

Applied Math 40S

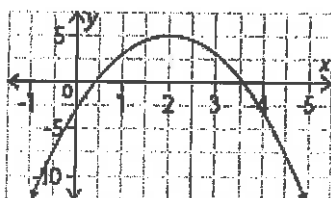
CHAPTER 6 TEST

Polynomial Functions

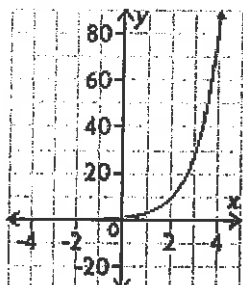
Name _____ Date _____

1. Which of the following graphs may represent polynomial functions?
Provide your reasoning for each.

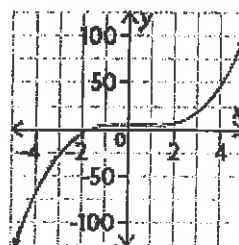
a)



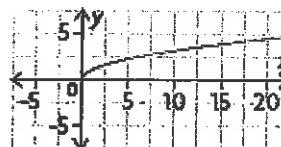
b)



c)

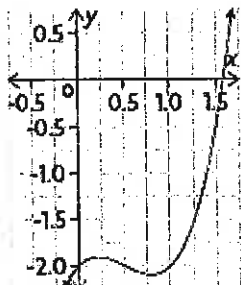


d)

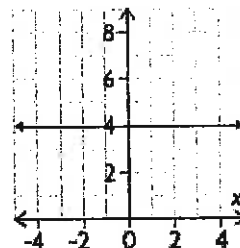


2. a) Describe the characteristics of each polynomial function. Include the degree, x -intercepts, y -intercept, end behaviour, domain, and range in your description.

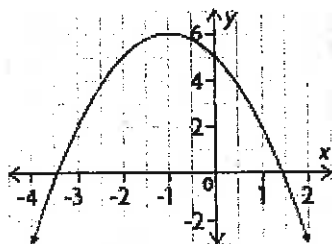
i)



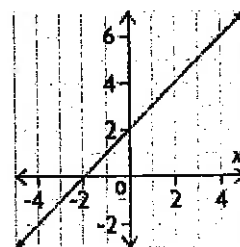
iii)



ii)



iv)



	Degree	x -intercept	y -intercept	End behaviour	Domain	Range
i						
ii						
iii						
iv						

3. Determine the y -intercept, end behaviour, domain, and range of each polynomial function.

a) $y = x^2 - 3x - 2$

c) $y = -x^3 + 10x + 6$

b) $y = -\frac{1}{2}x + 5$

d) $y = (4x + 2)(x - 3)(x + 10)$

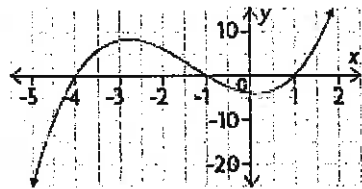
	y-intercept	End behaviour	Domain	Range
a)				
b)				
c)				
d)				

4. Match each graph with the correct polynomial function. Justify your decisions.

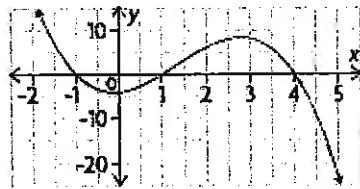
i) $y = -x^3 + 4x^2 + x - 4$ iii) $y = x^3 + 4x^2 - x - 4$

ii) $y = -x^2 + 5x - 4$ iv) $y = -x^2 + 4x - 3$

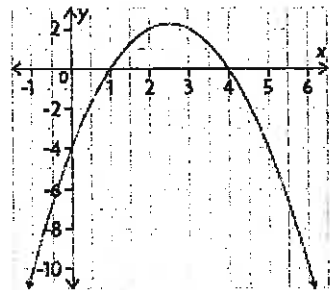
a)



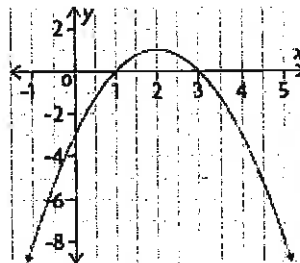
c)



b)



d)



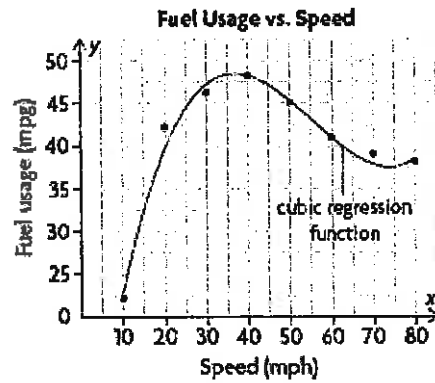
5. a) Determine a linear regression function that models the following data.

x	5	12	16	18	20	21	24	21	5	6	7	8	10	12
y	32	20	16	15	12	9	5	6	30	28	24	24	21	17

- Write the equation that represents the data.
- Include a sketch of your graph below.

b) Use your model to interpolate a value for y when x is 14.

