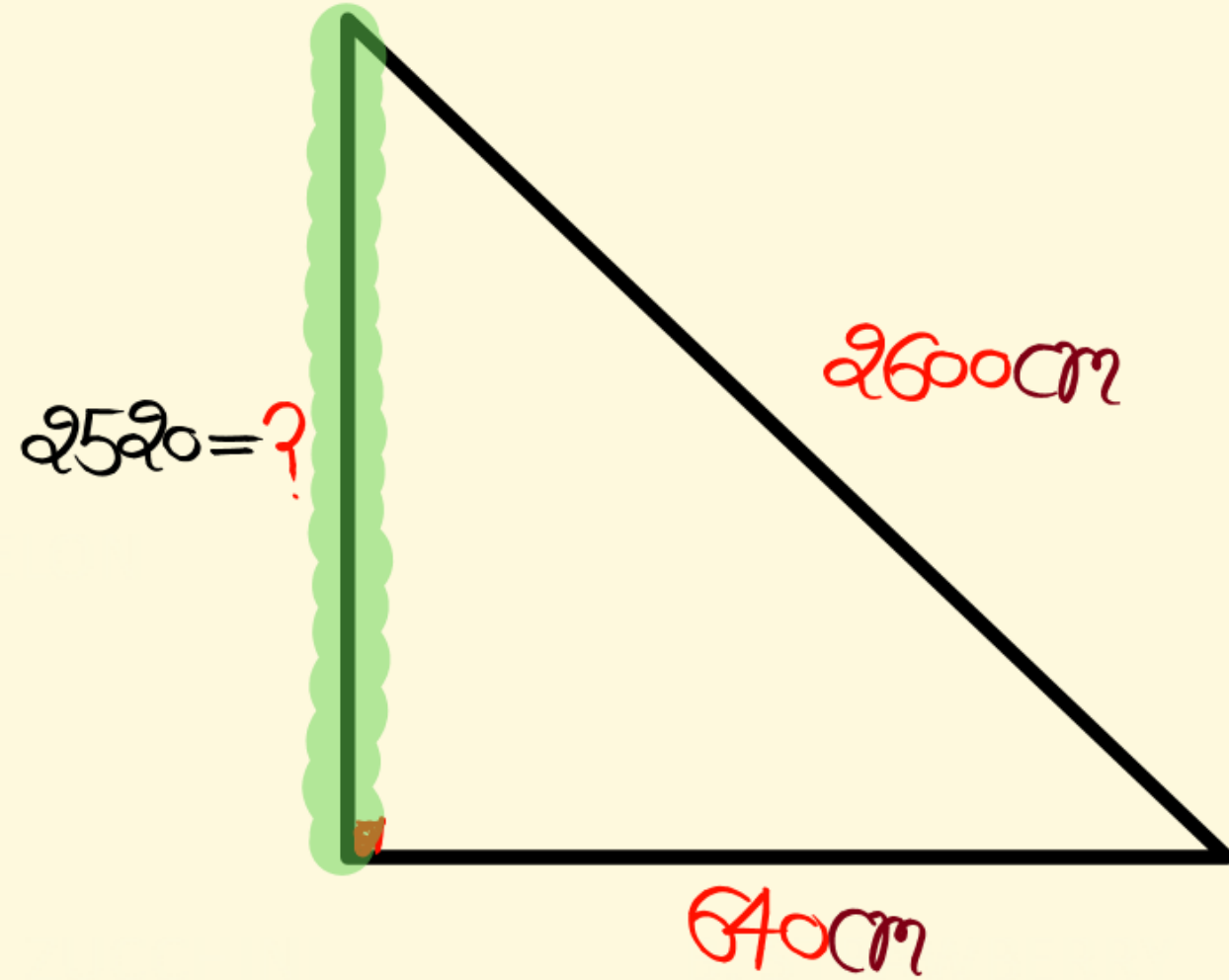
$\div 3$

$$(5, 12, 13) \times 3$$



÷3

$$(20, 21, 29)^H \times 3$$

