Tarea

$9x^3 - 60x^2 + 112x - 64$

Grado 3

$a_n = \pm 1, \pm 3, \pm 9$

$a_0 = \pm 1, \pm 2, \pm 4, \pm 8, \pm 16, \pm 32, \pm 64$

Posibles Raices:

$\pm 64, \pm 32, \pm \frac{64}{3}, 16, \frac{32}{3}, 8, \frac{16}{3}, \frac{8}{3}, 2, \frac{4}{3}, 1, \frac{2}{3}, \frac{4}{9}, \frac{1}{3}, \frac{1}{9}$

$\frac{16}{9}$ $\frac{8}{9}$ $\frac{2}{9}$

	9	-60	112	-64
-64		-576	-608	
	9	636	-524	
$-\frac{64}{3}$		-192	5376	
	9	-252	5488	
-32		-288	11136	
	9	-348		
-16		-144	3264	
	9	-204		
$-\frac{32}{3}$		-96	1664	
	9	-156		
-8		-72	1856	
	9	-132		
$-\frac{64}{9}$		-64	$\frac{7936}{9}$	
	9	-124		
16		-48	576	
	9	-108		
-4		-36	384	
	9	-96	496	
$-\frac{32}{9}$		-32	$\frac{320}{9}$	
	9	-92		
$-\frac{8}{3}$		-24	224	
	9	-86		
-2		-18	1156	
	9	-78		
$-\frac{16}{9}$		-16	133	
	9	-76		
$-\frac{4}{3}$		-12		
	9	-72		
-1		-9	-64	-43
	9	-69	43	
4		36	-96	64
	9	-24	16	0 →
4		36	-96	
	9	-24	16	
$\frac{4}{3}$		12	-64	

	9	-24	16 0
$\frac{4}{3}$		12	-16
	9	-12	0
$\frac{4}{3}$		12	
	9	0	

$x_1 = 4$

$x_2 = \frac{4}{3}$

$x_3 = \frac{4}{3}$

$\frac{1}{8}(8x^4 - 20x^3 - 86x^2 + 173x + 105)$

Grado 4

a_0: 1, 3, 5, 7, 15, 21, 35, 105

a_n: ±1, ±2, ±4, ±8

$\frac{1}{1}, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{3}{1}, \frac{3}{2}, \frac{3}{4}, \frac{3}{8}$

$\frac{5}{1}, \frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \frac{7}{1}, \frac{7}{2}, \frac{7}{4}, \frac{7}{8}$

$\frac{15}{1}, \frac{15}{2}, \frac{15}{4}, \frac{15}{8}, \frac{21}{1}, \frac{21}{2}, \frac{21}{4}, \frac{21}{8}$

$\frac{35}{1}, \frac{35}{2}, \frac{35}{4}, \frac{35}{8}, \frac{105}{1}, \frac{105}{2}, \frac{105}{4}, \frac{105}{8}$

-105	8	-20	-86	173	105
		-840	90300		
	8	-860			
-3		-24	+132	-138	-105
	8	-44	46	35	0 → ahora utilizamos este
		-24	204	-750	
-3	8	-68	250	-715	
		-4	24	-35	
$-\frac{1}{2}$	8	-48	70	0 → utilizamos este	
		-4	26		
$-\frac{1}{2}$	8	-52	96		
		20	-10 → utilizamos este		
$\frac{5}{2}$	8	-28	0		
		20			
	8	-8			
		28			
	8	0			

$x_1 = -3$

$x_2 = -\frac{1}{2}$

$x_3 = \frac{5}{2}$

$x_4 = \frac{7}{2}$

$\frac{4}{9}x^3 - \frac{56x^2}{9} + \frac{80x}{3} - 32$

$4x^3 - 56x^2 + \frac{80(3)(3)}{3}x - 32(3)$

$4x^3 - 56x^2 + 240x - 288$

$a_n: \pm 1, \pm 2, \pm 4$

$a_0: 1, \pm 2, \pm 3, \pm 6, \pm 12, \pm 16, \pm 32, \pm 48, \pm 96, \pm 288$

$a_n: 1, \pm 2, \pm 4, 1$

Raices

$\frac{1}{1}, \frac{1}{2}, \frac{1}{4}, \frac{2}{1}, \frac{2}{2}, \frac{2}{4}, \frac{3}{1}, \frac{3}{2}, \frac{3}{4}, \frac{6}{1}, \frac{6}{2}, \frac{6}{4}, \frac{12}{1}, \frac{12}{2}, \frac{12}{4}, \frac{16}{1}, \frac{16}{2}, \frac{16}{4}, \frac{24}{1}, \frac{24}{2}, \frac{24}{4}, \frac{32}{1}, \frac{32}{2}, \frac{32}{4}, \frac{48}{1}, \frac{48}{2}, \frac{48}{4}, \frac{96}{1}, \frac{96}{2}, \frac{96}{4}$

