

BEFORE WE START...

Resetting your graphing calculators:

(The "MEMORY" menu is located at 2nd → +)

RAM ARCHIVE ALL
1:All RAM...
2:Defaults...

RESET RAM
1:No
2:Reset

Resetting RAM erases all data and Programs from RAM.

TI-84 Plus Silver Edition
2.21

RAM cleared

Section 6.1 – Polynomial Functions

Polynomial Functions

You can classify a polynomial by the number of terms it contains. A polynomial of more than three terms does not usually have a special name. You can also classify a polynomial by its degree. The **degree of a polynomial** is the greatest degree of any term of the polynomial. The name assigned to each degree is listed below.

Degree	Name Using Degree	Polynomial Example	Number of Terms	Name Using Number of Terms
0	constant	6	1	monomial
1	linear	$x + 3$	2	binomial
2	quadratic	$3x^2$	1	monomial
3	cubic	$2x^3 - 5x^2 - 2x$	3	trinomial
4	quartic	$x^4 + 3x^2$	2	binomial
5	quintic	$-2x^5 + 3x^2 - x + 4$	4	polynomial of 4 terms

Section 6.1 – Polynomial Functions

Graphs of Polynomial Functions

Graphs of Polynomial Functions

Linear function Degree 1	Quadratic function Degree 2	Cubic function Degree 3	Quartic function Degree 4	Quintic function Degree 5

Section 6.1 – Polynomial Functions

Find a cubic model for each function. Then use your model to estimate the value of y when x = 17.

a. (10, 0), (11, 121), (12, 288), (13, 507)

b. (10, 500), (14, 588), (16, 512), (20, 0)

Section 6.1 – Polynomial Functions

Enter the data into a graphing calculator, then use the CubicReg option to find the model that fits the data points.

Use the "STAT" button, then choose "1:Edit"

Put "x" values in the "L1" column, "y" values in "L2".

L1	L2	L3
10	0	
11	121	
12	288	
13	507	

CubicReg

$y = ax^3 + bx^2 + cx + d$

a=1
b=-10
c=5.41E-9
d=-2.05E-8
R²=1

Section 6.1 – Polynomial Functions

Go back into "STAT" and this time, choose "CALC". We want to use a cubic model, so choose option #6: "CubicReg".

Note: If your calculator does not show the "R²" value, you may need to go into "CATALOG" (2nd → 0) and turn "DiagnosticOn".

CATALOG
DependAsk
DependAuto
det()
DiagnosticOff
DiagnosticOn
d1nx
Disp

The closer "R²" is to 1, the better that model fits the data set.

Section 6.1 – Polynomial Functions



Find a cubic model for each function. Then use your model to estimate the value of y when $x = 17$.

- a. $(10, 0), (11, 121), (12, 288), (13, 507)$

Fill in the values of “a”, “b”, “c”, etc, that the calculator gives you:

$$f(x) = x^3 - 10x^2$$

To estimate the value of the function at 17, plug in 17 for “x”:

$$f(17) = (17)^3 - 10(17)^2 = \underline{\hspace{2cm}}$$

- b. $(10, 500), (14, 588), (16, 512), (20, 0)$

Section 6.1 – Polynomial Functions

Simplify. Classify each result by number of terms.

35. $(7x^2 + 8x - 5) + (9x^2 - 9x)$

40. $(-a^2 - 3) - (3a - a^2 - 5)$

44. $(-3x^3 + 7x^2 - 8) - (-5x^3 + 9x^2 - 8x + 19)$

Section 6.1 – Polynomial Functions

Find each product. Classify the result by number of terms.

47. $5x^2(6x - 2)$

55. $(s + 3)(4s - 1)(3s + 7)$

Section 6.2 – Polynomials and Linear Factors

Writing a Polynomial in Standard Form

Write $(x + 1)(x + 2)(x + 3)$ in standard form.

Section 6.2 – Polynomials and Linear Factors

Writing a Polynomial in Factored Form

Write $2x^3 + 10x^2 + 12x$ in factored form.

Factor out the GCF

Section 6.2 – Polynomials and Linear Factors

Finding Zeros of a Polynomial Function

Find the zeros of $y = (x - 2)(x + 1)(x + 3)$.

Theorem

Factor Theorem

The expression $x - a$ is a linear factor of a polynomial if and only if the value a is a zero of the related polynomial function.

Section 6.2 – Polynomials and Linear Factors

Writing a Polynomial Function From its Zeros

Write a polynomial function in standard form with zeros at $-2, 3,$ and 3 .

$f(x) =$ ↓ ↓ ↓ **ZEROS**
 Write a linear factor for each zero.
 Multiply

Section 6.2 – Polynomials and Linear Factors

Writing a Polynomial Function From its Zeros

Write a polynomial function in standard form with zeros at $-4, -2,$ and 0 .

ZEROS
 Write a linear factor for each zero.
 Multiply

Section 6.2 – Polynomials and Linear Factors


Finding the Multiplicity of a Zero

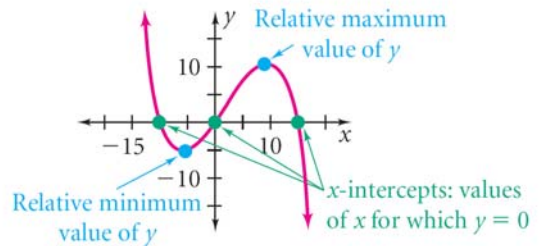
Find the zeros of each function. State the multiplicity of multiple zeros.

29. $y = (x + 3)^3$


34. $y = (x - 2)^2(x - 1)$

Section 6.2 – Polynomials and Linear Factors

 Relative minimum/maximum, and zeros of a polynomial function.




Section 6.2 – Polynomials and Linear Factors

 Find the relative minimum/maximum, and zeros of each function.

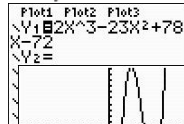
47. $y = 2x^3 - 23x^2 + 78x - 72$

49. $y = 8x^3 - 10x^2 - x - 3$

Section 6.2 – Polynomials and Linear Factors

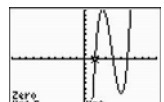
 Graph the function, then use CALC (2^{nd} → TRACE) to find the zeros, minimum, and maximum.

47. $y = 2x^3 - 23x^2 + 78x - 72$



Use TRACE or the TABLE (2^{nd} → GRAPH) to find the integer zeros (x-intercepts)

X	Y1
4	15
8	0
9	7
33	33



Use the ZERO function – option 2 under CALC (2^{nd} → TRACE) to find the other zeros.
 Use options 3 and 4 for the min/max values.

