Карта сайта
Недавние изменения
Поиск

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Вход

Математический марафон

Текущие задачи

Разбор задач

Рейтинг участников

Архив Марафона

−Содержание

n-gons for n to 8

Legenda

R denotes the number of regions resulting from cutting convex polygon by all it's diagonals

Ip denotes the number of inner points in which diagonals of polygon are intersected

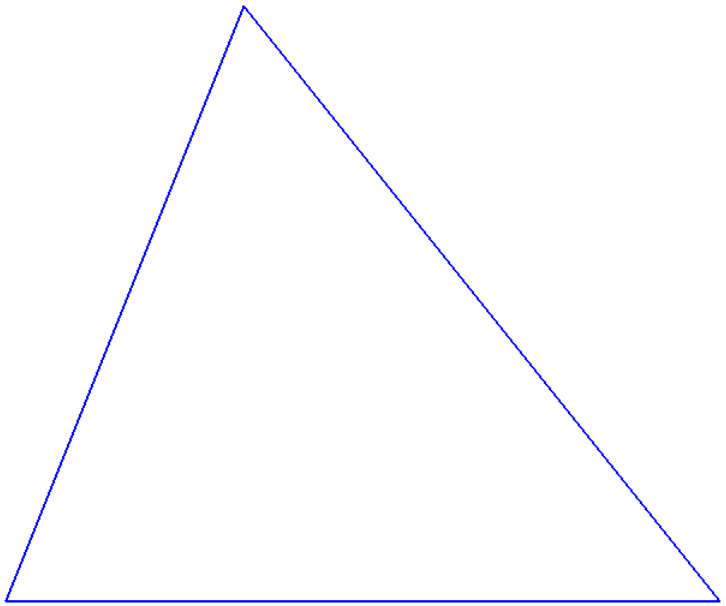
$\mathbf{s_i}$ denotes the number of inner points in which exactly **i+2** diagonals are intersected

