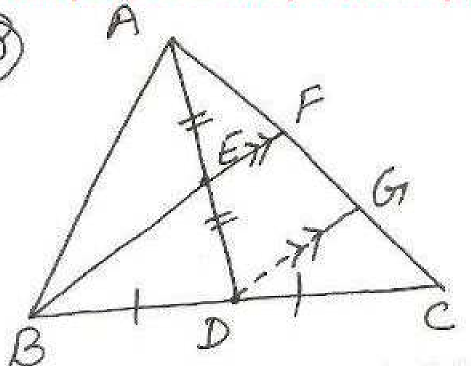
(10)



to show $AF = \frac{1}{3} AC$

const - draw $DG \parallel BF$ intersecting AC at G

proof In $\triangle ADG$, E is midpt of AD and $EF \parallel DG$

$\therefore AF = FG$ ... (i) [converse of midpt theorem]

In $\triangle FBC$, D is midpt of BC, $DG \parallel BF$

$\therefore FG = GC$ ... (ii) (do)

From (i), (ii)

$AF = FG = GC$ ... (iii)

$AC = AF + FG + GC$

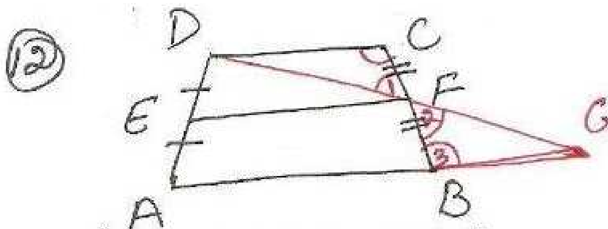
$= AF + AF + AF$

$= 3AF$

$\Rightarrow AF = \frac{AC}{3}$ ... (iv)

(11) Same as Q5. given square whose diagonals are equal and perpendicular

(12)



to prove $EF \parallel AB$

$EF = \frac{1}{2}(AB + CD)$

const - join DF and produce it to intersect AB produced at G

Proof In $\triangle CFD$ and $\triangle BFG$

$DC \parallel AB$

$\angle C = \angle 3$ (alternate interior $\angle$s)

$CF = BF$ (given)

$\angle 1 = \angle 2$ (vert. opp $\angle$s)

$\therefore \triangle CFD \cong \triangle BFG$ by ASA prop

$CD = BG$ (cpct)

EF joins midpts of sides AD and GD resp.

$\therefore EF \parallel AG$ (midpt th.)

$\Rightarrow EF \parallel AB$

$EF = \frac{1}{2} AG$ (do)

$= \frac{1}{2}(AB + BG)$

$= \frac{1}{2}(AB + CD)$

$[\because CD = BG]$

NCERT Exemplar Solutions by Dev Anoop (Bathinda)