8. Ratio of sides of $\triangle = 1 : \sqrt{2} : 1$

Let the sides be $x : \sqrt{2}x : x$

Acc. to pythagoras theorem

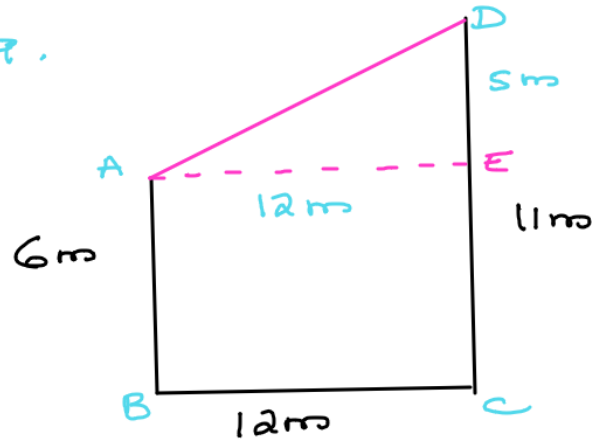
$$x^2 + x^2 = (\sqrt{2}x)^2$$

$$2x^2 = 2x^2$$

LHS = R.H.S

$\therefore$ The given $\triangle$ is a right angled $\triangle$.

9.




Construction : Draw AE ll to BC

$\therefore$ AE = 12m

DE = DC − EC

= DC − AB [$\because$ EC = AB]

= 11 − 6

= 5m

Using pythagoras theorem.

$AD^2 = AE^2 + DE^2$

$= (12)^2 + (5)^2$

$= 144 + 25$

$= 169$

$AD = \sqrt{169}$

$= 13\,m$

10. Given: AB ∥ CD

AB = 7cm

BD = 25cm

CD = 17cm.

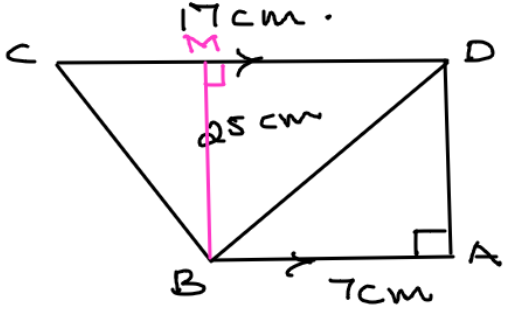
To prove: BC = ?

Construction: Draw BM ⊥ to CD

Proof: MD ∥ BA

MD = BA

7cm = 7cm




In △ BDM

right angled at M

Using pythagoras theorem.

$BD^2 = MD^2 + MB^2$

$(25)^2 = (7cm)^2 + MB^2$

$625 - 49 = MB^2$

$\sqrt{576} = MB$

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

$2 \times 12 = MB$

$MB = 24$

In $\triangle CMB$

$CM = CD - MD$

$= 17 - 7$

$= 10\,cm.$

Using pythagoras theorem.

