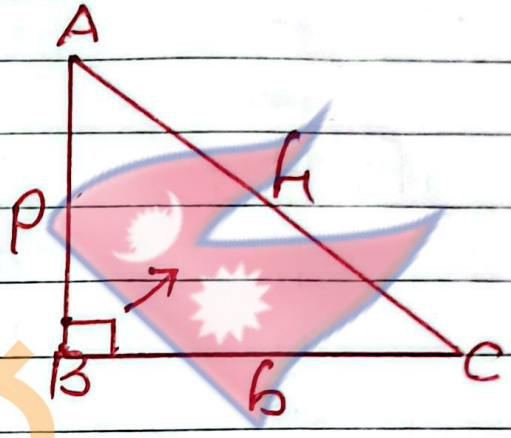
Coordinates

Pythagoras Theorem

$$h^2 = p^2 + b^2$$



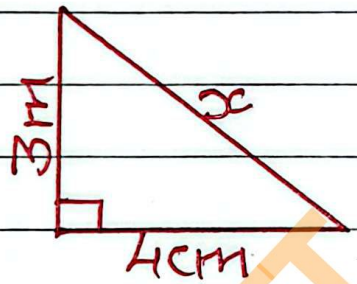
$\Rightarrow h = \sqrt{p^2 + b^2}$

$\Rightarrow p = \sqrt{h^2 - b^2}$

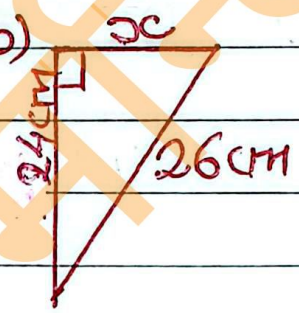
$\Rightarrow b = \sqrt{h^2 - p^2}$

Q.1. Find the value of x :-

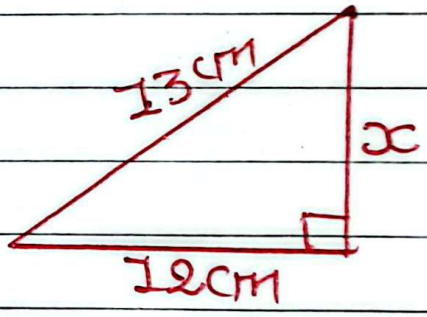
(a)



(b)



(c)



$\Rightarrow$ Sol^n.

(a) Here,

$p = 3cm$

$b = 4cm$

$h = x = ?$

By using pythagoras theorem,

$$h = \sqrt{p^2 + b^2}$$
$$= \sqrt{3^2 + 4^2}$$
$$= \sqrt{9 + 16}$$

$= \sqrt{25}$

$= 5\text{cm}$

Thus, the value of x is 5cm

(b) Here,

$p = 24\text{cm}$

$h = 26\text{cm}$

$b = x = ?$

By using pythagoras theorem,

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

$= \sqrt{26^2 - 24^2}$

$= \sqrt{676 - 576}$

$= \sqrt{100}$

$= 10\text{cm}$

Thus, the value of x is 10cm.

(c) Here,

$h = 13\text{cm}$

$b = 12\text{cm}$

$p = x = ?$

By using pythagoras theorem,

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

$$= \sqrt{13^2 - 12^2}$$

$$= \sqrt{169 - 144}$$

$$= \sqrt{25}$$

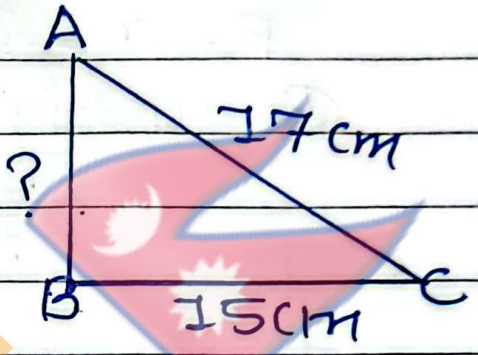
$$= 5\text{cm}$$

Thus, the value of x is 5cm.

VVI

Q.2. In right angled triangle ABC, $\angle ABC = 90°$, AC = 17cm, BC = 15cm then, find the length of AB.

⇒ Sol^{n}.



Here,

p = AB = ?

b = BC = 15cm

h = AC = 17cm

By using pythagoras theorem,

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

$$= \sqrt{17^2 - 15^2}$$

$$= \sqrt{289 - 225}$$

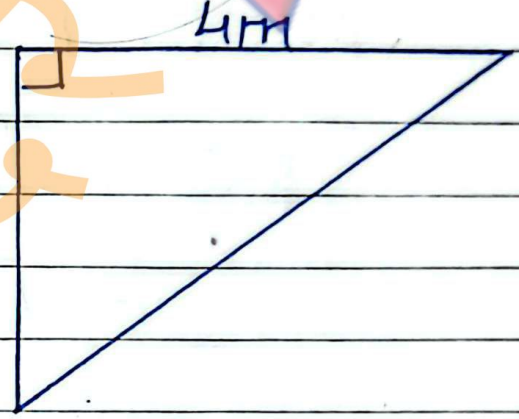
$$= \sqrt{64}$$

$$= 8\text{cm}$$

Thus, the length of AB is 8cm.

Q.3. A man walks towards north 3m and took a turn to the east and walked 4m more. What will be the shortest distance between the initial place and the final place. Calculate it.
[BLE-2081, Bharatpur]

⇒ Sol^{n}.



Here,
$p = 3m$
$b = 4m$
$h = ?$
By using pythagoras theorem,

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

$$= \sqrt{3^2 + 4^2}$$

$$= \sqrt{9 + 16}$$

$$= \sqrt{25}$$

$$= 5m$$

Thus, the shortest distance is 5m.