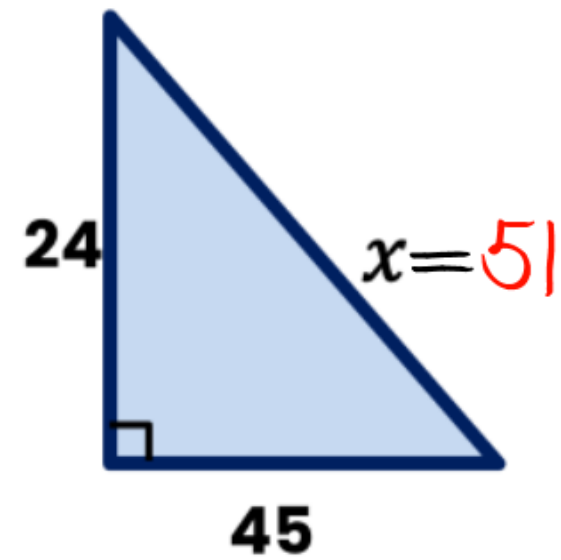
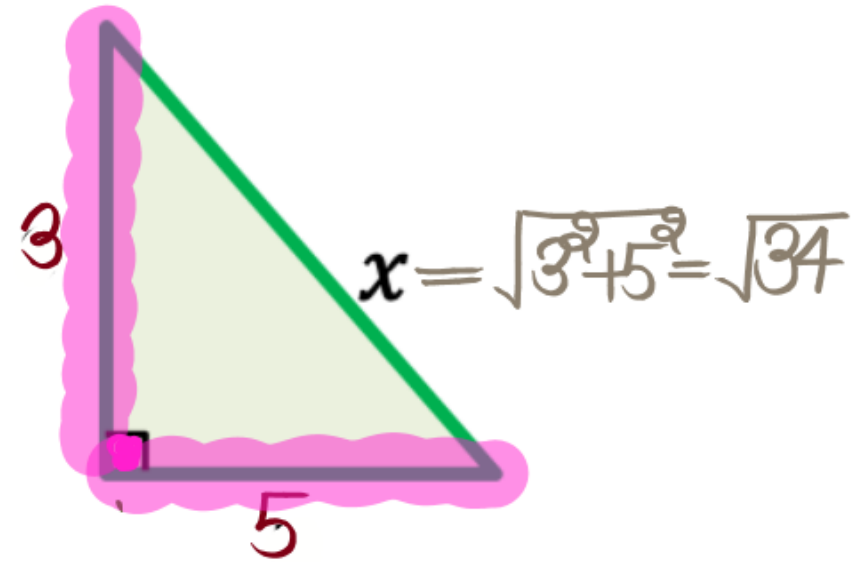
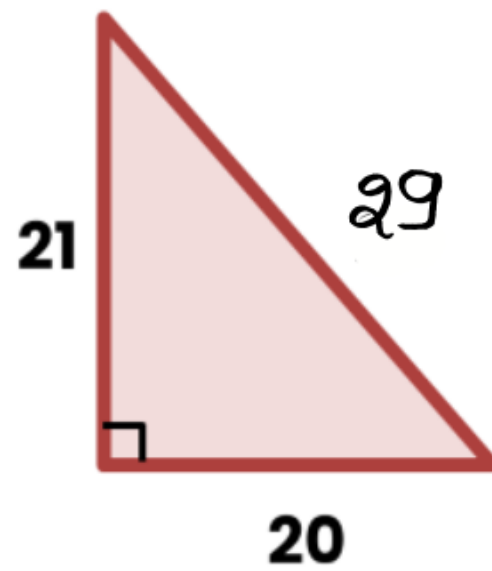


