22/11/2020

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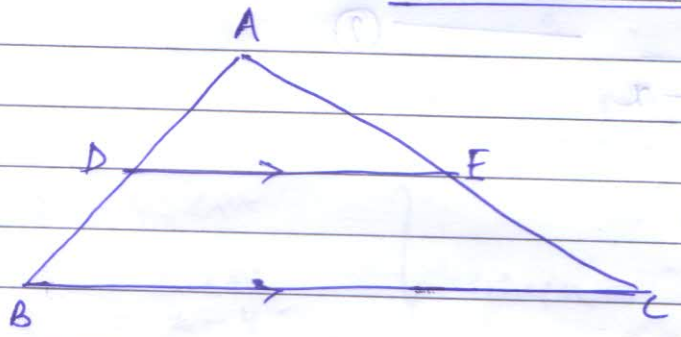
Ch - 7
Triangles
Exercise 7.1

Q.1 Same as NCERT

Q.2 Same as NCERT

Exercise 7.2

Q.1



In ΔABC,

$DE \parallel BC$ (given)

$\therefore \frac{AD}{DB} = \frac{AE}{EC}$ (By BPT)

(i) $AD = 6$ cm
$DB = 9$ cm
$AE = 8$ cm
} given

$\frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow \frac{6}{9} = \frac{8}{EC}$

$EC = \frac{8 \times 9}{6}$ 3

$EC = \boxed{12 \text{ cm}}$

$AC = AE + EC$

$= 8 + 12$

$= \boxed{20 \text{ cm}}$

(ii) $\frac{AD}{DB} = \frac{3}{4}$ } given

$AC = 15\ cm$

$\frac{AD}{DB} = \frac{AE}{EC} = \frac{3}{4}$ ——— (1)

Let AE be x

$EC = 15 - x$

$\therefore \frac{AE}{EC} = \frac{x}{15-x}$ ——— (2)

From (1) & (2)

$\frac{3}{4} = \frac{x}{15-x}$

$45 - 3x = 4x$

$45 = 7x$

$x = \frac{45}{7}$

$\boxed{x = 6.43\ cm}$

(iii) $\frac{AD}{DB} = \frac{2}{3}$ } given

$AC = 18\ cm$

$\frac{AD}{DB} = \frac{AE}{EC} = \frac{2}{3}$ ——— (1)

Let AE be x

$EC = 18 - x$

$$\therefore \frac{AE}{EC} = \frac{x}{18-x} \quad \text{——— (2)}$$

From (1) & (2)

$$\frac{2}{3} = \frac{x}{18-x}$$

$$36 - 2x = 3x$$

$$36 = 5x$$

$$x = \frac{36}{5}$$

$$\boxed{x = 7.2 \text{ cm}}$$

(iv) $AD = 4$ cm
$AE = 8$ cm
$DB = x - 4$ cm
$EC = 3x - 19$ cm
} given

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\Rightarrow \frac{4}{x-4} = \frac{8}{3x-19}$$

$$\Rightarrow 12x - 76 = 8x - 32$$

$$\Rightarrow 12x - 8x = 76 - 32$$

$$\Rightarrow 4x = 44$$

$$\Rightarrow \boxed{x = 11 \text{ cm}}$$

(v) $AD = 8$ cm
$AB = 12$ cm
$AE = 12$ cm
} given

$DB = AB - AD = 12 - 8$

$= 4\ cm$

$\frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow \frac{8}{4} = \frac{12}{EC}$

$\Rightarrow EC = \frac{12 \times 4}{8}$

$\Rightarrow EC = \boxed{6\ cm}$

(vi) $AD = 4\ cm$
$DB = 4.5\ cm$
$AE = 8\ cm$
} given

$\frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow \frac{4}{4.5} = \frac{8}{EC}$

$\Rightarrow EC = \frac{8 \times 4.5}{4}$

$\Rightarrow EC = 9\ cm$

$AC = AE + EC = 8 + 9$

$= \boxed{17\ cm}$

(vii) $AD = 2\ cm$
$AB = 6\ cm$
$AC = 9\ cm$

$DB = AB - AD = 6 - 2 = 4\ cm$

Let AE be x

$EC = 9 - x$

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\Rightarrow \frac{2}{4} = \frac{x}{9-x}$$