$$R=\frac{(n-1)(n-2)\left(n^2-3n+12\right)}{24}-\frac{1}{2}\sum k(k+1)s_k$$

$$Ip=\frac{(n-1)(n-2)(n-3)(n-4)}{24}-\frac{1}{2}\sum k(k+3)s_k$$

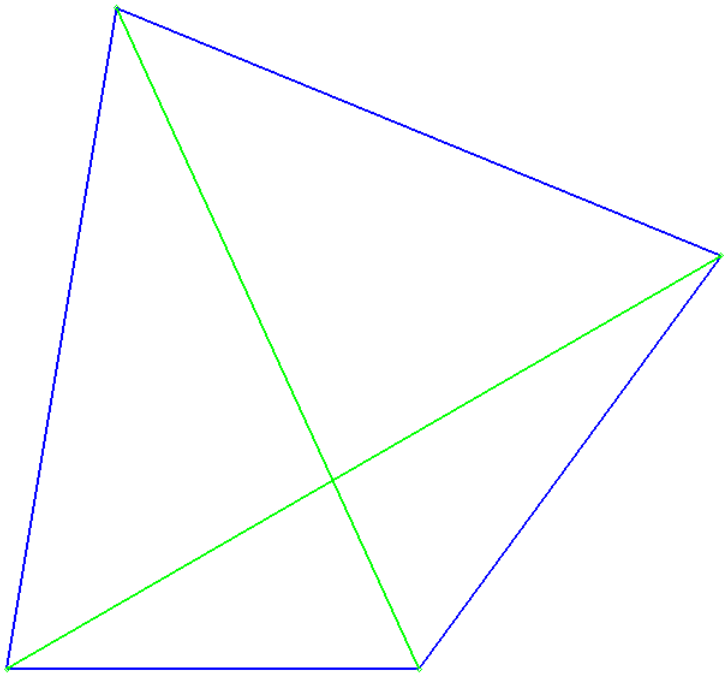
Triangle

R = 1
Ip = 0



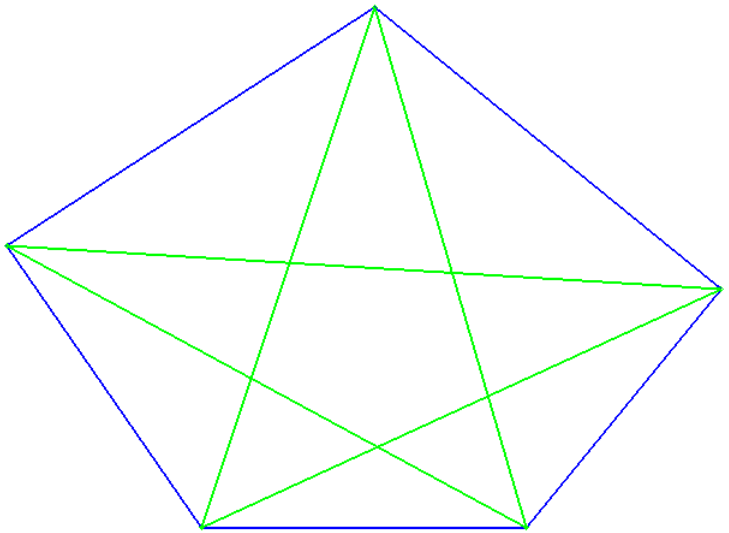
Quadrangle

R = 4
Ip = 1



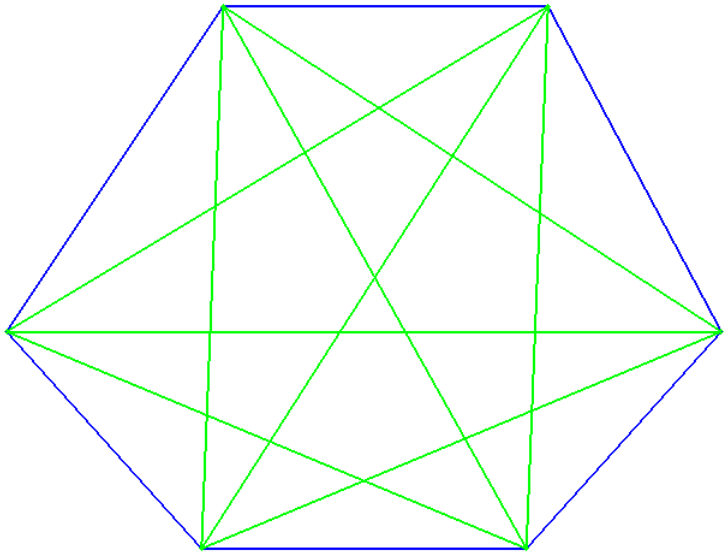
Pentagon

R = 10+0+1 = 11
Ip = 5

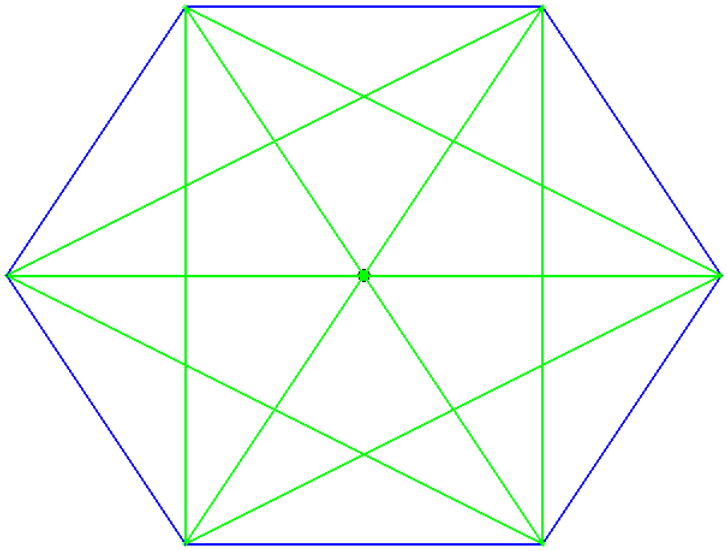


Hexagons

s_1 = 0
R = 19+3+3 = 25
Ip = 15

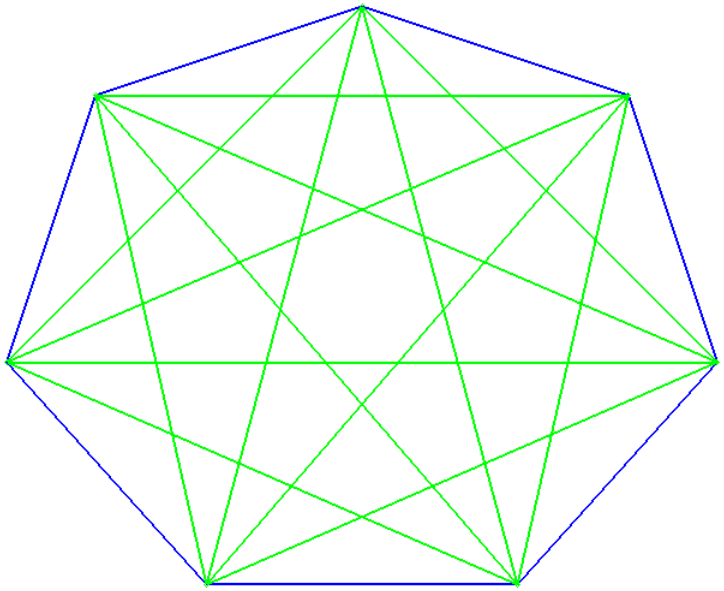


$s_1 = 1$
$R = 18 + 6 = 24$
$Ip = 15 - 1 \cdot 2 = 13$



Heptagons

s_1 = 0
R = 35+7+7+0+1 = 50 (= 33+10+6+1+0 = 32+11+7=0+0 = 31+13+6+0+0)
Ip = 35
(coordinates: [35, 0], [80, 50], [60, 110], [0, 130], [-60, 110], [-80, 50], [-35, 0])



