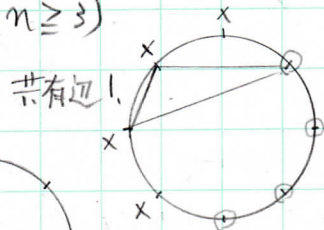


4. 正n角形の頂点を結ぶ3角形の個数

(1) 全ての個数 $\Rightarrow {}_n C_3 = \frac{1}{6} n(n-1)(n-2) \quad (n \geq 3)$

(2) 1辺のみ共有 $\Rightarrow n(n-4) \quad (n \geq 4)$



(3) 2辺共有 $\Rightarrow n \quad (n \geq 4)$

共有辺2.

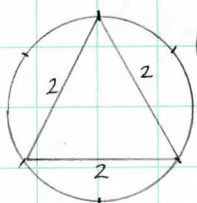


(4) 共有辺なし、即ち、対角線のみと辺とする

3角形の個数 $\Rightarrow f(n) = \text{①} - (\text{②} + \text{③}) = \frac{1}{6} n(n-4)(n-5) \quad (n \geq 6)$

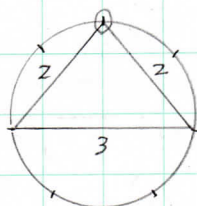
※ 実例確認

$f(6) = \frac{1}{6} \cdot 6 \cdot 2 \cdot 1 = 2$



(2,2,2型, 2)

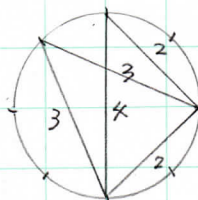
$f(7) = \frac{1}{6} \cdot 7 \cdot 3 \cdot 2 = 7$



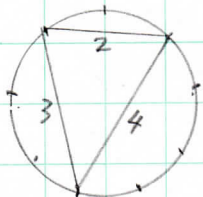
(2,2,3型, 7)

(2,2,4型 8)
(2,3,3型 8)

$f(8) = \frac{1}{6} \cdot 8 \cdot 4 \cdot 3 = 16$

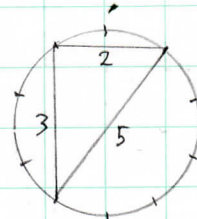


$f(9) = \frac{1}{6} \cdot 9 \cdot 5 \cdot 4 = 30$



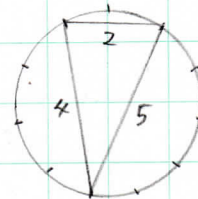
(2,2,5型: 9)
(2,3,4型: 18)
(3,3,3型: 3)

$f(10) = \frac{1}{6} \cdot 10 \cdot 6 \cdot 5 = 50$

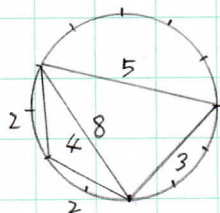


(2,2,6型: 10)
(2,3,5型: 20)
(2,4,4型: 10)
(3,3,4型: 10)

$f(11) = \frac{1}{6} \cdot 11 \cdot 7 \cdot 6 = 77$



$f(12) = \frac{1}{6} \cdot 12 \cdot 8 \cdot 7 = 112$



(2,2,8型: 12) (3,3,6型: 12)
(2,3,7型: 24) (3,4,5型: 24)
(2,4,6型: 24) (4,4,4型: 4)
(2,5,5型: 12) 計: 112

(2,2,7型: 11)
(2,3,6型: 22)
(2,4,5型: 22)
(3,3,5型: 11)
(3,4,4型: 11)