



Then  $\frac{2}{4} = \frac{x}{9-x}$  (Let  $x = AE$ )

$$4x = 18 - 2x$$

$$6x = 18\text{cm}$$

$$x = \frac{18}{6}\text{cm}$$

$$x = 3\text{cm}$$

Hence

$$\boxed{x = 3\text{cm}}$$

(viii) It is given that  $\frac{AD}{BD} = \frac{4}{5}$  and  $EC = 2.5\text{ cm}$

We have to find  $AE$ .

So  $\frac{AD}{DB} = \frac{AE}{CE}$  (by Thales theorem)

Then  $\frac{4}{5} = \frac{AE}{2.5}$

$$AE = \frac{4 \times 2.5}{5} = 2\text{ cm}$$

Hence

$$\boxed{AE = 2\text{cm}}$$

(ix) It is given that  $AD = x$ ,  $DB = x - 2$ ,  $AE = x + 2$  and  $EC = x - 1$ .

We have to find the value of  $x$ .

So  $\frac{AD}{DB} = \frac{AE}{CE}$  (by Thales theorem)

$$\begin{aligned}\text{Then } \frac{x}{x-2} &= \frac{x+2}{x-1} \\ x(x-1) &= (x-2)(x+2) \\ x^2 - x - x^2 + 4 &= 0 \\ x &= 4\end{aligned}$$

Hence

$$\boxed{x = 4\text{cm}}$$

(x) It is given that  $AD = 8x - 7$ ,  $DB = 5x - 3$ ,  $AE = 4x - 3$  and  $EC = 3x - 1$ .

We have to find the value of  $x$ .

$$\text{So } \frac{AD}{DB} = \frac{AE}{CE} \quad (\text{by Thales theorem})$$

Then,

$$\begin{aligned}\frac{8x-7}{5x-3} &= \frac{4x-3}{3x-1} \\ \Rightarrow (8x-7)(3x-1) &= (5x-3)(4x-3) \\ \Rightarrow 24x^2 - 29x + 7 &= 20x^2 - 27x + 9 \\ \Rightarrow 4x^2 - 2x - 2 &= 0 \\ \Rightarrow 2[2x^2 - x - 1] &= 0 \\ \Rightarrow 2x^2 - x - 1 &= 0 \\ \Rightarrow 2x^2 - 2x + x - 1 &= 0 \\ \Rightarrow 2x(x-1) + 1(x-1) &= 0 \\ \Rightarrow (x-1)(2x+1) &= 0 \\ \Rightarrow x-1 = 0 \text{ or } 2x+1 &= 0 \\ \Rightarrow x = 1 \text{ or } x = -\frac{1}{2} & \text{ (rejected)}\end{aligned}$$

Hence,

$$\boxed{x = 1\text{cm}}$$

(xi) It is given that  $AD = 4x - 3$ ,  $BD = 3x - 1$ ,  $AE = 8x - 7$  and  $EC = 5x - 3$ .

We have to find the value of  $x$ .

$$\text{So } \frac{AD}{DB} = \frac{AE}{CE} \quad (\text{by Thales theorem})$$

$$\text{Then } \frac{4x-3}{3x-1} = \frac{8x-7}{5x-3}$$

$$\begin{aligned}(4x-3)(5x-3) &= (3x-1)(8x-7) \\ 4x(5x-3) - 3(5x-3) &= 3x(8x-7) - 1(8x-7) \\ 20x^2 - 12x - 15x + 9 &= 24x^2 - 21x - 8x + 7 \\ 20x^2 - 27x + 9 &= 24x^2 - 29x + 7\end{aligned}$$

Then

$$\begin{aligned}-4x^2 + 2x + 2 &= 0 \\ 4x^2 - 2x - 2 &= 0 \\ 4x^2 - 4x + 2x - 2 &= 0 \\ 4x(x-1) + 2(x-1) &= 0 \\ (4x+2)(x-1) &= 0 \\ x &= 1\end{aligned}$$

Hence

$$\boxed{x = 1\text{cm}}$$

(xii) It is given that  $AD = 2.5\text{cm}$  ,  $AE = 3.75\text{cm}$  and  $BD = 3\text{cm}$  .

$$\text{So } \frac{AD}{DB} = \frac{AE}{CE} \quad (\text{by Thales theorem})$$

$$\text{Then } \frac{2.5}{3} = \frac{3.75}{CE}$$

$$2.5CE = 3.75 \times 3$$

$$CE = \frac{3.75 \times 3}{2.5}$$

$$= \frac{11.25}{2.5}$$

$$= 4.50$$

Now

$$AC = 3.75\text{cm} + 4.50\text{cm}$$

$$= 8.25\text{cm}$$

\*\*\*\*\* END \*\*\*\*\*