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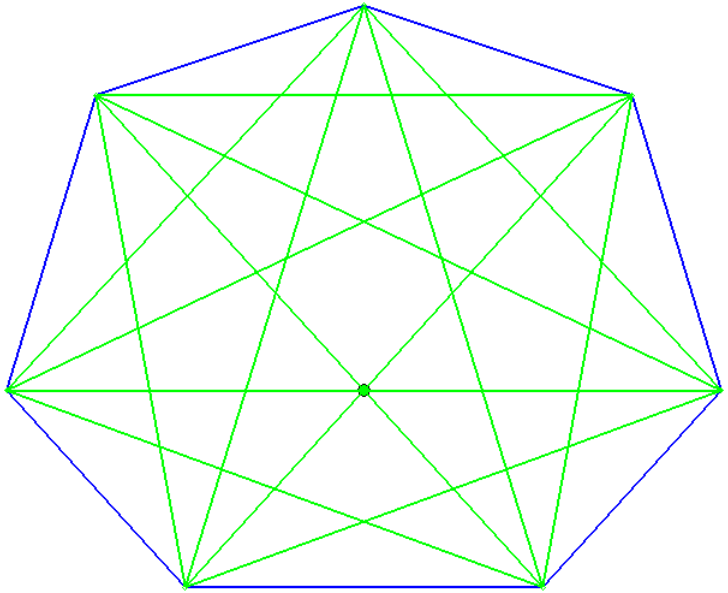
s_1 = 1
R = 34+9+5+1+0 = 49 (= 32+12+5+0+0 = 31+14+4+0+0 = 30+16+3+0+0)
Ip = 35 − 1·2 = 33
(coordinates: [35, 0], [80, 50], [60, 110], [0, 130], [−60, 110], [−80, 50], [−35, 0])



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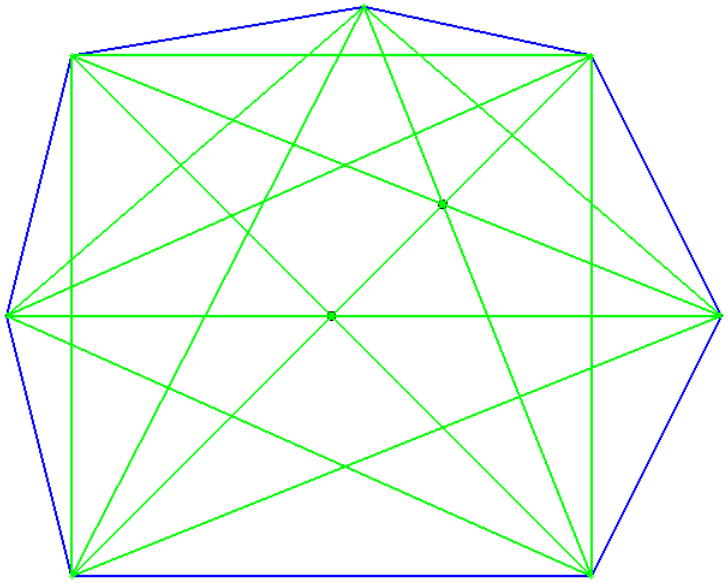
s_1 = 2
R = 33+11+4+0+0 = 48 (= 31+15+2+0+0)
Ip = 35 − 2·2 = 31
(coordinates: [120,0],[80,80],[10,95],[−80,80],[−100,0],[−80,−80],[80,−80])



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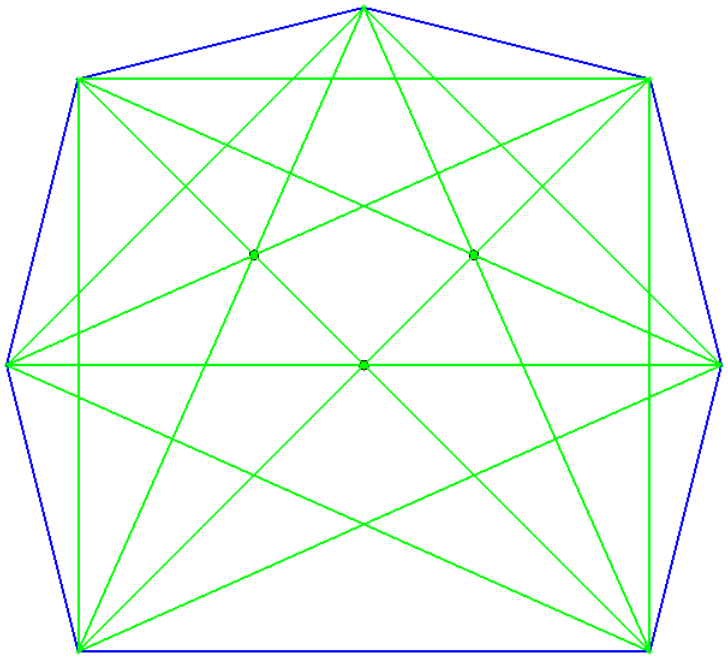
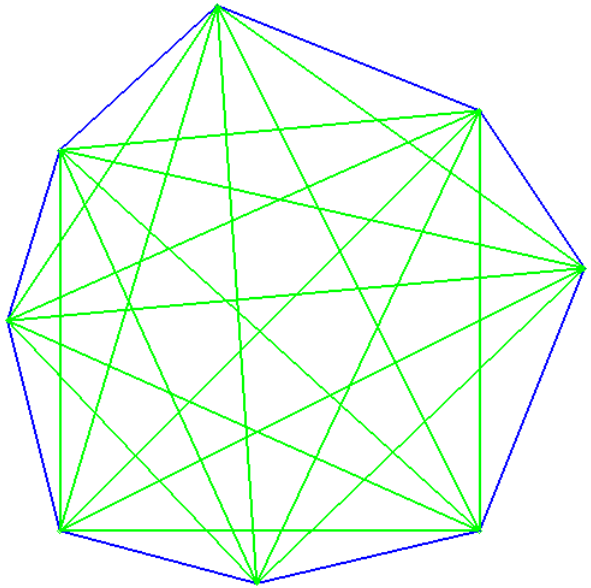
s_1 = 3
R = 32+14+1+0+0 = 47
Ip = 35 − 3·2 = 29
(coordinates: [100,0],[80,80],[0,100],[−80,80],[−100,0],[−80,−80],[80,−80])

