U1 (2/2 points)

A Football is composed of several pentagons and hexagons, so it has ( ) pentagons and ( ) hexagons

please fill in the number in sequence

12

12

Answer: 12

20

20

Answer: 20

EXPLANATION

Using complement angels to figure it out:

（1）The sum of complement angels is 720°

for eache vertex of the football, it connects two hexagons and one pentagon, thus the complement angel is：

$360^\circ - (120^\circ \times 2 + 108^\circ) = 12^\circ$

so the number of vertexs is $720^\circ / 12^\circ$ = 60

and the number of pentagons is （1×60）/ 5 = 12

the number of hexagons is （2×60）/ 6 = 20

Hide Answer

You have used 1 of 4 submissions

U2 (1/2 points)

There are 4 kinds of colored beads(r, g, b, y) to seal onto the 6 vertices of a regular hexagon, how many solutions are there?

430

430

Answer: 430

if there are 2 r, 2 b, one y and one g, how many solutions are there?

Answer: 16

EXPLANATION

(1) :

No movement $(1)^6$ one situation

Rotate $\pm 60^\circ$: $(6)^1$ two situation

Rotate $\pm 120^\circ$: $(3)^2$ two situation

Rotate 180° : $(2)^3$ one situation

Made the two opposite vertexs as shaft, flip $(1)^2(2)^2$ three situation

Made the the two opposite edge center as shaft, flip : $(2)^3$ three situation

totally:

$\frac{1}{12}[4^6 + 2 \times 4 + 2 \times 4^2 + 4^3 + 3 \times 4^4 + 3 \times 4^3] = 430$

(2)generating function form of Polya theorem

$$\begin{aligned} & f(r,b,y,g) \\ & = (r+b+y+g)^6 \\ & + 2(r^6+b^6+y^6+g^6) \\ & + 2(r^3+b^3+y^3+g^3)^2 \\ & + (r^2+b^2+y^2+g^2)^3 \\ & + 3(r+b+y+g)^2(r^2+b^2+y^2+g^2)^2 \\ & + 3(r^2+b^2+y^2+g^2)^3 \end{aligned}$$

and get the coefficient of r^2b^2yg in f

$\frac{1}{12}[C(6,2)C(4,2)C(2,1) + 3 * C(2,1)C(2,1)] = 16$

Hide Answer

You have used 1 of 3 submissions

Show Discussion

New Post

EdX offers interactive online classes and MOOCs from the world's best universities. Online courses from MITx, HarvardX, BerkeleyX, UTx and many other universities. Topics include biology, business, chemistry, computer science, economics, finance, electronics, engineering, food and nutrition, history, humanities, law, literature, math, medicine, music, philosophy, physics, science, statistics and more. EdX is a non-profit online initiative created by founding partners Harvard and MIT.

Terms of Service and Honor Code

Privacy Policy (Revised 4/16/2014)

About edX

About

News

Contact

FAQ

edX Blog

Donate to edX

Jobs at edX

Follow Us

Twitter

Facebook

Meetup

LinkedIn

Google+