

Polynomial Functions - Engaging Resources

RF SO7 - Polynomial Functions Concept Summary Sheet

(Download: [Polynomials Concept Map.pdf](#))

This chart may help students see the big picture and the connections within the topic.




POLYNOMIALS

Characteristics from Graph

Determine characteristics by analyzing a graph:

- x and y intercepts
- turning points
- local maximum / minimum
- absolute maximum / minimum
- Domain and Range
- y when x is known
- x when y is known
- start and end quadrant

Types of Polynomials

- Linear $y = ax + b$ 
- Quadratic $y = ax^2 + bx + c$ 
- Cubic $y = ax^3 + bx^2 + cx + d$ 

Graph Equations and Analyze


Use Graphing Calculator to graph given equations and analyze them:

- Enter Equation and Graph
↳ $Y =$, **GRAPH**
- Adjust Window Settings
↳ **WINDOW** Use context and **TABLE** to help choose window settings.
- Determine y when x is known
↳ **CALC**, **1: Value**, $X = \square$
- Determine x when y is known
↳ $Y_2 = \square$, **CALC**, **5: INTERSECT**
- Determine y-intercept
↳ Determine y when $x = 0$ using C.
- Determine x-intercept
↳ Determine x when $y = 0$ using D.
- Determine maximums / minimums
↳ **CALC**, **2: minimum**, **3: maximum**


Modelling

Solve problems by modelling a scenario with an equation. Determine equation using the following methods:

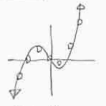
- Regression with Graphing Calculator
 - Enter Data into Lists **STAT**, **1: Edit**
 - Turn Plot 1 On and Graph (adjust window settings as needed)
 - Determine Regression Equation
↳ **STAT**, **CALC**, select regression...
 - Graph Regression Equation
↳ $Y =$, **VARS**, **5: Statistics**, EQ menu, **1: RegEQ**
- Determine an equation from the description of the problem.



LinReg (ax+b)



QuadReg



Cubic Reg

RF SO7 - Sketching Polynomials Assignment

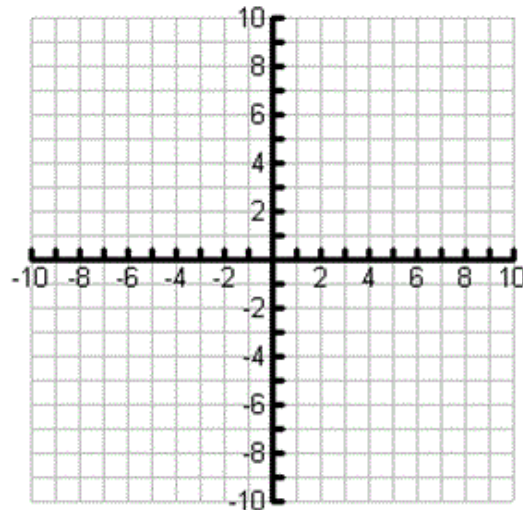
(Download: [Sketching Polynomials Assignment.docx](#))

This assignment allows students to improve familiarity with the appearance, vocabulary and characteristics of linear, quadratic and cubic functions. Students need to sketch a graph based on given criteria and then state some characteristics of the graph they drew.

1. Draw the sketch of a continuous function that has no x-intercepts, one turning point and a y-intercept of -3.

State the following for your graph:

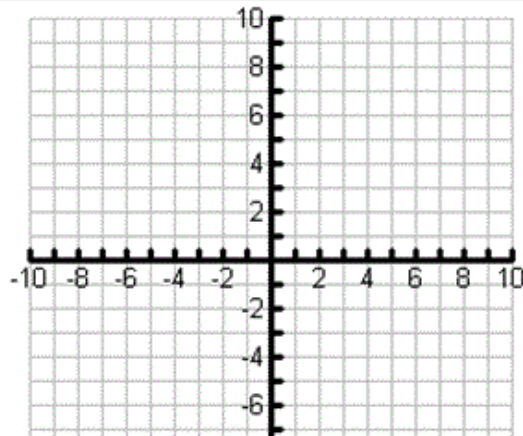
- a) Absolute Maximum: _____
b) Domain: _____
c) Range: _____



2. Draw the sketch of a continuous function that starts in quadrant III and ends in quadrant I, has no turning points, a Domain of $[-4, 6]$ and a Range of $[-3, 2]$.