$$\Rightarrow 18 - 2x = 4x$$

$$\Rightarrow 18 = 4x + 2x$$

$$\Rightarrow x = \frac{18}{6}\ 3$$

$$\Rightarrow x = 3$$

$\therefore AE = \boxed{3\ cm}$

(viii) $\frac{AD}{BD} = \frac{4}{5}$

$EC = 2.5\ cm$

} given

$$\frac{AD}{DB} = \frac{AE}{EC}$$

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

$$\Rightarrow AE = \frac{2 \times 2.5}{5}$$

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

(ix) $AD = x$

$DB = x - 2$

$AE = x + 2$

$EC = x - 1$

} given

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\Rightarrow \frac{x}{x-2} = \frac{x+2}{x-1}$$

$$\Rightarrow x^2 - x = x^2 - 4$$

$$\Rightarrow \boxed{x = 4}$$

(x) $AD = 8x - 7$
$DB = 5x - 3$
$AE = 4x - 3$
$EC = 3x - 1$
} given

$$\frac{AD}{DB} = \frac{AE}{EC}$$

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

$$\Rightarrow (8x-7)(3x-1) = (4x-3)(5x-3)$$

$$\Rightarrow 24x^2 - 8x - 21x + 7 = 20x^2 - 12x - 15x + 9$$

$$\Rightarrow 24x^2 - 20x^2 - 29x + 27x + 7 - 9 = 0$$

$$\Rightarrow 4x^2 - 2x - 2 = 0$$

$$\Rightarrow 2x^2 - x - 1 = 0$$

$$\Rightarrow 2x^2 - 2x + x - 1 = 0$$

$$\Rightarrow 2x(x-1) + 1(x-1) = 0$$

$$\Rightarrow (x-1)(2x+1) = 0$$

$x - 1 = 0$
$\boxed{x = 1}$

$2x + 1 = 0$
$\boxed{x = -\frac{1}{2}}$
(Neglected)

(xi) $AD = 4x-3$
$AE = 8x-7$
$BD = 3x-1$
$CE = 5x-3$
} given

$$\frac{AD}{DB} = \frac{AE}{EC}$$

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

$$\Rightarrow (4x-3)(5x-3) = (8x-7)(3x-1)$$

$$\Rightarrow 20x^2 - 12x - 15x + 9 = 24x^2 - 8x - 21x + 7$$

$$\Rightarrow 20x^2 - 27x + 9 = 24x^2 - 29x + 7$$

$$\Rightarrow 20x^2 - 24x^2 - 27x + 29x + 9 - 7 = 0$$

$$\Rightarrow -4x^2 + 2x + 2 = 0$$

$$\Rightarrow 2x^2 - x - 1 = 0$$

$$\Rightarrow 2x^2 - 2x + x - 1 = 0$$

$$\Rightarrow 2x(x-1) + 1(x-1) = 0$$

$$\Rightarrow (x-1)(2x+1) = 0$$

$x - 1 = 0$
$\boxed{x = 0}$

$2x + 1 = 0$
$\boxed{x = \frac{-1}{2}}$
(Neglected)

(xii) $AD = 2.5\,cm$, $BD = 3\,cm$, $AE = 3.75\,cm$ (given)

$$\frac{AD}{BD} = \frac{AE}{EC} \Rightarrow \frac{2.5}{3} = \frac{3.75}{EC} \Rightarrow EC = \frac{3.75 \times 3}{2.5}$$

$$\Rightarrow EC = \frac{11.25}{2.5} \Rightarrow EC = 4.5\,cm$$

$AC = AE + EC = 3.75 + 4.5 = \boxed{8.25\,cm}$

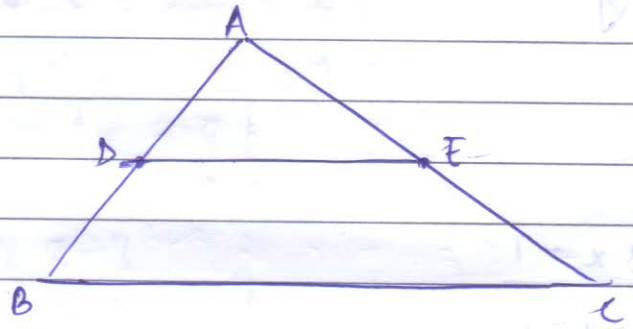
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Ch-7

Exercise 7.2

Q. 2



(i) $AB = 12\ cm$
$AD = 8\ cm$
$AE = 12\ cm$
$AC = 18\ cm$
} Given

$DB = AB - AD = 12 - 8 = 4\ cm$
$EC = AC - AE = 18 - 12 = 6\ cm$

$\frac{AD}{DB} = \frac{8}{4} = \frac{2}{1}$ —— (1)

$\frac{AE}{EC} = \frac{12}{6} = \frac{2}{1}$ —— (2)

From (1) & (2)

$\frac{AD}{DB} = \frac{AE}{EC}$

$\therefore$ $DE \parallel BC$ (By converse of BPT)