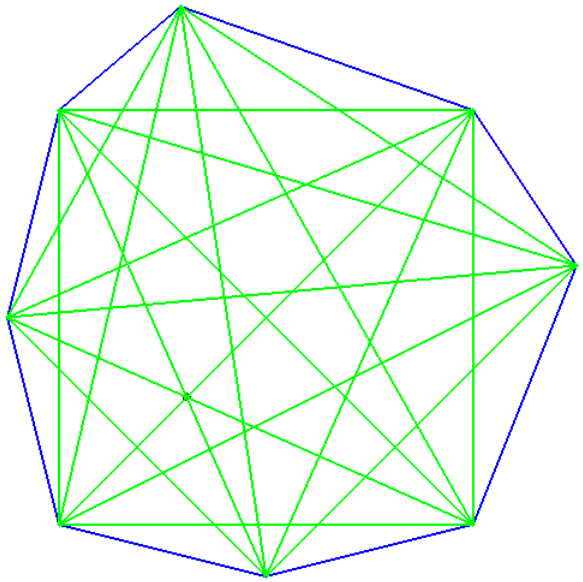


Octagons

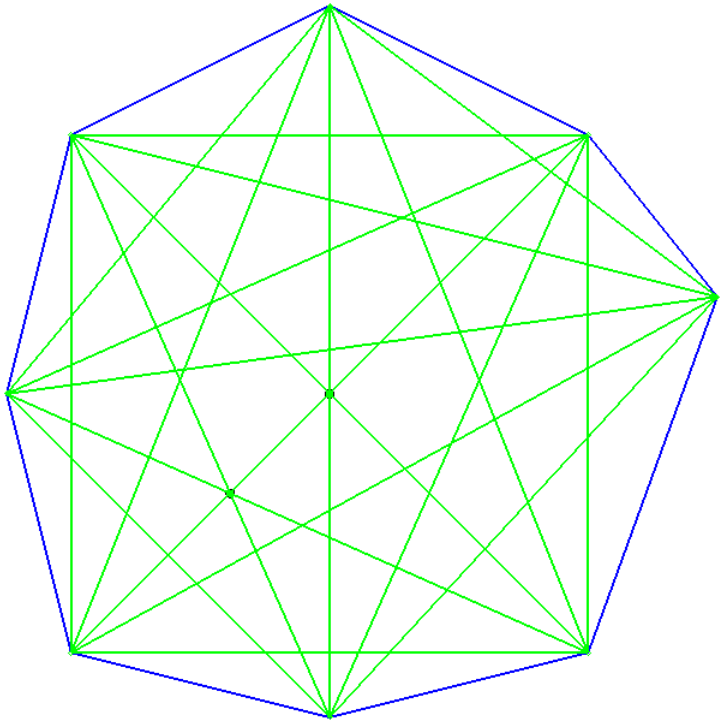
s_1 = 0, s_2 = 0
R = 91
Ip = 70
(coordinates: [120,20],[80,80],[-20,120],[-80,65],[-100,0],[-80,-80],[-5,-100],[80,-80])



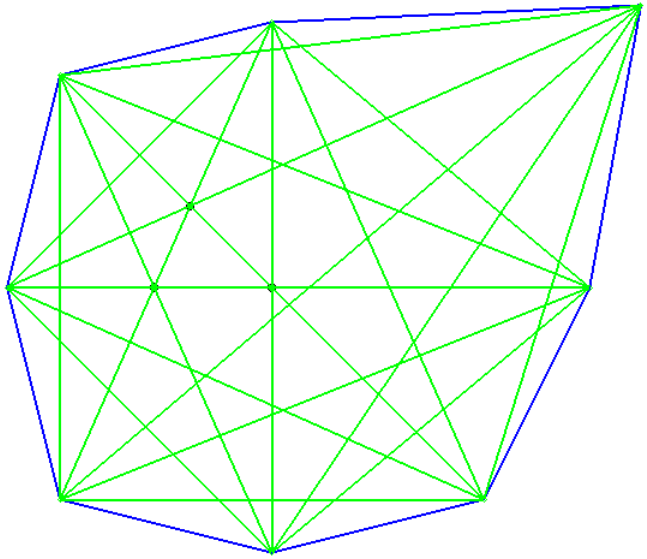
$s_1 = 1, s_2 = 0$
R = 91−1 = 90
Ip = 70−1·2 = 68
(coordinates: [120,20],[80,80],[−33,120],[−80,80],[−100,0],[−80,−80],[0,−100],[80,−80])