$CB^2 = CM^2 + MB^2$

$= (10)^2 + (24)^2$

$= 100 + 576$

$CB = \sqrt{676}$

$= \sqrt{2 \times 2 \times 13 \times 13}$

$= 2 \times 13$

$= 26\,cm$

| | |
|---|---|
| 2 | 676 |
| 2 | 338 |
| 13 | 169 |
| | 13 |

11. $\angle B = 90^\circ$

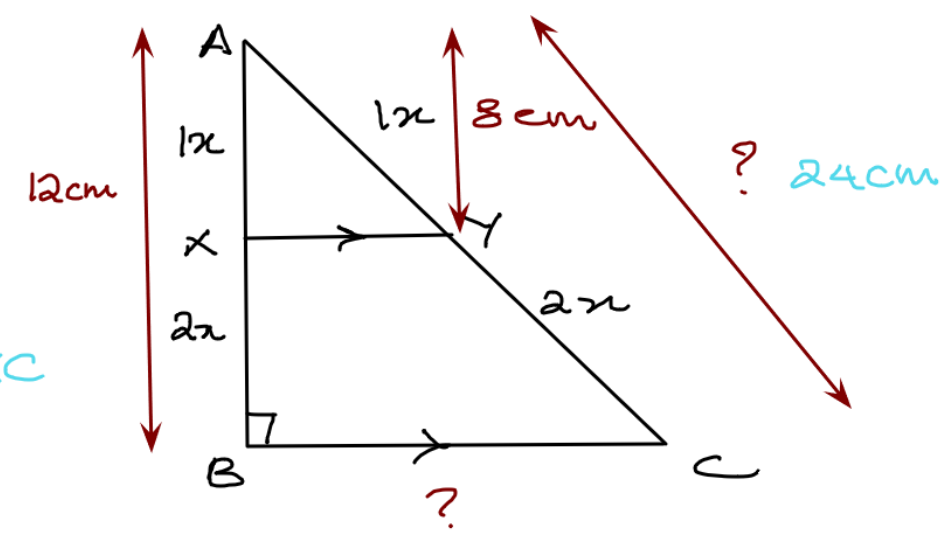
$XY \parallel BC$

$AB = 12\text{cm}$

$AY = 8\text{cm}$.

$AX : XB = 1 : 2 = AY : YC$

AC & BC = ?




proof:

$AX : XB = 1 : 2$

also $AY : YC = 1 : 2$

Let AX be $x$

XB be $2x$

AY be $x$

YC be $2x$.

$AX + XB = x + 2x$

$AB = 3x$ [$\because AB = AX + XB$]

$12 = 3x$

$\frac{12}{3} = x$

$4 = x$

$\therefore AX = 4\text{cm}$

$XB = 2 \times 4$

$= 8\text{cm}$

Since

$AY = x$

$YC = 2x$

$AC = AY + YC$ — (i)

$\left[\because AY = 8\right]$ — (ii)

$\therefore YC = 2 \text{ of } AY$

$= 2 \times 8$

$= 16$ — (iii)

Substituting ii & iii in (i)

$AC = 8 + 16$

$= 24$

In $\Delta ABC$

$\angle B = 90^\circ$

$\therefore$ Using pythagoras theorem

$BC^2 = AC^2 - AB^2$

$BC^2 = (24)^2 - (12)^2$

$= 576 - 144$

$= 432$

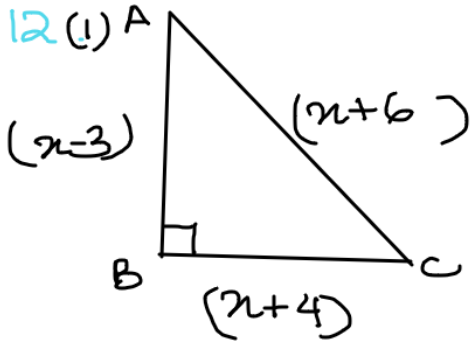
$BC = \sqrt{432}$

$= \sqrt{2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3}$

$= 2 \times 2 \times 3\sqrt{3}$

$= 12\sqrt{3}$ cm.

12 (i)




Using pythagoras theorem

$AC^2 = AB^2 + BC^2$

$(x+6)^2 = (x-3)^2 + (x+4)^2$

$x^2 + 36 + 12x = x^2 + 9 - 6x + x^2 + 16 + 8x$

$36 + 12x = x^2 + 2x + 25$

$36 - 25 = x^2 + 2x - 12x$

$11 = x^2 - 10x$

$x^2 - 10x - 11 = 0$

$x^2 - 11x + x - 11 = 0$

$x(x-11) + 1(x-11) = 0$

$(x-11)(x+1) = 0$

$x = 11$ or $x = -1$

discarding $x = -1$ since length cannot be -ve value.

Since $x = 11$

$\therefore AB = x - 3$

$= 11 - 3$

$= 8\text{cm}$

$BC = x + 4$

$= 11 + 4$

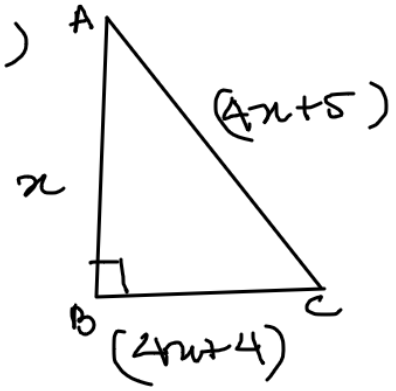
$= 15\text{cm}$

$AC = x + 6$

$= 11 + 6$

$= 17\text{cm}$.

(iii)




Since $\Delta ABC$ is right angled at B using pythagoras theorem.

