

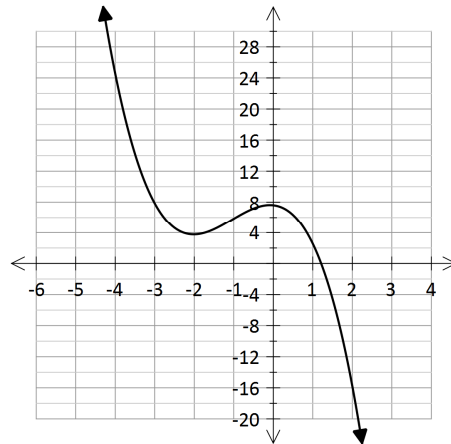
Applied Math 40S

Name _____

Functions Hand-In Assignment 1 (Polynomials)

Complete the following questions in the spaces provided. Show all work where possible (*including calculator functions used*). If rounding is necessary, round final answer to *two decimal places*.

- Examine the graph shown below and then fill in the table below the graph with the requested information.

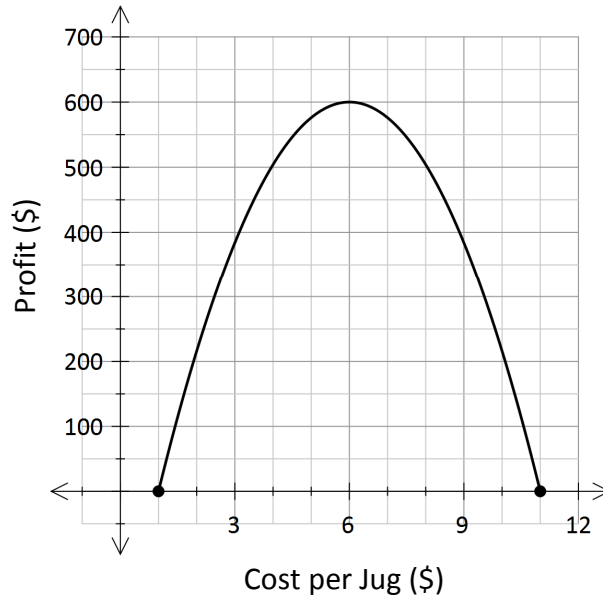


Degree	# of Turning Points	Value of y -int.	Value(s) of x -int(s)	Domain	Range	End Behaviour

- Use your graphing calculator to graph the following functions, and then fill in the requested information for each function.

Equation	Degree	# of Turning Points	Value of y -int.	Value(s) of x -int(s)	Domain	Range	End Behaviour
$y = -x^3 + 2x^2 + 3x - 4$							
$y = \frac{1}{7}x - 2$							
$y = 4x^2 - 5x - 11$							

3. The profit earned in a week by a business that sells 18.9 L jugs of water depends on the price per jug. The relationship between price and profit is shown on the graph below.



- a) Fill in the blanks below with the appropriate information:

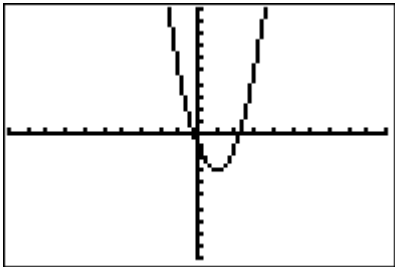
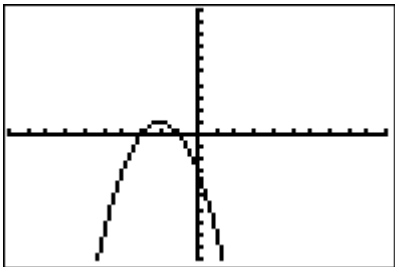
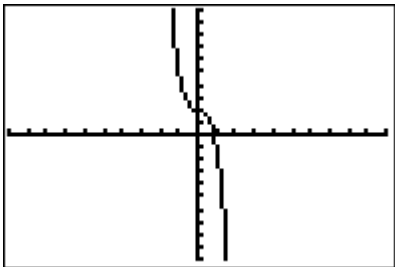
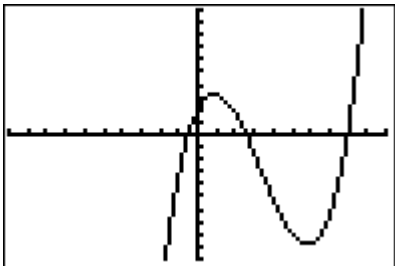
type of function: _____ is there a maximum or a minimum?: _____

value of max/min: _____ x-intercept(s): _____ y-intercept: _____

degree: _____ domain: _____ range: _____

- b) What is the maximum amount of profit per week that this company can earn?
- c) How much should this company charge per jug in order to earn the maximum profit?
- d) Why does the graph of this function not continue below the x-axis?
- e) Estimate the weekly profit for this business if they charged \$9.00 per jug.

4. In the chart shown below, **DRAW A LINE** connecting each graph with its appropriate equation. Try doing this **WITHOUT** using a graphing calculator.

Equation	Graph
$y = -3x^3 + 2$	
$y = 2(x - 1)^2 - 3$	
$y = \frac{1}{5}x^3 - 2x^2 + 3x + 2$	
$y = -x^2 - 4x - 3$	

5. If a polynomial function has a negative leading coefficient, is the graph of the function **increasing** or **decreasing**?

6. Ben has a model airplane that he starts the engine and then throws off a cliff (at $t = 0$). The equation that models the flight of the airplane is:

$$h(t) = -0.02t^3 + 0.65t^2 - 3.82t + 50$$

where

h represents the height (m) of the plane from the ground, and
 t represents the time (sec) that has elapsed since the plane was thrown.

- a) Draw a clearly labelled sketch of the function below from 0 to 30 seconds. Be sure to include labels and scale on your graph.
- b) State the height of the plane at the time it was thrown.
- c) Determine the highest height reached by the plane during its flight.
- d) Determine the length of the flight.
- e) State an appropriate domain for this situation.
- f) State the range applicable to this situation.

7. The following data represents the number of McDonald's restaurants in various cities with given populations.

Population (Thousands)	200	450	600	1 000	1 200	1 400	3 200
# of McDonald's Restaurants	10	23	41	48	61	75	173

- a) Enter the given data into your calculator and create a scatter plot. What type of function is suggested by this data?
- b) Use an appropriate regression to determine the regression equation for this data. Write this equation below.
- c) How many McDonald's restaurants would you expect to find in a city with 800 000 people?
- d) If a city has 55 McDonald's restaurants, what is the predicted population?



8. The population present in a bacteria culture over five days is given in the table below:

Time (Days)	0	1	2	3	4	5
Population	30	133	214	337	527	819

- a) Enter the given data into your calculator and create a scatterplot. Your teacher claims this is a cubic function (and he is always right!). What is it about this scatterplot that would make it a cubic as opposed to a quadratic?
- b) Find the appropriate regression equation for this data and write it below.
- c) Estimate the population of bacteria after seven days.
- d) How long will it take for the bacteria population to grow to ten times its initial size?

