

Tarea

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

-64	9	-60	112	-64
		-576	-628	
-64/3	9	676	-524	
		-192	5376	
-32	9	-252	5488	
		-288	11136	
-16	9	-348		
		-144	3264	
-32/3	9	-204		
		-96	1064	
-8	9	-156		
		-72	1056	
-64/9	9	-132		
		-64	2986	
16/9	9	-124		
		-48	576	
-4	9	-108		
		-36	384	
-32/9	9	-96	496	
		-32	322	
-8/3	9	-92		
		-26	224	
-2	9	-86		
		-18	1156	
16/9	9	-78		
		-16	153	
-4/3	9	-72		
		-12		
-1	9	-69	43	
		-9	-69	-43
4	9	-69	43	
		36	-96	64
4	9	-24	16	0 →
		36	-96	
4/3	9	-24	16	
		12	-64	

Grade 3

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

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

Posibles Raices

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

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

$$\begin{array}{r|rrrr} 4/3 & 9 & -24 & 16 & 0 \\ & & 12 & -16 & \\ \hline & 9 & -12 & 0 & \\ & & 12 & & \\ \hline & 9 & 0 & & \end{array}$$

$$x_1 = 4$$

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

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

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

$$\begin{array}{r} 8 - 20 - 86 - 173 - 105 \\ -105 \\ \hline 8 - 860 \end{array}$$

$$\begin{array}{r} -3 \\ 8 - 24 + 132 - 158 - 105 \end{array}$$

$$\begin{array}{r} 8 - 44 + 46 - 35 - 0 \rightarrow \text{ahora} \\ -24 + 204 - 750 \end{array}$$

Utilizamos este

$$\begin{array}{r} -3 \\ 8 - 68 + 204 - 715 \end{array}$$

$$\begin{array}{r} -\frac{1}{2} \\ 8 - 48 + 70 - 0 \rightarrow \text{utilizamos este} \\ -4 + 26 \end{array}$$

$$\begin{array}{r} -\frac{1}{2} \\ 8 - 52 + 96 \end{array}$$

$$\begin{array}{r} \frac{5}{2} \\ 20 - 70 \rightarrow \text{utilizamos este} \\ \hline 8 - 28 - 0 \end{array}$$

$$\begin{array}{r} \frac{5}{2} \\ 20 \\ \hline 8 - 8 \\ 28 \\ \hline 8 - 0 \end{array}$$

Grado 4

$$q_0 = 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99$$

$$\begin{array}{l} \frac{1}{1}, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}, \frac{1}{11}, \frac{1}{12}, \frac{1}{13}, \frac{1}{14}, \frac{1}{15}, \frac{1}{16}, \frac{1}{17}, \frac{1}{18}, \frac{1}{19}, \frac{1}{20}, \frac{1}{21}, \frac{1}{22}, \frac{1}{23}, \frac{1}{24}, \frac{1}{25}, \frac{1}{26}, \frac{1}{27}, \frac{1}{28}, \frac{1}{29}, \frac{1}{30}, \frac{1}{31}, \frac{1}{32}, \frac{1}{33}, \frac{1}{34}, \frac{1}{35}, \frac{1}{36}, \frac{1}{37}, \frac{1}{38}, \frac{1}{39}, \frac{1}{40}, \frac{1}{41}, \frac{1}{42}, \frac{1}{43}, \frac{1}{44}, \frac{1}{45}, \frac{1}{46}, \frac{1}{47}, \frac{1}{48}, \frac{1}{49}, \frac{1}{50}, \frac{1}{51}, \frac{1}{52}, \frac{1}{53}, \frac{1}{54}, \frac{1}{55}, \frac{1}{56}, \frac{1}{57}, \frac{1}{58}, \frac{1}{59}, \frac{1}{60}, \frac{1}{61}, \frac{1}{62}, \frac{1}{63}, \frac{1}{64}, \frac{1}{65}, \frac{1}{66}, \frac{1}{67}, \frac{1}{68}, \frac{1}{69}, \frac{1}{70}, \frac{1}{71}, \frac{1}{72}, \frac{1}{73}, \frac{1}{74}, \frac{1}{75}, \frac{1}{76}, \frac{1}{77}, \frac{1}{78}, \frac{1}{79}, \frac{1}{80}, \frac{1}{81}, \frac{1}{82}, \frac{1}{83}, \frac{1}{84}, \frac{1}{85}, \frac{1}{86}, \frac{1}{87}, \frac{1}{88}, \frac{1}{89}, \frac{1}{90}, \frac{1}{91}, \frac{1}{92}, \frac{1}{93}, \frac{1}{94}, \frac{1}{95}, \frac{1}{96}, \frac{1}{97}, \frac{1}{98}, \frac{1}{99} \end{array}$$