(ii) $AB = 5.6\ cm$
$AD = 1.4\ cm$
$AC = 7.2\ cm$
$AE = 1.8\ cm$
} Given

$DB = AB - AD = 5.6 - 1.4 = 4.2$ cm

$EC = AC - AE = 7.2 - 1.8 = 5.4$ cm

$\frac{AD}{DB} = \frac{1.4}{4.2} = \frac{1}{3}$ ——— (1)

$\frac{AE}{EC} = \frac{1.8}{5.4} = \frac{1}{3}$ ——— (2)

From (1) & (2),

$\frac{AD}{DB} = \frac{AE}{EC}$

$\therefore$ $DE \parallel BC$ (By the converse of BPT)

(iii) $AB = 10.8$ cm
$BD = 4.5$ cm
$AC = 4.8$ cm
$AE = 2.8$ cm
} Given

$AD = AB - BD = 10.8 - 4.5 = 6.3$ cm

$EC = AC - AE = 4.8 - 2.8 = 2$ cm

$\frac{AD}{DB} = \frac{6.3}{4.5} = \frac{7}{5}$ ——— (1)

$\frac{AE}{EC} = \frac{2.8}{2} = \frac{7}{5}$ ——— (2)

$\therefore$ From (1) & (2)

$\frac{AD}{DB} = \frac{AE}{EC}$

$\therefore$ $DE \parallel BC$ (By converse of BPT)

(iv) $AD = 5.7$ cm
$BD = 9.5$ cm
$AE = 3.3$ cm
$EC = 5.5$ cm
} Given

$$\frac{AD}{DB} = \frac{5.7}{9.5} = \frac{3}{5} \quad \text{---} (1)$$

$$\frac{AE}{EC} = \frac{3.3}{5.5} = \frac{3}{5} \quad \text{---} (2)$$

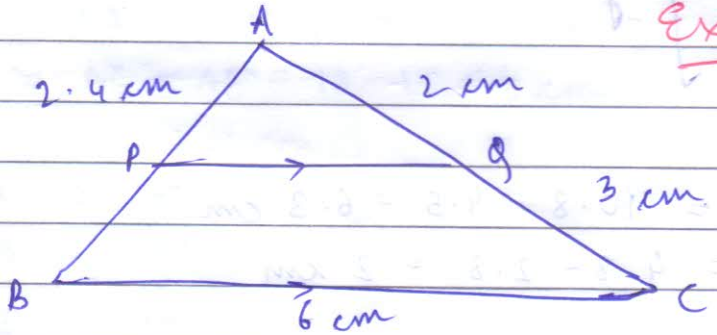
From (1) & (2)

$$\therefore \frac{AD}{DB} = \frac{AE}{EC}$$

$\therefore$ $DE \parallel BC$ (By converse of BPT)

Q.3

Ex 7.2



$PQ \parallel BC$
$AP = 2.4$ cm
$AQ = 2$ cm
$QC = 3$ cm
$BC = 6$ cm
} given

As $PQ \parallel BC$

$\therefore \frac{AP}{AB} = \frac{AQ}{QC}$ (By BPT)

$\Rightarrow \frac{2.4}{PB} = \frac{2}{3}$

$\Rightarrow PB = \frac{2.4 \times 3}{2} = \frac{7.2}{2}$

$\Rightarrow PB = 3.6 \text{ cm}$

$AB = AP + PB = 2.4 + 3.6$

$= \boxed{6 \text{ cm}}$

In ΔAPQ & ΔABC

$\angle A = \angle A$ (Common)

$\angle APQ = \angle ABC$ (Corresponding $\angle$s)

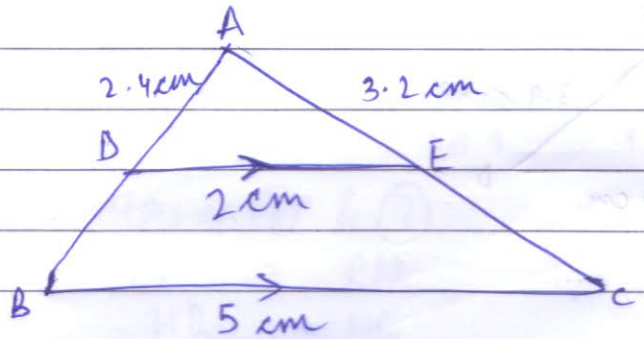
$\therefore \Delta APQ \sim \Delta ABC$ (AA similarity)