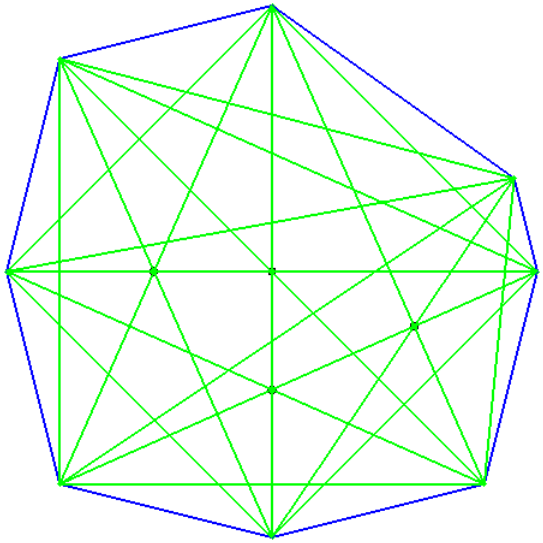
$s_1 = 2, s_2 = 0$
R = 91−2 = 89
Ip = 70−2·2 = 66
(coordinates: [120,30],[80,80],[0,120],[−80,80],[−100,0],[−80,−80],[0,−100],[80,−80])



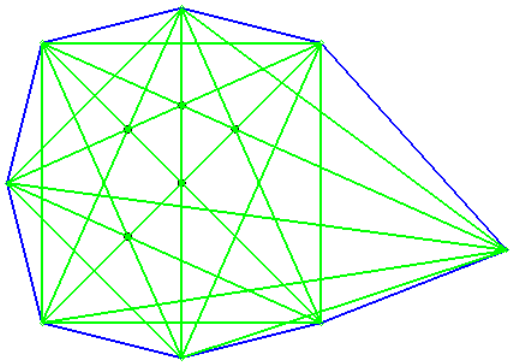
$s_1 = 3, s_2 = 0$
R = 91−3 = 88
Ip = 70−3·2 = 64
(coordinates: [120,0],[13520/97, 10320/97],[0,100],[−80,80],[−100,0],[−80,−80],[0,−100],[80,−80])



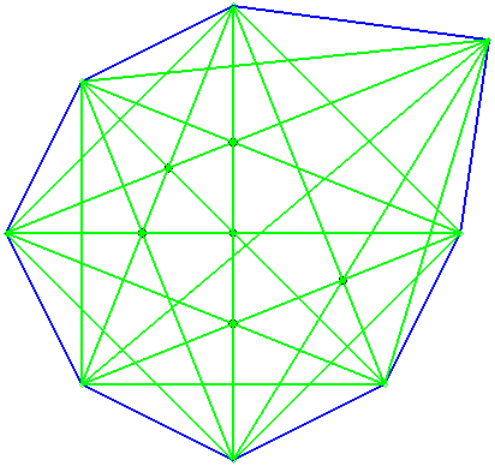
$s_1 = 4$, $s_2 = 0$
R = 91−4 = 87
Ip = 70−4·2 = 62
(coordinates: [100,0],[5200/57, 2000/57],[0,100],[−80,80],[−100,0],[−80,−80],[0,−100],[80,−80])



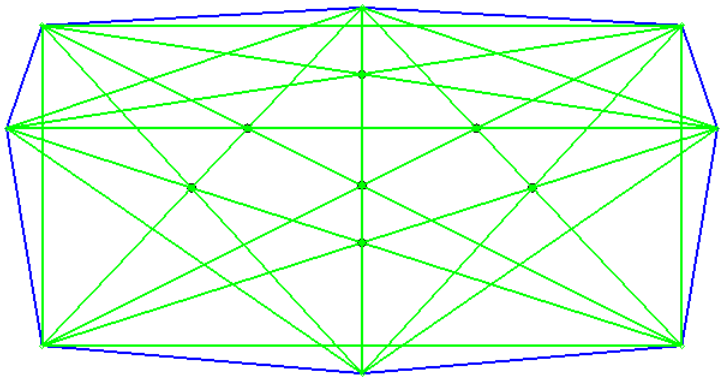
$s_1 = 5$, $s_2 = 0$
R = 91−5 = 86
Ip = 70−5·2 = 60
(coordinates: [7275/65, −300/13],[48,48],[0,60],[−48,48],[−60,0],[−48,−48],[0,−60],[48,−48])



