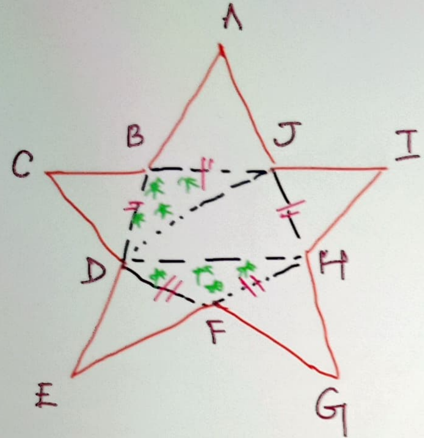
MCI – Feb



<u>Contribution:</u>

Anita → 4 cakes each of which is isosceles

Bindu → A trapezium CDHI

Anita : ΔABJ, ΔDFH, ΔDEF, ΔFHG

<u>Construction:</u> Join BD, JH, JD (apart from the given construction)

We thus divide Bindu's trapezium into 4 parts :–

$\Delta CBD + \Delta BDJ + \Delta DJH + \Delta JHI$

Now $\Delta BDJ \cong \Delta DFH$ $\Big\}$ By SAS congruency
$\angle DFH = \angle DBJ$
$BD = BJ = DF = FH$
(By property of reg. poly)

$\boxed{ar(\Delta BDJ) = ar(\Delta DFH)}$

and $DH = DJ$ (i)

thus

$\Delta CBD \cong \Delta DEF$ $\Big\}$ By SAS congruency

Now $\triangle BDJ \cong \triangle DFH$ {By SAS congruency
$\angle DFH = \angle DBJ$
$BD = BJ = DF = FH$
(By property of reg poly}

$$\boxed{ar(\triangle BDJ) = ar(\triangle DFH)} \quad (i)$$

and $DH = DJ$

thus

$\triangle CBD \cong \triangle DEF$ {By SAS congruency
$\angle BCD = \angle DEF$
$CB = CD = DE = EF$ } By properties of a regular polygon }

$$\boxed{ar(\triangle CBD) = ar(\triangle DEF)} \quad (ii)$$

Now In quadrilateral DJIH

$JI \parallel DH$ {JI is parallel to DH}

and $\angle DJI = \angle DHI$

{as In $\triangle DJH$, $\angle DJH = \angle DHJ$ as $\triangle DJH$ is isosceles with $DJ = DH$
and $\angle IJH = \angle IHJ$ as $\triangle JHI$ is isosceles by defn of the regular polygon}

thus DJIH is a parallelogram

and thus its diagonal JH divid…

polygon ; "

thus DJIH is a parallelogram and thus its diagonal JH divides the parallelogram in equal halves

thus $\triangle DJH \cong \underbrace{\triangle JIH \cong \triangle ABJ}_{\text{By property of regular poly}}$

thus $\boxed{\triangle DJH \cong \triangle ABJ}$

$\boxed{ar(\triangle DJH) = ar(\triangle ABJ)}$ — (iii)

$\boxed{\triangle JIH \cong \triangle FHG}$

By SAS congruency

$\boxed{ar(\triangle JIH) \cong ar(\triangle FHG)}$ — (iv)

Adding (i), (ii), (iii) & (iv)

$\boxed{ar(\Delta DJH) = ar(\Delta ABJ)}$ — (iii)

$\boxed{\Delta JIH \cong \Delta FHG}$

By SAS congruency

$\boxed{ar(\Delta JIH) \cong ar(\Delta FHG)}$ — (IV)

Adding (i), (ii), (iii) & (iv)

$ar(\Delta BDJ + \Delta CBD + \Delta DJH + \Delta JHI)$

$= ar(\Delta FHG + \Delta ABJ + \Delta DFH + \Delta DEF)$

$\Rightarrow ar(\text{Anita}) = ar(\text{Bindu})$

Thus Both will share half the cost

(2)