State the following for your graph:

- a) The x-intercept is: _____.
b) The y-intercept is: _____.



RF SO6-8 - Calculator Instructions Sheets

(Download: [Calculator Instructions Sheets.docx](#))

The first page provides instructions on how to graph a given equation and then solve problems related to the equation. The second page provides instructions on how to perform regression to determine an equation for a line or curve of best fit.

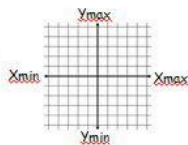
GRAPH AND ANALYZE FUNCTIONS WITH A GRAPHING CALCULATOR

A. Enter Equation and Graph

- Press $\boxed{Y=}$ and enter equation.
- Press $\boxed{\text{GRAPH}}$

B. Adjust Window Settings

- Press $\boxed{\text{WINDOW}}$ to adjust the window settings as needed.
- x:[Xmin, Xmax, Xscl] y:[Ymin, Ymax, Yscl]



Note: Use the table of values, $\boxed{\text{TABLE}}$, and context of the problem to help choose window settings. $\boxed{\text{TBLSET}}$ will help you navigate the table of values.

C. Determine y when x is known

- Press $\boxed{\text{CALC}}$ then $\boxed{1:\text{value}}$ and enter the known x-value into X=___ and press $\boxed{\text{ENTER}}$.
- or
- Press $\boxed{\text{TABLE}}$ and scroll through the table to find the y-value for the known x-value.

D. Determine x when y is known

- Press $\boxed{Y=}$ and set $Y_2 =$ known value of y, then $\boxed{\text{GRAPH}}$.
- Press $\boxed{\text{CALC}}$ then $\boxed{5:\text{intersect}}$ and follow the calculator directions to determine the intersection point.

E. Determine y-intercept

- Determine y when x = 0 using the instructions in section C.

F. Determine x-intercept

- Determine x when y = 0 using the instructions in section D.

G. Determine maximums / minimums

- Press $\boxed{\text{CALC}}$ then either $\boxed{3:\text{minimum}}$ or $\boxed{4:\text{maximum}}$ and follow the calculator directions to determine the maximum or minimum value.

REGRESSION EQUATIONS WITH A GRAPHING CALCULATOR

The graphing calculators have a feature that performs statistical analysis of data to determine an equation for a line or curve of best fit. This line or curve of best fit is called a regression function.

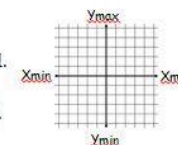
regression function: A line or curve of best fit, developed through a statistical analysis of data.

A. Enter Data into Lists

- Press $\boxed{\text{Stat}}$ then $\boxed{1:\text{Edit}}$ and enter values for the independent variable (x) in L₁ and values for the dependent variable (y) in L₂.

B. Turn Plot1 On and Graph

- Press $\boxed{Y=}$ and use the arrow keys to move to highlight Plot1. Press $\boxed{\text{ENTER}}$ to turn Plot 1 on. It should now be dark.
- Press $\boxed{\text{WINDOW}}$ to adjust the window settings as needed. and then $\boxed{\text{GRAPH}}$.
- x:[Xmin, Xmax, Xscl] y:[Ymin, Ymax, Yscl]



C. Identify Type of Polynomial

- Use the data points on your scatter plot and the context to decide which type of polynomial would best fit the data.

D. Determine Regression Equation

- Press $\boxed{\text{STAT}}$ and use the right arrow key to go to the CALC menu.
- From the CALC menu select the regression type ... $\boxed{4:\text{LinReg(ax+b)}}$ or $\boxed{5:\text{QuadReg}}$ or $\boxed{6:\text{CubicReg}}$ etc.
- The main screen should appear with your chosen regression type. Press $\boxed{\text{ENTER}}$ to calculate the regression equation.

E. Graph Regression Equation

- Send regression equation to Y₁ by pressing $\boxed{Y=}$.
- With the cursor in Y₁ do the following:
 - $\boxed{\text{VAR}}$, $\boxed{5:\text{Statistics}}$, right arrow key to EQ menu, $\boxed{1:\text{RegEQ}}$
- Equation should now be in Y₁ so press $\boxed{\text{GRAPH}}$.