$\therefore AC^2 = AB^2 + BC^2$

$(4x+5)^2 = x^2 + (4x+4)^2$

$16x^2 + 25 + 40x = x^2 + 16x^2 + 16 + 32x$

$25 - 16 = x^2 + 32x - 40x$

$9 = x^2 - 8x$

$x^2 - 8x - 9 = 0$

$x^2 - 9x + 1x - 9 = 0$

$x(x-9) + 1(x-9) = 0$

$(x+1)(x-9) = 0$

$x+1 = 0$ or $x-9 = 0$

$x = -1$ $x = 9$

$x = -1$ is discarded since length cannot be a -ve value.

$AB = x$

$= 9\text{cm}$

$AC = 4x+5$

$= 4 \times 9 + 5$

$= 36 + 5$

$= 41\text{cm}$

$BC = 4x+4$

$= 4 \times 9 + 4$

$= 36 + 4$

$= 40\text{cm}$

# 14 (A)

Quadrilateral [polygon] — (1) figure with 4 sides [e.g square, rectangle, parallelogram, Rhombus, Trapezium, Kite]

(2) Sum of angles of a quadrilateral $= 360^\circ$

A quadrilateral is a parallelogram if —

a) opposite side are equal.

b) " angles " "

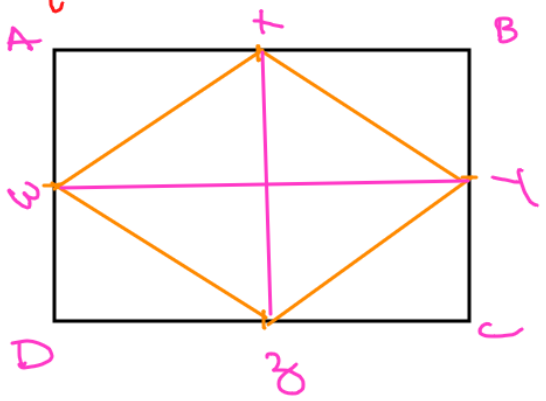
c) the diagonals bisect each other.

d) A pair of opposite side are equal & parallel.

e) A diagonal divides a parallelogram into two congruent triangles.

Quadrilateral formed by joining the mid-points of the sides of

A quadrilateral is a parallelogram.




wxyz in a quadrilateral ABCD is a parallelogram.

Rhombus — Diagonals of a rhombus bisect each other at right angles.

Square — Diagonals of a square bisect each other at right and they are equal.

Rectangle — Diagonal of a rectangle bisect each other.

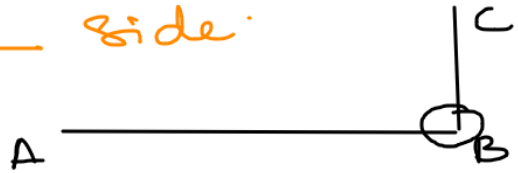
Triangle — a) A line segment joining the mid points of any two sides of a Δ is parallel to the third


AB ∥ XY
X & Y are mid points of AC & BC

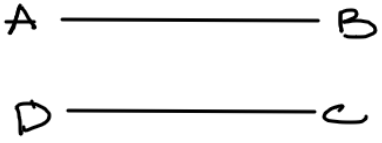
b) A line segment joining the mid-points of any two sides of a triangle is half of the third side.

c) A line through the mid-point of a side of a triangle, parallel to another side bisects the third side.

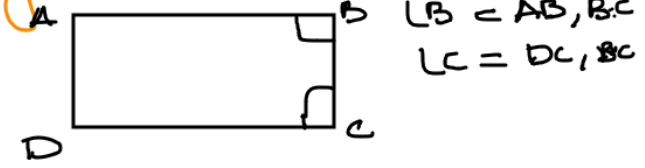
1. Two sides having a common end point are called adjacent side.



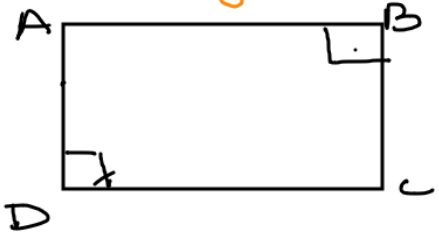

2. Two sides having no common end point are called opposite sides.




3. Two angles of a quadrilateral having a common arm are called consecutive angles.



4. Two angles of a quadrilateral having no common arm are called opposite angles.




angle sum property of quadrilateral = 360°

" " " " triangle = 180°