Solving Cubic Equations in Excel

For this example let the polynomial be

$f(x) = 4x^3 - 386x^2 + 9222x - 49140 = 0$

Write the coefficients in cells B2 to B5

	A	B
1		
2	A	4
3	B	-386
4	C	9222
5	D	-49140
6		

Write 3 in cell F2 (will be the increment of x) (when necessary this value should be changed)

E	F
dx	3
x	f(x)
0	=$B$2*E4^3+$B$3*E4^2+$B$4*E4+$B$5
=E4+$F$2	=$B$2*E5^3+$B$3*E5^2+$B$4*E5+$B$5

Write 0 in cell E4

Write down the equation in cell E5

=E4+$F$2

Write down the equation in cell F4

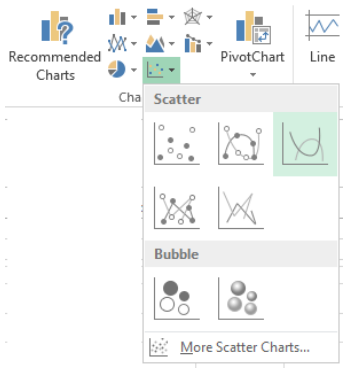
=$B$2*E4^3+$B$3*E4^2+$B$4*E4+$B$5

Copy cell F4 to F5

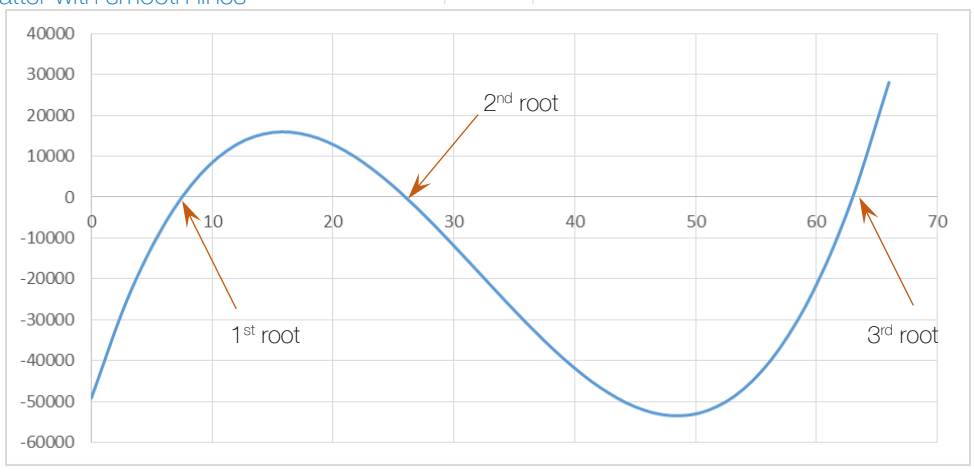
Copy cells E5: F5 to E30:F30 (or you can drag and drop)

Select cells E4:F30

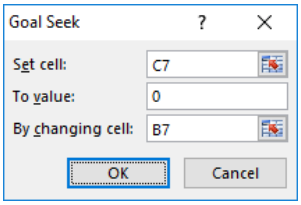
Plot the polynomial and estimate where the roots

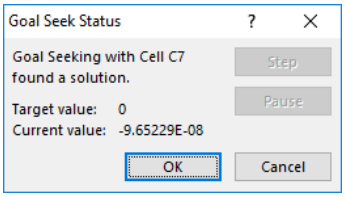


Insert→Scatter with smooth lines



The roots are between 0-10, 20-30 and 60-70. The third root is 63 and can be seen in cell E25.
Copy cells E4: F4 and paste to B7:C7
Select cell C7
Data→What if Analysis → Goal Seek
Set Cell C7
To Value 0
By changing cell B7 and click OK
The first root is found as 7.5





Write 20 in cell B7 (the second root is between 20-30)
Select cell C7
Data→What if Analysis → Goal Seek
Set Cell C7
To Value 0
By changing cell B7 and click OK
The second root is found as 26

Write 60 in cell B7 (the third root is between 60-70)
Select cell C7
Data→What if Analysis → Goal Seek
Set Cell C7
To Value 0
By changing cell B7 and click OK
The third root is found as 63