

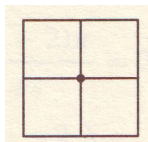
GIOCHI MATEMATICI 2008

I TAPPA – Frazioni – 13 novembre 2008

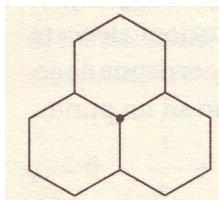
SOLUZIONI

1) Gli altri (due) casi di tipo **A** (in cui ci sono solo poligoni tutti uguali tra loro) sono:

$$1/4 + 1/4 + 1/4 + 1/4 = 1$$



$$1/3 + 1/3 + 1/3 = 1$$



Alle classi terze avevamo chiesto di spiegare perché non c'erano altre possibilità (ma anche gli studenti delle classi prime e seconde potrebbero avere questa curiosità...!):

Non ci sono altre possibilità, perché l'angolo del pentagono regolare non va bene ($3/10 \times 3 < 1$ e $3/10 \times 4 > 1$) e, per un qualunque poligono con un numero di lati maggiore di 6, l'angolo è troppo grande. Infatti anche prendendone solo 3 trovo un angolo maggiore dell'angolo giro:

$$3 \times \frac{7-2}{14} = 3 \times \frac{5}{14} = \frac{15}{14} > 1$$

$$3 \times \frac{8-2}{16} = 3 \times \frac{6}{16} = \frac{9}{8} > 1$$

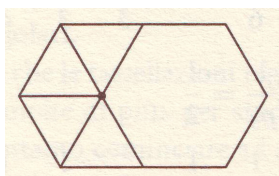
$$3 \times \frac{9-2}{18} = 3 \times \frac{7}{18} = \frac{21}{18} > 1$$

...

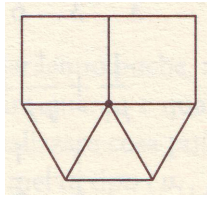
$$3 \times \frac{n-2}{2n} = \frac{3}{2} - \frac{3}{n} = 1 + \left(\frac{1}{2} - \frac{3}{n} \right) > 1, \text{ per ogni } n > 6.$$

2) Ci sono altri diciassette casi di tipo **B** (anche se non vi avevamo certo chiesto di trovarli tutti):

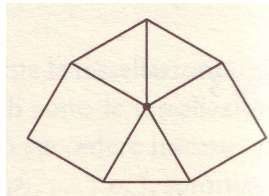
$$1/6 + 1/6 + 1/6 + 1/6 + 1/3 = 1$$



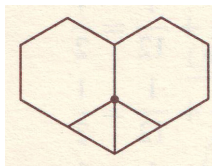
$$1/6 + 1/6 + 1/6 + 1/4 + 1/4 = 1$$



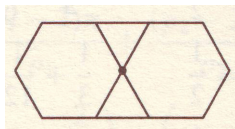
$$1/6 + 1/6 + 1/4 + 1/6 + 1/4 = 1$$



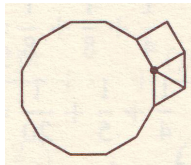
$$1/6 + 1/6 + 1/3 + 1/3 = 1$$



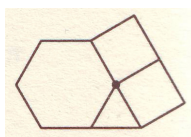
$$1/6 + 1/3 + 1/6 + 1/3 = 1$$



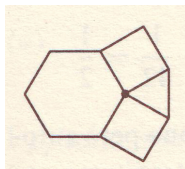
$$1/6 + 1/6 + 1/4 + 5/12 = 1$$



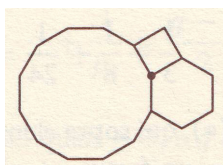
$$1/6 + 1/4 + 1/4 + 1/3 = 1$$



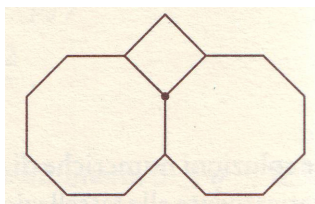
$$1/6 + 1/4 + 1/3 + 1/4 = 1$$



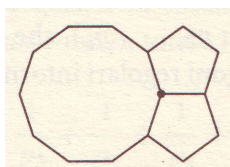
$$1/4 + 1/3 + 5/12 = 1$$



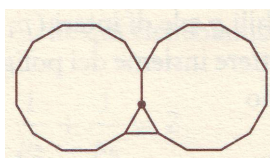
$$1/4 + 3/8 + 3/8 = 1$$



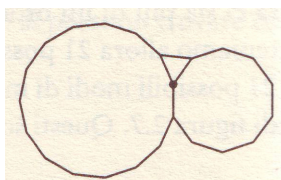
$$3/10 + 3/10 + 2/5 = 1$$



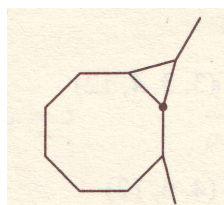
$$1/6 + 5/12 + 5/12 = 1$$



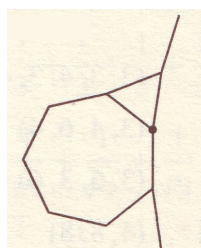
$$1/6 + 2/5 + 13/30 = 1$$



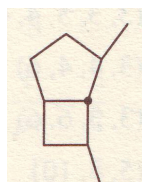
$$1/6 + 3/8 + 11/24 = 1$$



$$1/6 + 5/14 + 10/21 = 1$$



$$1/4 + 3/10 + 9/20 = 1$$



$$1/6 + 7/18 + 4/9 = 1$$