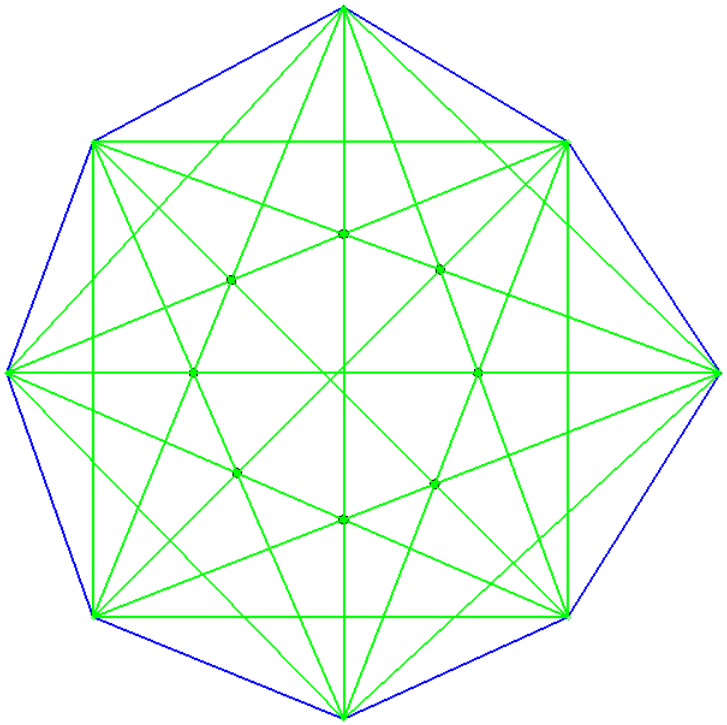
$s_1 = 6$, $s_2 = 0$
R = 91−6 = 85
Ip = 70−6·2 = 58
(coordinates: [72,0],[11760/145,8880/145],[0,72],[−48,48],[−72,0],[−48,−48],[0,−72],[48,−48])



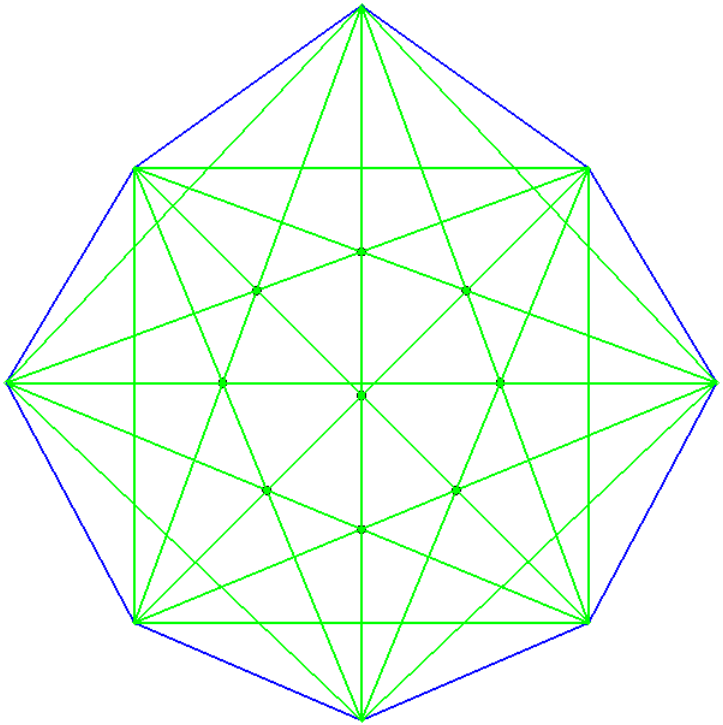
$s_1 = 7$, $s_2 = 0$
R = 91−7 = 84
Ip = 70−7·2 = 56
(coordinates: [100,225/14],[90,45],[0,50],[−90,45],[−100,225/14],[−90,−45],[0,−475/9],[90,−45])



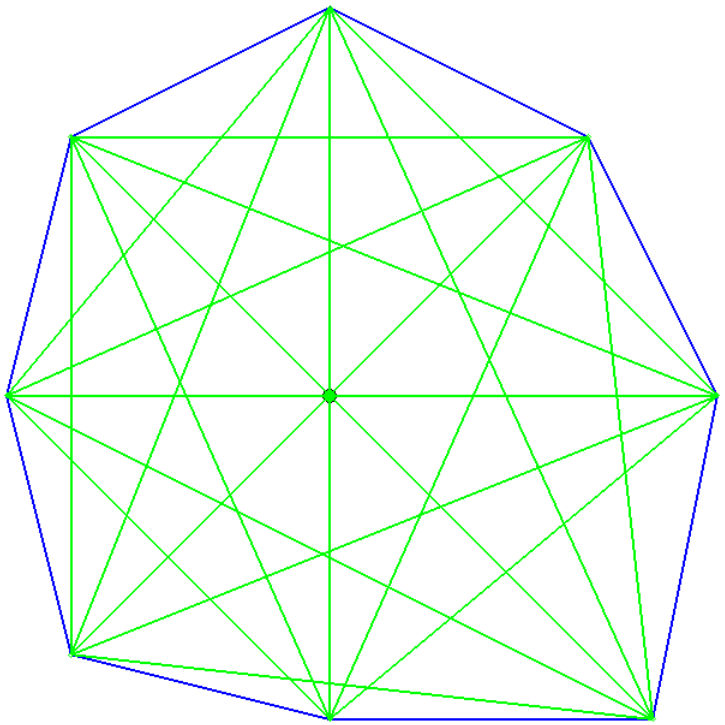
$s_1 = 8, s_2 = 0$
R = 91−8 = 83
Ip = 70−8·2 = 54
(coordinates: [[35/9, −100], [70, −70], [115, 35/18], [70, 70], [35/9, 768/7], [−70, 70], [−1815/19, 35/18], [−70, −70])