Distance bet^{n}. two points

The distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Q.1. In which quadrant does the given point lie?

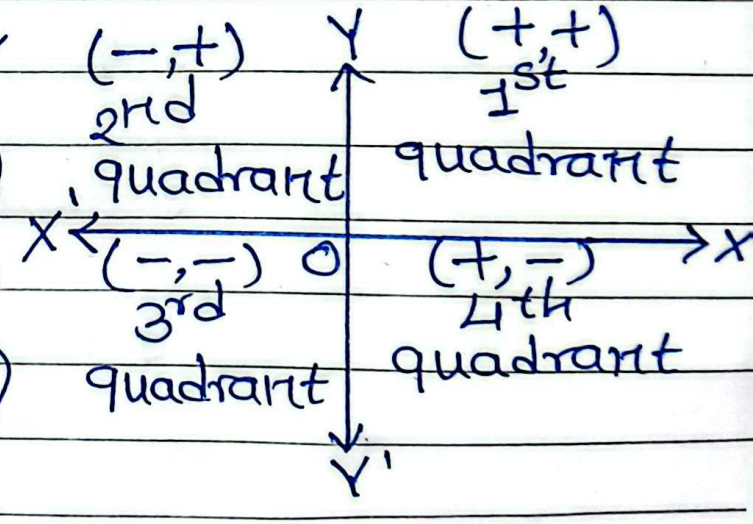
(a) (5, 2) (b) (−2, 5)

(c) (−5, −7) (d) (−4, 2)

(e) (4, −7) (e) (−2, −3)

⇒ Ans:-

(a) 1st quadrant
(b) 2nd quadrant
(c) 3rd quadrant
(d) 2nd quadrant
(e) 4th quadrant
(f) 3rd quadrant



Q.2. Find the distance between the points A(-3,4) and B(4,3)

⇒ Solⁿ.

Here,

$A(x_1, y_1) = A(-3, 4)$

$B(x_2, y_2) = B(4, 3)$

Now,

The distance between A(-3,4) and B(4,3) is

$$AB = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$

$$= \sqrt{(4+3)^2 + (3-4)^2}$$

$$= \sqrt{7^2 + (-1)^2}$$

$$= \sqrt{49+1}$$

$$= \sqrt{50}$$

$$= 5\sqrt{2} \text{ units}$$

VVI

Q.3. Find the distance between the points P(-2,-4) and Q(10,1).

⇒ Sol^{n}.

Here,

$P(x_1, y_1) = P(-2, -4)$

$Q(x_2, y_2) = Q(10, 1)$

Now,

The distance between the points P and Q is

$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(10+2)^2 + (1+4)^2}$$

$$= \sqrt{12^2 + 5^2}$$

$$= \sqrt{144 + 25}$$

$$= \sqrt{169}$$

$$= 13 \text{ units}$$

Q.4. If the distance between P(0,6) and Q(a,0) is 6 units, what is the value of a?

⇒ Solⁿ

Here,

$P(x_1, y_1) = P(0, 6)$

$Q(x_2, y_2) = Q(a, 0)$

$PQ = 6$ units

Now,

The distance between the points P and Q is

$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

or, $6 = \sqrt{(a-0)^2 + (0-6)^2}$

or, $6 = \sqrt{a^2 + 36}$

or, $6^2 = a^2 + 36$ (Squaring)

or, $36 = a^2 + 36$

or, $a^2 = 36 - 36$

or, $a^2 = 0$

or, $a = \sqrt{0}$

$\therefore a = 0$

Thus, the value of a is 0.

Q.5. If the distance between A(0, 8) and B(a, 0) is $2\sqrt{41}$ units, find the value of a.

⇒ Sol^{n}:

Here,

$A(x_1, y_1) = A(0, 8)$

$B(x_2, y_2) = B(a, 0)$

$AB = 2\sqrt{41}$ units

Now,

The distance between A and B is

$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

or, $2\sqrt{41} = \sqrt{(a-0)^2 + (0-8)^2}$

or, $2\sqrt{41} = \sqrt{a^2 + 64}$

or, $4 \times 41 = a^2 + 64$ (squaring)

or, $164 = a^2 + 64$

or, $a^2 = 164 - 64$

or, $a^2 = 100$

or, $a = \sqrt{100}$

$\therefore a = 10$

Thus, the value of a is 10.

Q.6. Show that the points A(4,3), B(3,2) and C(2,1) are collinear.

⇒ Sol^{n}.

Given points,

A(4,3), B(3,2) and C(2,1)

By using distance formula,

$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

Now,

$AB = \sqrt{(3-4)^2+(2-3)^2}$

$= \sqrt{(-1)^2+(-1)^2}$

$= \sqrt{1+1}$

$= \sqrt{2}$

$BC = \sqrt{(2-3)^2 + (1-2)^2}$

$= \sqrt{(-1)^2 + (-1)^2}$

$= \sqrt{1+1}$

$= \sqrt{2}$

Also,

$AC = \sqrt{(2-4)^2 + (1-3)^2}$

$= \sqrt{(-2)^2 + (-2)^2}$

$= \sqrt{4+4}$

$= \sqrt{8}$

$= 2\sqrt{2}$

Since,

$AB + BC = AC$

or, $\sqrt{2} + \sqrt{2} = 2\sqrt{2}$

or, $2\sqrt{2} = 2\sqrt{2}$

Thus, the points A(4, 3), B(3, 2) and C(2, 1) are collinear.