

$$\begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \end{matrix}$$

جهان را با جابجایی می‌کنیم

$$2a = 3 \Rightarrow a = \frac{3}{2} \quad \Rightarrow \quad \frac{3}{2}n^2 + bn + c = 0$$

$$\frac{3}{2} + b = 1 \Rightarrow b = -\frac{1}{2} \Rightarrow t_n = \frac{3}{2}n^2 - \frac{1}{2}n \Rightarrow t_{10} = \frac{3}{2} \times 100 - \frac{1}{2} \times 10 = 145$$

شکل n مقدار مثلث های تشکیل شده برابر $0 + 1 + 2 + \dots + (n-1)$ است
پس تعداد این مثلث ها $(\frac{n-1}{2})(1+n-1)$ است

آنگاه $n(n-1) = 11 \times 10 = 110$ پس در شکل زیر هر یک از مثلث های تشکیل شده را در نظر بگیرید

الکتری که در هر یک از این مثلث ها قرار دارد

$$t_n = 4n + 1 \Rightarrow t_{11} = 4 \times 11 + 1 = 45$$

الکتری که در هر یک از این مثلث ها قرار دارد

$$t_n = 11n - 3 \Rightarrow t_{11} = 11 \times 11 - 3 = 121 - 3 = 118$$

اگر n فرد باشد $(-1)^n = -1$
اگر n زوج باشد $(-1)^n = +1$

$$\frac{(-1)^2}{2} = \frac{1}{2} \Rightarrow \frac{1}{2} - (-1) = \frac{3}{2} = 1.5$$

$b_3 = (-3)^3 = -27$
 $b_k = a_3 \Rightarrow -4k + 22 = -27 \Rightarrow k = 14$

6	$q_0 - a_1 = 12 \Rightarrow (a_1 + 7d) - (a_1 + 4d) = 12$ $\Rightarrow 3d = 12 \Rightarrow d = 4$ $a_2 - a_1 = 3 \Rightarrow (a_1 + 4d) - a_1 = 3 \Rightarrow 4d = 3$
7	$a_2 = a_1 + d = 7$ $a_3 = a_1 + 2d = 10$ $\Rightarrow a_n = 3n - 1$ $b_1 = a_1 = 7$ $a_n = a_1 + (n-1)d = 7 + (n-1)4 = 4n - 1$
8	$a_n = \frac{2n-1}{n+1} \Rightarrow \int \frac{2n-1}{n+1} = \int \frac{2(n+1)-2}{n+1} = \int \frac{2(n+1)}{n+1} - \int \frac{2}{n+1}$ $= 2n - 2 \ln(n+1) + C$ $a_1 = 1 \Rightarrow 2(1) - 2 \ln(2) + C = 1 \Rightarrow C = 1 - 2 \ln(2)$ $a_n = 2n - 2 \ln(n+1) + 1 - 2 \ln(2)$
9	$\frac{2n-1}{n+1} < \frac{3}{2} \Rightarrow \frac{2n-1}{n+1} < \frac{3}{2} \Rightarrow 2(2n-1) < 3(n+1) \Rightarrow 4n-2 < 3n+3 \Rightarrow n < 5$ $n = 1, 2, 3, 4$
10	$a_1 = 1, a_2 = 2, a_3 = 3, a_4 = 4, a_5 = 5, a_6 = 6, a_7 = 7, a_8 = 8, a_9 = 9, a_{10} = 10$ $d = 1$ $a_n = 1 + (n-1)1 = n$
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$$a_1 - a_n = 12 \Rightarrow (a_1 + 7d) - (a_1 + 4d) = 12$$

$$\Rightarrow 3d = 12 \Rightarrow d = 4$$

$$a_2 - a_1 = 3 \Rightarrow (a_1 + 4d) - a_1 = 3 \Rightarrow 4d = 3$$