÷40

$$(16, 63, 65)^H \times 40$$

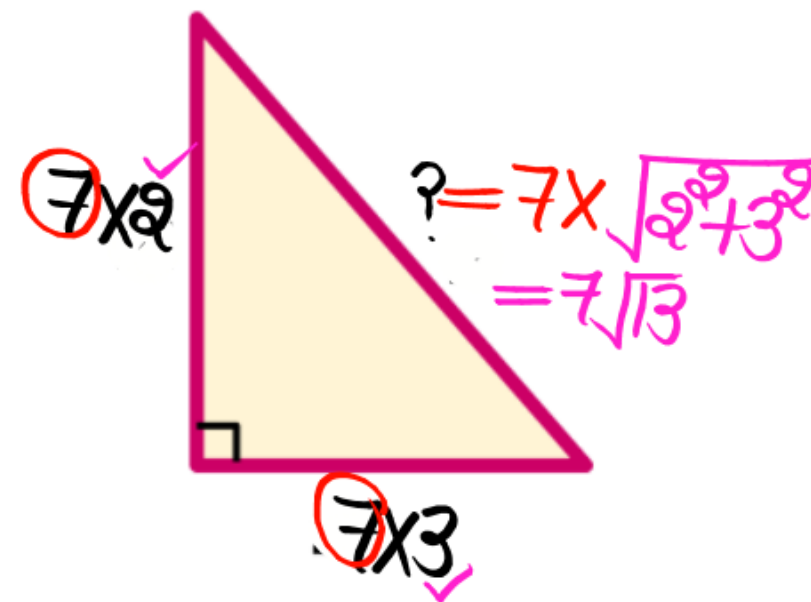


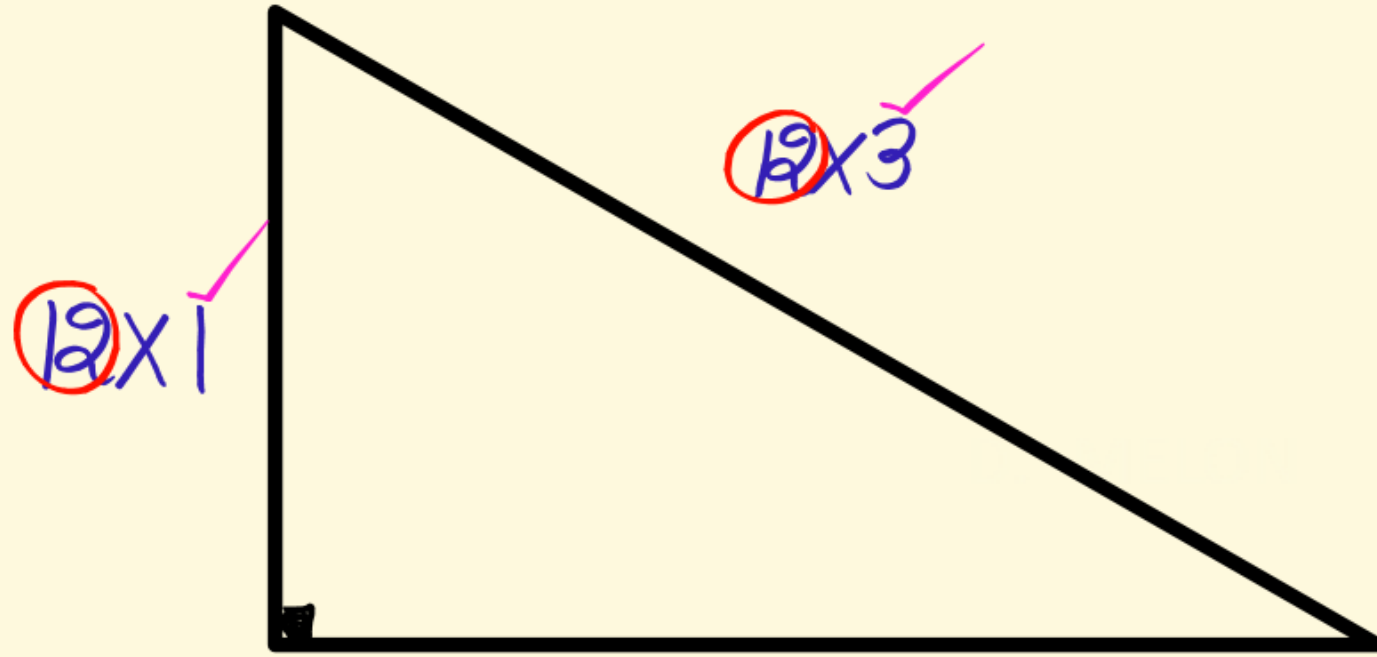
EXAMPLE



$\div 7$

2, 3



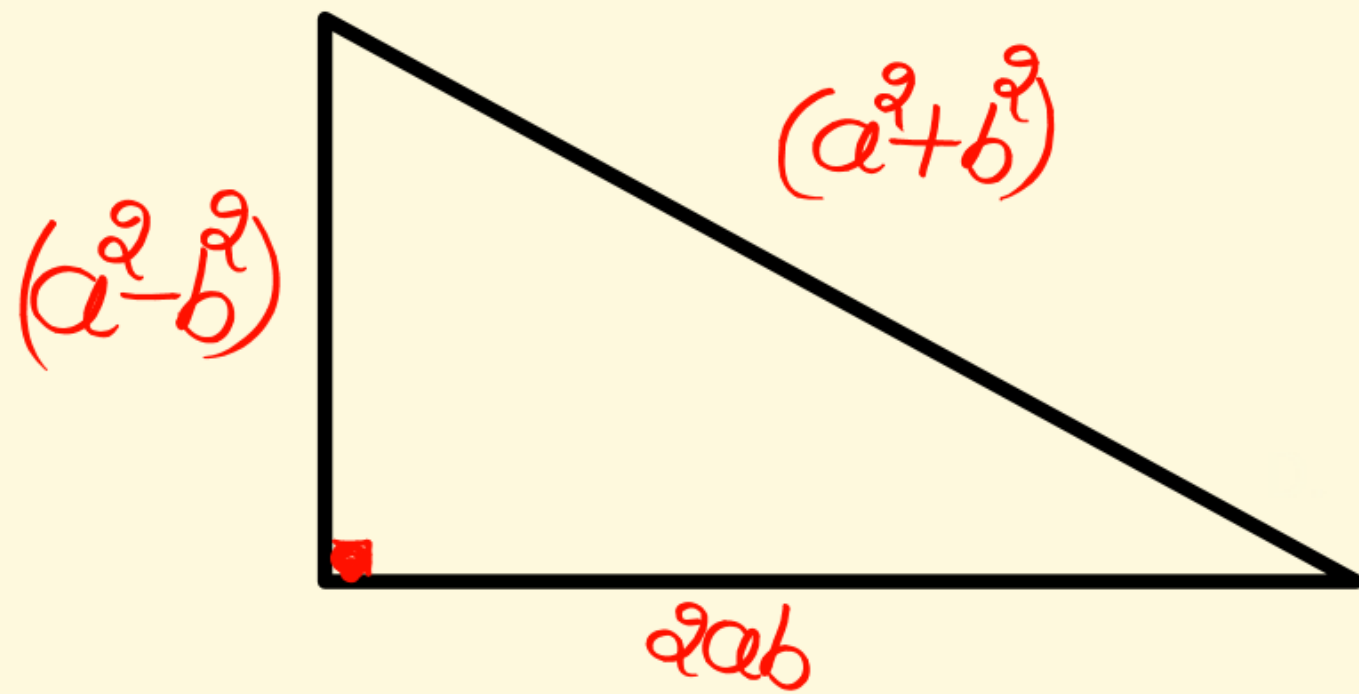


$$? = 12 \times \sqrt{3^2 - 1^2}$$

$$= 12 \times 2\sqrt{2}$$

$$= 24\sqrt{2}$$

$$\sqrt{8} \\ = \sqrt{4 \times 2}$$



$$(a^2 - b^2)^2 + (2ab)^2 = (a^2 + b^2)^2$$

$$a \rightarrow x$$

$$b \rightarrow 1$$

$$a \rightarrow 2y$$

$$b \rightarrow 3$$

$$(a^2 - b^2, 2ab, \overset{H}{a^2 + b^2})$$

$$(x^2 - 1, 2x, x^2 + 1) \checkmark$$

$$(4y^2 - 9, 12y, 4y^2 + 9) \checkmark$$

76. Consider an obtuse-angled triangle with sides 8cm, 15cm and x cm. if x is an integer, then how many such triangles exist?