$s_1 = 9$, $s_2 = 0$
R = 91−9 = 82
Ip = 70−9·2 = 52
(coordinates: [0, −100], [70, −70], [985/9, 35/9], [70, 70], [0, 120], [−70, 70], [−985/9, 35/9], [−70, −70])



$s_1 = 0$, $s_2 = 1$
$R = 91-1 \cdot 3 = 88$
$Ip = 70-1 \cdot 5 = 65$
(coordinates: [120,0],[80,80],[0,120],[-80,80],[-100,0],[-80,-80],[0,-100],[100,-100])



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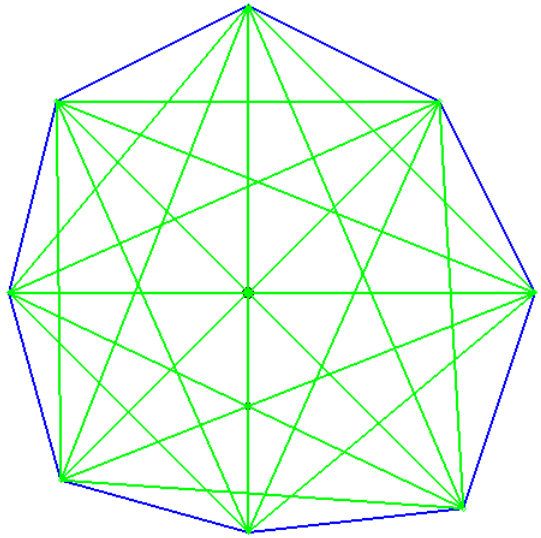
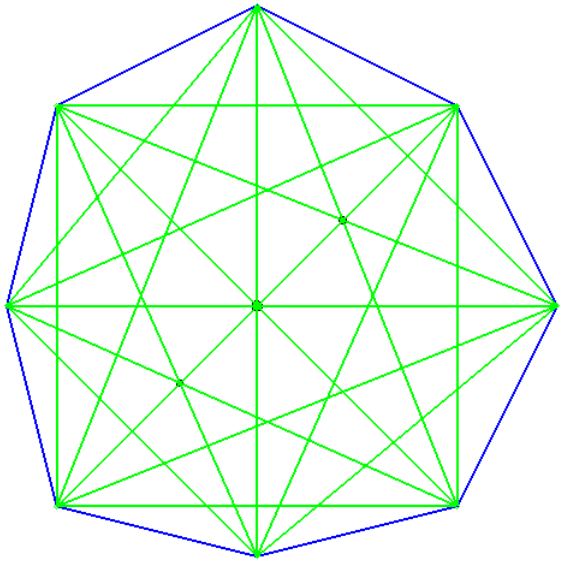
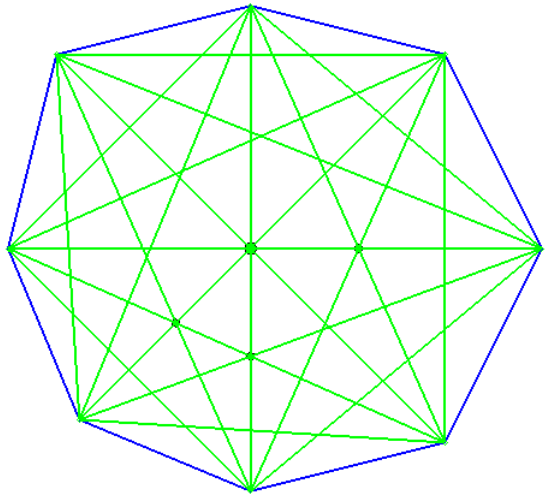
s_1 = 1, s_2 = 1
R = 91−1−1·3 = 87
Ip = 70−1·2−1·5 = 63
(coordinates: [120,0],[80,80],[0,120],[−80,80],[−100,0],[−1800/23,−1800/23],[0,−100],[90,−90])