-96	4	-56	+240	-288	
		-384	-42240		
	4	440			
1		4	-52	188	
	4	-52	188	92	
2		8	-96	288	
	4	-48	144	0	→ utilizar esta
2		8	-80		
	4	-40			
3		12	-108		
	4	-36			
5		20	-140		
	4	-16	4		
		24	-144		
6	4	-24	0		→ utilizar esta
1		24			
6	4	0			

$x_1 = 2$

$x_2 = 6$

$x_3 = 6$

Grado 7

$x^7 - 8x^6 - 10x^5 + 104x^4 + 105x^3$

$x^3(x^4 - 8x^3 - 10x^2 + 104x + 105) = 0$

$a_n = \pm 1$

$a_0 = 1, 3, 5, 7, 15, 21, 35, 105$

$x^3 = 0$

$x = 0$

$x^4 - 8x^3 - 10x^2 + 104x + 105 = 0$

$\frac{1}{1}, -\frac{1}{1}, \frac{3}{1}, -\frac{3}{1}, \frac{5}{1}, -\frac{5}{1}, \frac{7}{1}, -\frac{7}{1}, \frac{15}{1}, -\frac{15}{1}, \frac{21}{1}, -\frac{21}{1}, \frac{35}{1}, -\frac{35}{1}, \frac{105}{1}, -\frac{105}{1}$

105 | 1 -8 -10 104 105

105 1015 105

1 97 1015 1

-3 33 -69 -105

-3 | 1 -11 23 35 0 → utilizaremos esta

-3 42 -195

-3 | 1 -14 65

-1 12 -35

1 | 1 -12 35 0 → utilizaremos esta

-1 13

1 | 1 -13 48

5 -35

1 | 1 -7 0 → utilizaremos esta

7

1 | 1 0

$x_1 = 0$

$x_2 = -3$

$x_3 = -1$

$x_4 = 7$

$x^6 - 6x^5 + 15x^4 - 20x^3 + 15x^2 - 6x + 1$

Grado 6

$a_n = 1$

$a_0 = \pm 1$

$x_1, x_2 \ldots x_6 = 1$

+1	1	-6	+15	-20	+15	-6	+1
		1	-5	10	-10	5	-1
	1	-5	10	-10	5	-1	0
+1		1	-4	6	-4	1	
	1	-4	6	-4	1	0	
1		1	-3	3	-1		
	1	-3	3	-1	0		
1		1	-2	1			
	1	-2	1	0			
1		1	-1				
	1	-1	0				
1		1					
	1	0					

$x^5 + x^4 - 15x^3 - 25x^2 + 14x + 24$

Grado 5

$a_0 = \pm 1, \pm 2, \pm 3, \pm 4, \pm 8, \pm 12, \pm 24$

$a_n = \pm 1$

$\frac{1}{1}, \frac{2}{1}, \frac{3}{1}, \frac{4}{1}, \frac{8}{1}, \frac{12}{1}, \frac{24}{1}$

	1	1	-15	-25	14	24
-3		-3	6	27	-6	-24
	1	-2	-9	2	8	0
-3		-3	15	-18		
	1	-5	6	-16		
		-2	8	2	-8	
-2	1	-4	-1	4	0	
		2	-4	+10		
-2	1	-2	-5			
		-1	5	-4		
-1	1	-5	4	0		
		-1	6			
-1	1	-6				
		1	-4			
1	1	-4	0			
		1				
1	1					
	1	4				
4	1	6				

$x_1 = -3$

$x_2 = -2$

$x_3 = -1$

$x_4 = 1$

$x_5 = 4$

$x^4 - 16x^3 + 96x^2 - 256x + 256$

Grado 4

$a_n = \pm 1$

$a_0, \pm 1, \pm 2, \pm 4, \pm 8, \pm 16, \pm 32, \pm 64, \pm 128, \pm 256$

$\frac{1}{1}, \frac{2}{1}, \frac{4}{1}, \frac{8}{1}, \frac{16}{1}, \frac{32}{1}, \frac{64}{1}, \frac{256}{1}$

	1	-16	96	-256	256
		-8	192	-2304	
-2	1	-24	288		
		-4	+80	-704	
-4	1	-20	176	-960	
		4	-48	192	-256
4	1	-12	48	-64	0
		4	-32	64	
4	1	-8	16	0	
		4	-16		
4	1	-4	0		
		4			
4	1	0			

$x_1 = 4$

$x_2 = 4$

$x_3 = 4$

$x_4 = 4$