एक अधिक कोण त्रिभुज की भुजाओं की लंबाई 8 सेमी, 15 सेमी तथा x सेमी है। यदि x एक पूर्णांक है तो ऐसे कितने त्रिभुज संभव हो सकता है।

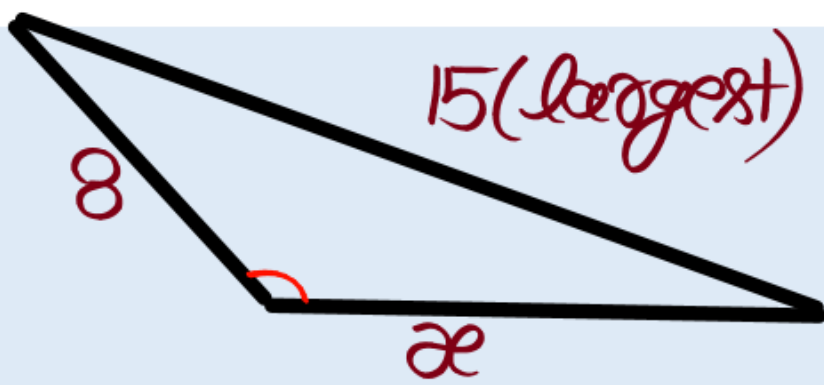
[A] 10

[B] 5

[C] 14

[D] 15

Case I →



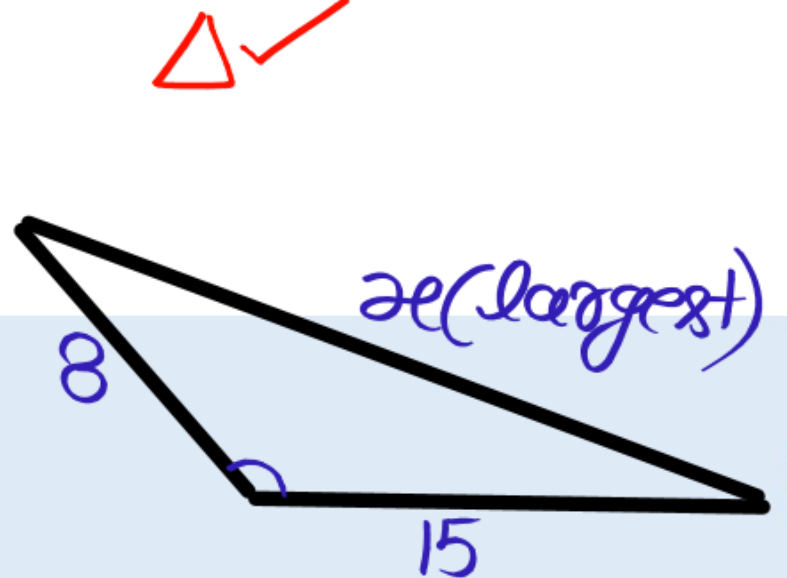
$$15^2 > 8^2 + x^2$$

$$161 > x^2$$

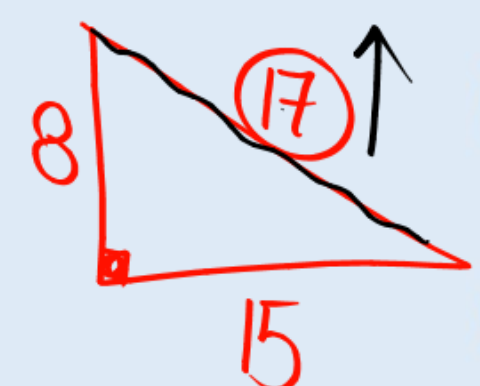
$$x = (12, 11, 10, 9, 8)$$

$$7 < x < 23$$

Case 2 →



$$x = (18, 19, 20, 21, 22)$$



77. If x^2-1 , $2x$ and x^2+1 are the three sides of a right angled triangle, then which of the following can be its hypotenuse?

यदि x^2-1 , $2x$ और x^2+1 एक समकोण त्रिभुज की तीन भुजाएँ हैं, तो निम्नलिखित में से कौन सा इसका कर्ण हो सकता है?

(SSC SELECTION POST XII GRADUATE LEVEL)

[A] x^2+1

[B] $2x$

[C] x^2-1

[D] x^2

78. **A triangle is NOT said to be a right-angled triangle, if its sides measure:**
उस त्रिभुज को समकोण त्रिभुज कहीं कहा जा सकता है, जिसकी भुजाओं की माप ____ हो?