$\therefore \frac{AP}{PB} = \frac{PQ}{BC}$

$\Rightarrow \frac{2.4}{6} = \frac{PQ}{6}$

$\Rightarrow PQ = \frac{2.4 \times 6}{6}$

$\Rightarrow \boxed{PQ = 2.4 \text{ cm}}$



In ΔABC,

$DE \parallel BC$

$AD = 2.4 \text{ cm}$, $AE = 3.2 \text{ cm}$

$DE = 2 \text{ cm}$, $BC = 5 \text{ cm}$

} given

$\Rightarrow PB = \frac{2.4 \times 3}{2} = \frac{7.2}{2}$

$\Rightarrow PB = 3.6 \text{ cm}$

$AB = AP + PB = 2.4 + 3.6$

$= \boxed{6 \text{ cm}}$

In ΔAPQ & ΔABC

$\angle A = \angle A$ (Common)

$\angle APQ = \angle ABC$ (corresponding $\angle$s)

$\therefore \Delta APQ \sim \Delta ABC$ (AA similarity)

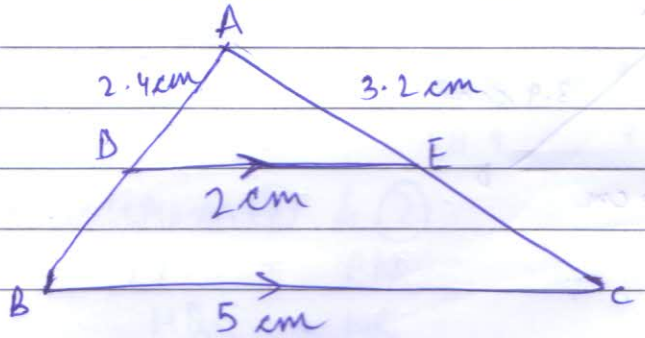
$\therefore \frac{AP}{PB} = \frac{PQ}{BC}$

$\Rightarrow \frac{2.4}{6} = \frac{PQ}{6}$

$\Rightarrow PQ = \frac{2.4 \times 6}{6}$

$\Rightarrow \boxed{PQ = 2.4 \text{ cm}}$

Q.4



In ΔABC,

$DE \parallel BC$

$AD = 2.4 \text{ cm}$, $AE = 3.2 \text{ cm}$

$DE = 2 \text{ cm}$, $BC = 5 \text{ cm}$

} Given

In $\triangle ADE$ & $\triangle ABC$,

$\angle A = \angle A$ (common)

$\angle ADE = \angle ABC$ (corresponding $\angle$s)

$\therefore \triangle ADE \sim \triangle ABC$ (AA similarity)

$\therefore \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$

$\Rightarrow \frac{2.4}{AB} = \frac{3.2}{AC} = \frac{2}{5}$

$\Rightarrow \frac{2.4}{AB} = \frac{2}{5}$

$\Rightarrow AB = \frac{2.4 \times 5}{2}$

$\Rightarrow \boxed{AB = 6 \text{ cm}}$

$DB = AB - AD = 6 - 2.4$

$= \boxed{3.6 \text{ cm}}$

$\Rightarrow \frac{3.2}{AC} = \frac{2}{5}$

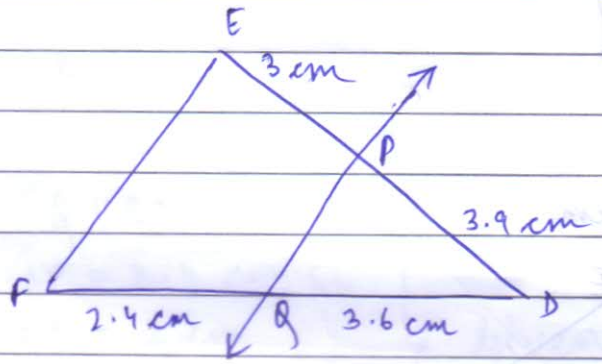
$\Rightarrow AC = \frac{3.2 \times 5}{2}$

$\Rightarrow \boxed{AC = 8.75 \text{ cm}}$

$CE = AC - AE = 8 - 3.2$

$= \boxed{4.8 \text{ cm}}$

Q. 5



In $\triangle DEF$,

$\frac{DP}{PE} = \frac{3.9}{3} = \frac{39}{30} = \frac{13}{10}$ ——— (1)

$\frac{DQ}{QF} = \frac{3.6}{2.4} = \frac{3}{2}$ ——— (2)