6. The following cubic function models the relationship between fuel usage, in miles per gallon, and speed, in miles per hour, for an automobile.



- a) Estimate the fuel usage when the automobile is travelling at 60 mph.
- b) At what speed would the fuel usage be 30 mpg?
- c) What range of speeds would provide the best fuel usage? Explain.

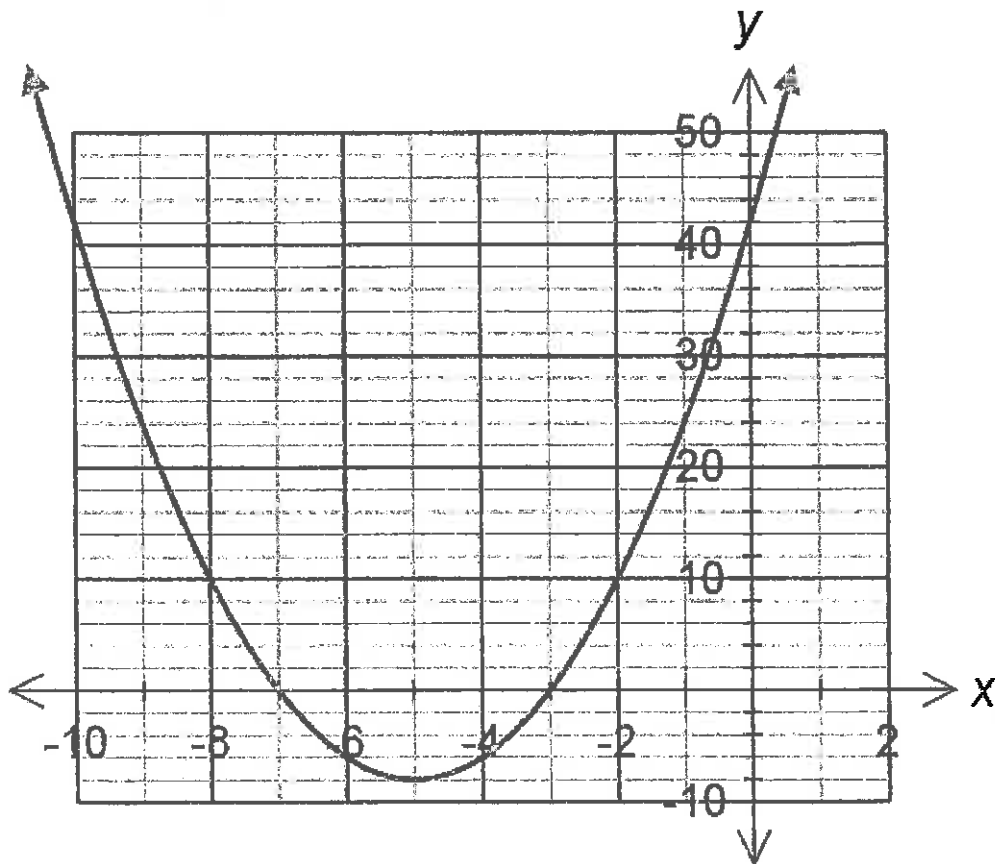
7. The volume of air that is required to fill four spheres with different diameters is recorded in the table below.

Volume (cm ³)	524	4189	14 137	33 510
Diameter (cm)	10	20	30	40

(Include a sketch of your graph below.)

- a) Estimate the volume of air that is required to fill a soccer ball with a diameter of 22 cm. Justify your estimate.
- b) Determine a cubic regression function to model this data.
- c) Determine the volume of air that is required to fill a soccer ball with a diameter of 22 cm.

8. Given the following graph:



- State the vertex.
- State the axis of symmetry.
- State the values of the intercepts.
- State the domain and range of the function.

9. A cannon shoots a cannonball! The cannonball's height after being shot is given by the following formula:

$$h = -4.9t^2 + 100t + 50$$

where h represents height in metres and t represents the number of seconds.

(Include a sketch of your graph.)

- a) From what height is the cannonball fired?

- b) When does the cannonball reach a maximum height? What is the maximum height?

- c) How many seconds is the cannonball above a height of 300 m?

- d) How long is the cannonball in the air?

10. Consider the cubic function $y = 2x^3 + 8x^2 - 22x - 60$.

(Include a sketch of your graph.)

- a) What are the coordinates of the relative maximum and minimum points?

- b) What are the coordinates of the x-intercepts?

- c) What are the coordinates of the y-intercept?