~~[A] 5 cm, 12 cm and 13 cm~~

~~[B] 5 cm, 7 cm and 9 cm~~

~~[C] 6 cm, 8 cm and 10 cm~~

~~[D] 8 cm, 15 cm and 17 cm~~

79. If the sides of a triangle are in the ratio $1\frac{2}{5} : 4\frac{4}{5} : 5$, then the triangle would be a/an?

यदि किसी त्रिभुज की भुजाएँ $1\frac{2}{5} : 4\frac{4}{5} : 5$ के अनुपात में हों, तो त्रिभुज होगा?

- [A] Equilateral/समबाहु
- [B] Right-angle/समकोण
- [C] Isosceles/समद्विबाहु
- [D] None/इनमें से कोई नहीं

$$\left(\frac{7}{5} : \frac{24}{5} : 5\right) \times 5$$

$$7 : 24 : 25$$

80. In a $\triangle ABC$, $2\angle ABC = 9\angle ACB$ and $2\angle BAC = 7\angle ACB$. If $AB = 7$ cm, $AC = 25$ cm, then the length of BC is:

एक $\triangle ABC$ में, $2\angle ABC = 9\angle ACB$ और $2\angle BAC = 7\angle ACB$ है। यदि $AB = 7$ सेमी, $AC = 25$ सेमी है, तो BC की लंबाई है:

[A] 22cm

[B] 21cm

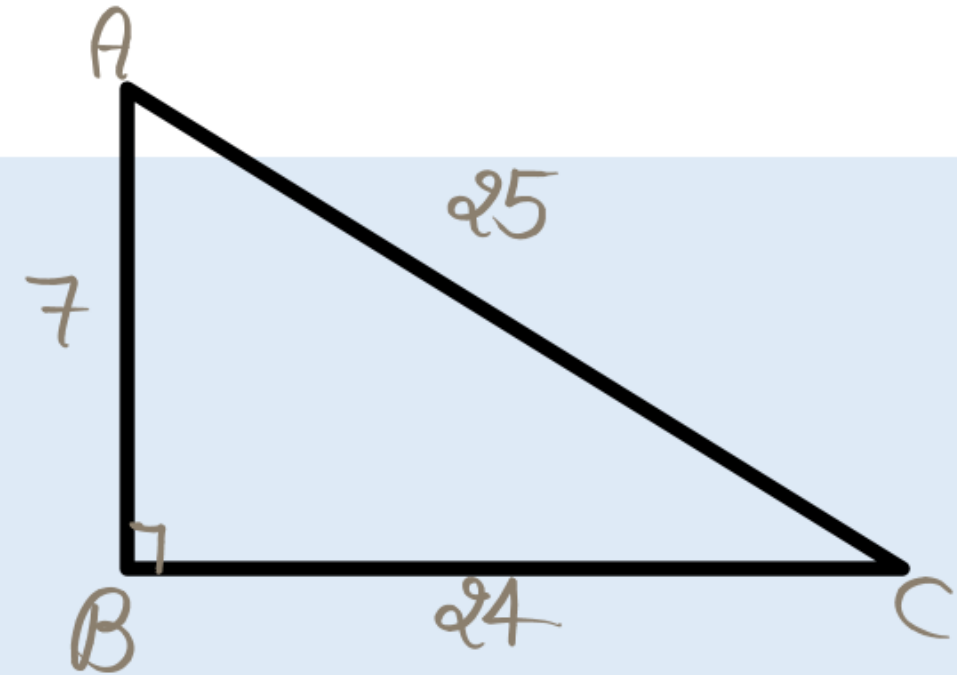
[C] 24cm

[D] 27cm

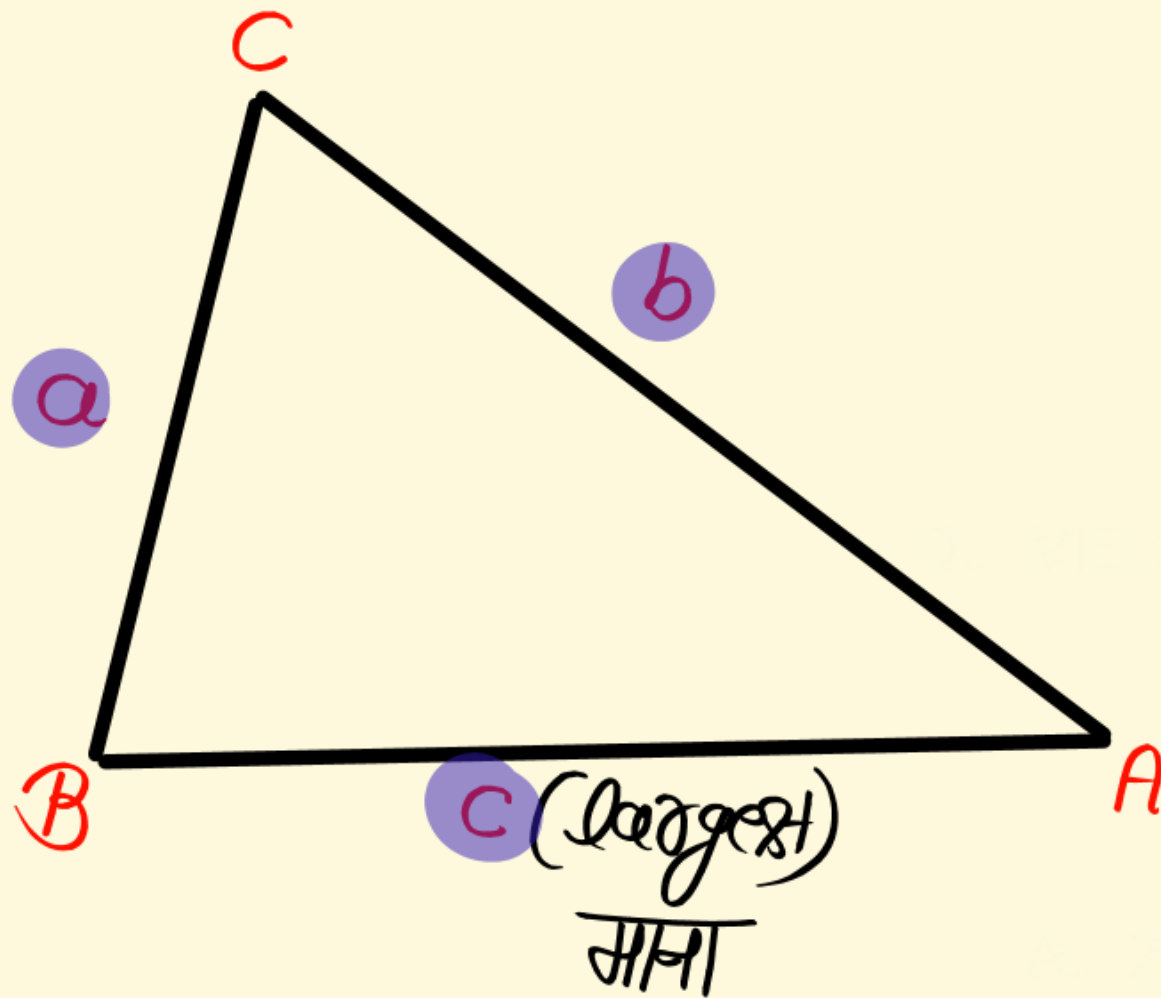
$$\frac{\angle B}{\angle C} = \frac{9}{2}$$

$$\frac{\angle A}{\angle C} = \frac{7}{2}$$

$$\angle A \quad \angle C \quad \angle B = 90^\circ$$
$$7 : 2 : 9$$







$$c + c < a + b + c$$

$$2c < \text{Perimeter}$$

$$c < \frac{\text{Perimeter}}{2}$$

81. Perimeter of triangle is 65 cm. what will be the length of maximum integral value of largest side?

त्रिभुज का परिमाप 65 सेमी है। सबसे बड़ी भुजा के अधिकतम पूर्णांक मान की लंबाई क्या होगी?

[A] 43

[B] 33

[C] 32

[D] 16

$$C < \frac{65}{2}$$

$$C < 32.5$$

82. If a triangle has a perimeter of 52 units, then all its sides have length ___ units.

यदि किसी त्रिभुज का परिमाप 52 इकाई है, तो उसकी सभी भुजाओं की लंबाई ___ इकाई होगी।

SSC CGL 2024 PRE

[A] <26

[B] <20

[C] <24

[D] <18

largest side < $\frac{52}{2}$



83. In a quadrilateral ABCD, AB = 6 cm, BC = 18 cm, CD = 6 cm and DA = 10 cm. If the diagonal BD = x, then which one of the following is correct?