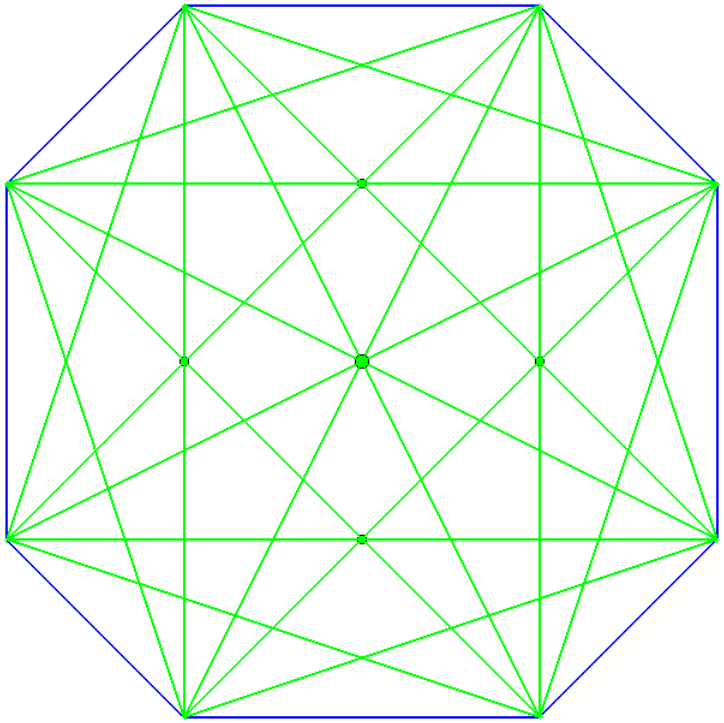
$s_1 = 2, s_2 = 1$
$R = 91-2-1 \cdot 3 = 86$
$Ip = 70-2 \cdot 2-1 \cdot 5 = 61$
(coordinates: [120,0],[80,80],[0,120],[-80,80],[-100,0],[-80,-80],[0,-100],[80,-80])



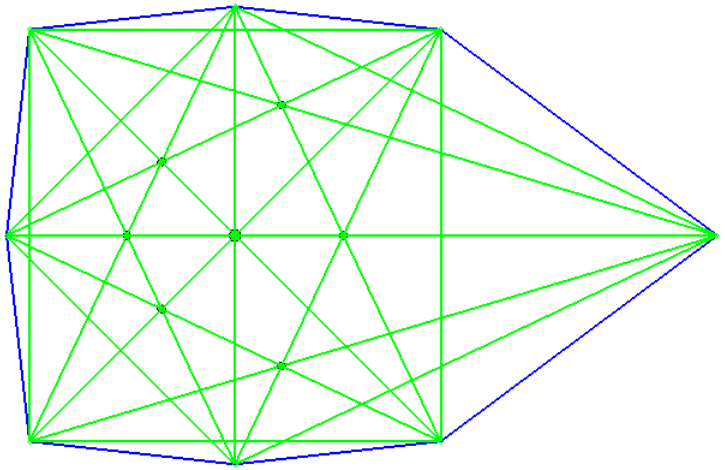
$s_1 = 3, s_2 = 1$
$R = 91-3-1 \cdot 3 = 85$
$Ip = 70-3 \cdot 2-1 \cdot 5 = 59$
(coordinates: [120,0],[80,80],[0,100],[-80,80],[-100,0],[-1200/17,-1200/17],[0,-100],[80,-80])



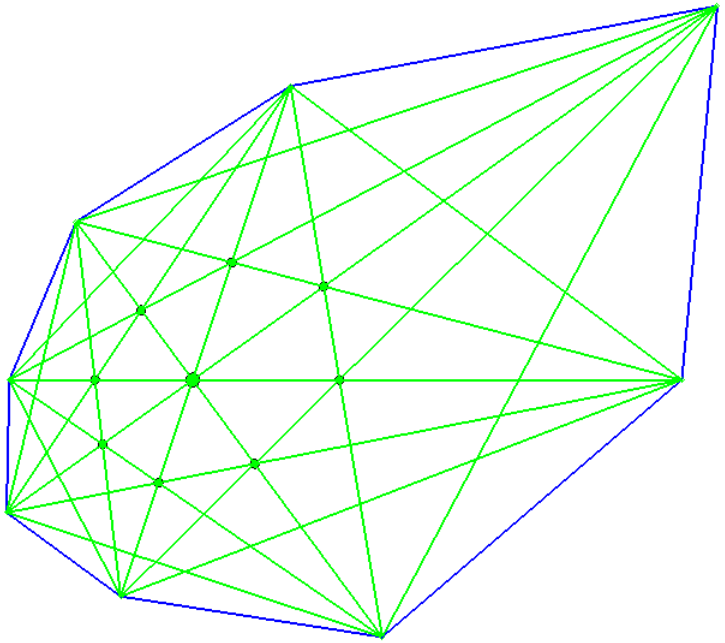
$s_1 = 4, s_2 = 1$
$R = 91-4-1 \cdot 3 = 84$
$Ip = 70-4 \cdot 2-1 \cdot 5 = 57$
(coordinates: [10,-20],[20,-10],[20,10],[10,20],[-10,20],[-20,10],[-20,-10],[-10,-20])



$s_1 = 6, s_2 = 1$
R = 91−6−1·3 = 82
Ip = 70−6·2−1·5 = 53
(coordinates: [1900/9,0],[90,90],[0,100],[−90,90],[−100,0],[−90,−90],[0,−100],[90,−90])



$s_1 = 8$, $s_2 = 1$
R = 91−8−1·3 = 80
Ip = 70−8·2−1·5 = 49
(coordinates: [100,0],[1180/11,840/11],[20,60],[−310/13,420/13],[−75/2,0],[−1180/31,−840/31],[−280/19,−840/19],[155/4,−105/2])



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