$$x_1 = -3$$

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

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

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

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

$$4x^3 - 56x^2 + 80(3)(x) - 32(9)$$

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

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

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

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

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	
		8	-96	288	
2	4	-48	144	0	utilizar csc
		8	-80		
2	4	-40			
		12	-108		
3	4	-36			
		20	-140		
5	4	-26	4		
		24	-144		
6	4	-24	0		utilizar csc
		24			
6	4	0			

$$x_1 = 2$$

$$x_2 = 6$$

$$x_3 = 6$$

Grado 4

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

$$X^3(X^4 - 8x^3 - 10x^2 + 104x + 105) = 0 \quad a_n = \pm 1$$

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

$$x^3 = 0$$

$$x = 0$$

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

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

105		1	-8	-10	104	105	
			105	10185			
		1	97	10175			
			-3	33	-69	-105	
-3		1	-11	23	33	0	→ utilizaras etc
			-3	42	-195		
-3		1	-14	65			
			-1	12	-35		
1		1	-12	35	0		→ utilizaras etc
			-1	13			
1		1	-13	48			
			5	-35			
1		1	-7	0			→ utilizaras etc
			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

$$a_n = 1$$

$$a_0 = \pm 1$$

$$x_1, x_2, \dots, x_6 = 1$$

$$\begin{array}{r|rrrrrr} +1 & 1 & -6 & +15 & -20 & +15 & -6 & +1 \\ & & 1 & -5 & 10 & -10 & 5 & -1 \\ \hline & 1 & -5 & 10 & -10 & 5 & -1 & 0 \\ +1 & & 1 & -4 & 6 & -4 & 1 & \\ \hline & 1 & -4 & 6 & -4 & 1 & 0 & \\ 1 & & 1 & -3 & 3 & -1 & & \\ \hline & 1 & -3 & 3 & -1 & 0 & & \\ 1 & & 1 & -2 & 1 & & & \\ \hline & 1 & -2 & 1 & 0 & & & \\ 1 & & 1 & -1 & & & & \\ \hline & 1 & -1 & 0 & & & & \\ 1 & & 1 & & & & & \\ \hline & 1 & 0 & & & & & \end{array}$$

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

Grado 5

$$a_0 = \pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 8, \pm 12, \pm 24$$

$$a_n = \pm 1$$

$$\frac{1}{1}, \frac{2}{1}, \frac{3}{1}, \frac{4}{1}, \frac{6}{1}, \frac{8}{1}, \frac{12}{1}, \frac{24}{1}$$

$$\begin{array}{r|rrrrrr} -3 & 1 & 1 & -15 & -25 & 14 & 24 \\ & & -3 & 6 & 27 & -6 & -24 \\ \hline & 1 & -2 & -9 & 2 & 8 & 0 & 4 \\ -3 & & -3 & 15 & -18 & & & \\ \hline & 1 & -5 & 6 & -16 & & & \\ -2 & & -2 & 8 & 2 & -8 & & \\ \hline & 1 & -4 & -1 & 4 & 0 & & * \\ & & 2 & -4 & +10 & & & \\ -2 & & 1 & -2 & -5 & & & \\ & & & -1 & 5 & -4 & & \\ \hline & 1 & -5 & 4 & 0 & & & 4 \\ -1 & & -1 & 6 & & & & \\ \hline & 1 & -6 & & & & & \\ -1 & & 1 & -4 & & & & \\ \hline & 1 & -4 & 0 & & & & 4 \\ 1 & & 1 & & & & & \\ \hline & 1 & 4 & & & & & \\ 4 & & 1 & 6 & & & & \end{array}$$

$$x_1 = -3$$

$$x_2 = -2$$

$$x_3 = -1$$

$$x_4 = 1$$

$$x_5 = 4$$

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

$$\begin{array}{r|rrrrrr}
 & 1 & -16 & 96 & -256 & 256 & \\
-3 & & -8 & 192 & -2304 & & \\
\hline
-3 & 1 & -24 & 288 & & & \\
-4 & & -4 & 480 & -704 & & \\
\hline
4 & 1 & -20 & 176 & -960 & & \\
4 & & 4 & -48 & 192 & -256 & \\
\hline
4 & 1 & -12 & 48 & -64 & 0 & \\
4 & & 4 & -32 & 64 & & \\
\hline
4 & 1 & -8 & 16 & 0 & & \\
4 & & 4 & -16 & & & \\
\hline
4 & 1 & -4 & 0 & & & \\
4 & & 4 & & & & \\
\hline
1 & 1 & 0 & & & & 
\end{array}$$

Grado 4

$$a_n \pm 1$$

$$a_n, \pm 1, \pm 2, \pm 4, \pm 8, \pm 16, \pm 32, \pm 64$$

$$\pm 128, \pm 256$$

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

$$\frac{256}{1}$$

$$x_1 = 4$$

$$x_2 = 4$$

$$x_3 = 4$$

$$x_4 = 4$$