चतुर्भुज ABCD में, AB = 6 सेमी, BC = 18 सेमी, CD = 6 सेमी और DA = 10 सेमी है। यदि विकर्ण BD = x है, तो निम्नलिखित में से कौन सा सही है?

(CDS-1 2024)

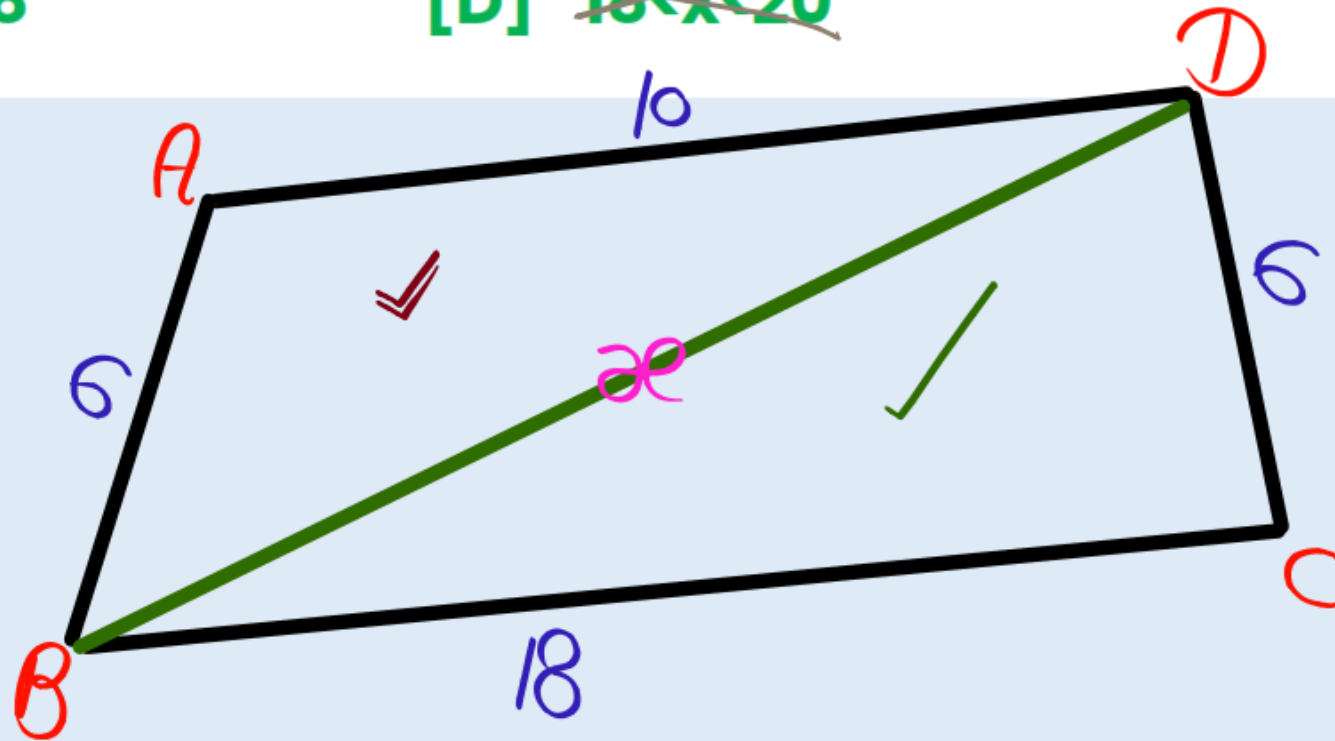
[A] ~~$8 < x < 12$~~

[C] ~~$16 < x < 18$~~

[B] $12 < x < 16$

[D] ~~$18 < x < 20$~~

$$\left. \begin{array}{l} 4 < x < 16 \\ 12 < x < 24 \end{array} \right\}$$



$$12 < x < 16$$

$$(13, 14, 15)$$

quadrilateral w/ 4 sides $\rightarrow$ 8, 15, 31, x

$$x < 8 + 15 + 31$$

$$x < 54$$

$$31 < 8 + 15 + x$$

$$8 < x$$

$$8 < x < 54$$