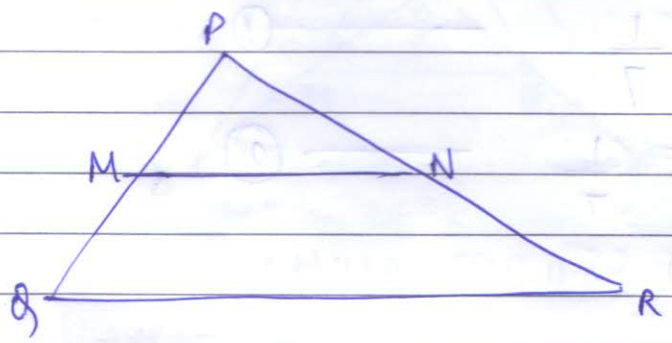
From ① & ②

$$\frac{13}{10} \neq \frac{3}{2}$$

$$\frac{DP}{PE} \neq \frac{DQ}{QF}$$

$\therefore$ PQ is not $\parallel$ ~~to~~ EF

Q6



(i) PM = 4 cm
QM = 4.5 cm
PN = 4 cm
NR = 4.5 cm
} given

In ΔPQR,

$$\frac{PM}{MQ} = \frac{4}{4.5} = \frac{4 \times 8}{4.5 \times 8} = \frac{8}{9} \quad \text{——— ①}$$

$$\frac{PN}{NR} = \frac{4}{4.5} = \frac{4 \times 8}{4.5 \times 8} = \frac{8}{9} \quad \text{——— ②}$$

From ① & ②

$$\frac{PM}{MQ} = \frac{PN}{NR}$$

$\therefore$ MN $\parallel$ QR (By converse of BPT)

(ii) PQ = 1.28 cm
PR = 2.56 cm
PM = 0.16 cm
PN = 0.32 cm
} given

$QM = PQ - PM$

$= 1.28 - 0.16$

$= 1.12 \text{ cm}$

$RN = PR - PN$

$= 2.56 - 0.32$

$= 2.24 \text{ cm}$

$\frac{PM}{MQ} = \frac{0.16}{1.12} = \frac{1}{7}$ ——— (1)

$\frac{PN}{NR} = \frac{0.32}{2.24} = \frac{1}{7}$ ——— (2)

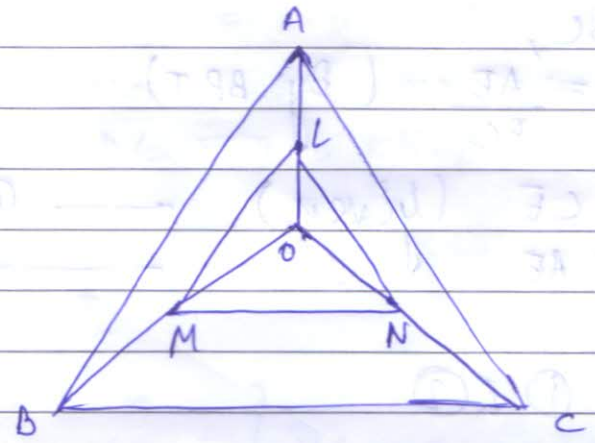
From (1) & (2)

$\frac{PM}{MQ} = \frac{PN}{NR}$

$\therefore$ $MN \parallel QR$ (By converse of BPT)

Ch-7

Exercise 7.2



Given – LM ∥ AB, MN ∥ BC

To prove – LN ∥ AC

Proof – In ΔOAB,

LM ∥ AB (Given)

$\therefore \frac{OL}{LA} = \frac{OM}{MB}$ — ① (By BPT)

Similarly, in Δ OBC,

MN ∥ BC (given)

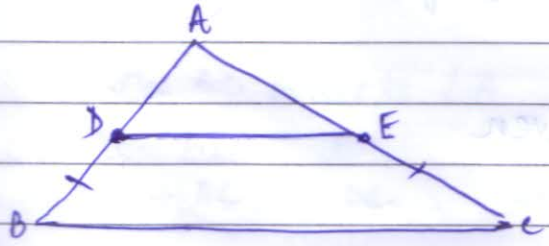
$\therefore \frac{OM}{MB} = \frac{ON}{NC}$ — ② (By BPT)

From ① & ②

$\frac{OL}{LA} = \frac{ON}{NC}$

$\therefore$ $\boxed{LN \parallel AC}$ (By converse of BPT)

Hence, proved.



Given – • $DE \parallel BC$
• $BD = CE$

To prove – $\triangle ABC$ is isosceles

Proof – In $\triangle ABC$,

$$\frac{AD}{DB} = \frac{AE}{EC} \quad \text{(By BPT)}$$

$BD = CE$ (given) —— ①

$\therefore AD = AE$ —— ②

Add ① & ②

$BD + AD = CE + AE$

$\Rightarrow \boxed{AB = AC}$

Hence, $\triangle ABC$ is an isosceles $\triangle$.