Determine a window which gives a complete graph of the polynomial function.

1) $f(x) = 0.3x^5 + 3x^4 - 2x^3 + 3x^2 + 2$

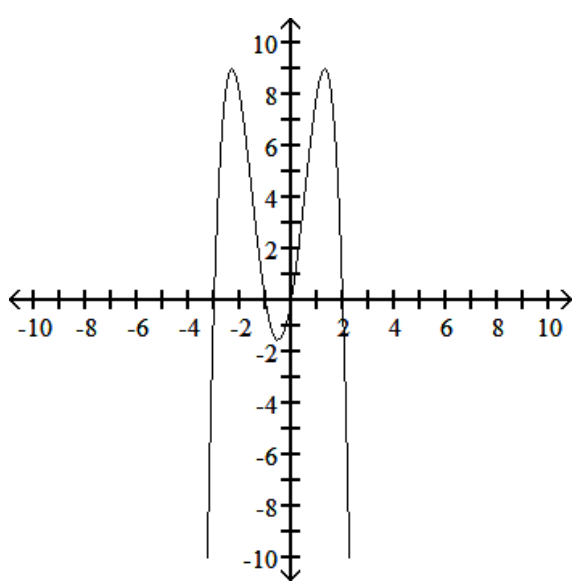
A) [-10, 10] by [-1200, 2000]
B) [-20, 20] by [-5000, 8000]
C) [-5000, 5000] by [-150, 150]
D) [-6, 6] by [-3000, 3000]

2) $f(x) = 4.5x^3 + 12x^2 - 82$

A) [-5, 5] by [-200, 50]
B) [-6, 6] by [-50, 100]
C) [-2, 8] by [-250, 150]
D) [-100, 100] by [-10, 10]

Use the given graph of the polynomial function to estimate the x-intercepts.

3)



A. State the x-intercepts of the graph.
B. What is the sign of the leading coefficient ?
C. What is the nature of the poloynomial whose graph is shown in the figure? Quartic or Cubic ?

Solve the problem.

4) Ariel, a marine biologist, models a population P of crabs, t days after being left to reproduce, with the function $P(t) = -0.00009t^3 + 0.024t^2 + 10.5t + 1800$. Assuming that this model continues to be accurate, when will this population become extinct? (Round to the nearest day.)

5) The polynomial $R(x) = -0.035x^5 + 3.785x^4 + 200$ approximates the shark population in a particular area, where x is the number of years from 1985. Use a graphing calculator to describe the shark population from the years 1985 to 2010.

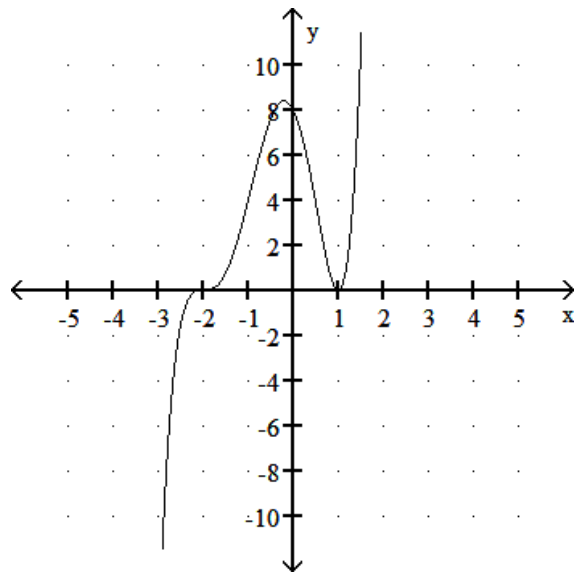
6) $P(x) = -x^3 + \frac{27}{2}x^2 - 60x + 100$, $x \geq 5$ is an approximation of the total profit (in thousands of dollars) from the sale of x hundred thousand tires. Find the number of hundred thousands of tires that must be sold to maximize profit.

Solve the polynomial equation.

7) $(3x + 2)(x - 4)^2(x + 5) = 0$

Use the graph of the polynomial function f(x) to solve f(x) = 0 then write f(x) in factored form.

8)



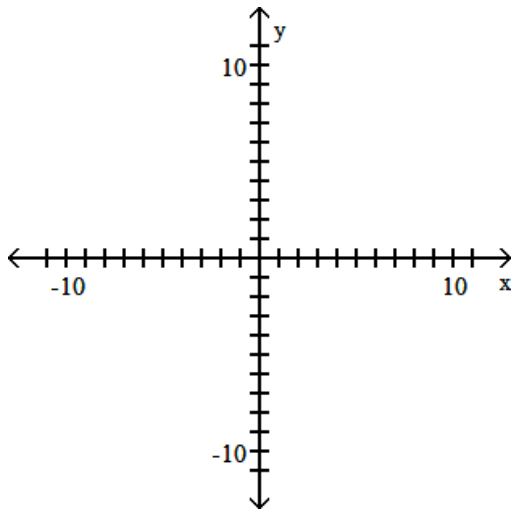
Solve the problem.

9) Suppose a business can sell x gadgets for p = 250 - 0.01x dollars apiece, and it costs the business c(x) = 1000 + 25x dollars to produce the x gadgets. Determine the production level and cost per gadget required to maximize profit.

Construct a scatter plot of the data in the table. Use the scatter plot to determine whether the data should be modeled by a linear function. Explain why it is linear or not linear.

10)

x	-10	-7	-5	-3	-2	2	3	6	7	9
y	-2	-5	-4	2	3	2	-1	3	-6	-2



Write the best-fit linear model for the data.

11) The paired data below consist of the test scores of 6 randomly selected students and the number of hours they studied for the test. Find a linear function that predicts a student's score as a function of the number of hours he or she studied.

Hours	5	10	4	6	10	9
Score	64	86	69	86	59	87

Solve the problem.

12) A furniture manufacturer decides to make a new line of desks. The table shows the profit, in thousands of dollars, for various levels of production.

Number of Desks Produced	120	350	500	650	750
Profit (Thousands)	13	37	44	34	25

Find a quadratic function to model the data, and use the model to predict the profit if 450 desks are made. Round the final answer to the nearest thousands of dollars.

Solve the problem.

13) The height of an object dropped from a tall building is given by the table, where t is the elapsed time in seconds and h is the height in feet.

t	0	1	2	3	4	5
h	800	784	736	656	544	400

If the height is modeled by $h(t) = h_0 - 16t^2$, find h_0. _____

Solve the problem.

14) The paired data below consist of the temperatures on randomly chosen days and the amount a certain kind of plant grew (in millimeters). The linear model for this data is $y = 14.6 + 0.211x$, where x is temperature and y is growth in millimeters. Use this model to predict the growth of a plant if the temperature is 55.

15) The table lists the distance traveled by a falling object, where t is the elapsed time in seconds and d is the distance in meters.

t	0	1	2	3	4	5
d	0	4.9	19.6	44.1	78.4	122.5

If the distance is modeled by $d(t) = at^2$, find the distance traveled after 13 seconds.

16) The following points form a quadratic relationship: (1, 5.0), (2, 4.4), (3, 4.3), (4, 4.2), (5, 4.6), (6, 4.8), (7, 5.4), (8, 6.2). The x-coordinates are the years a particular company has been in operation and the y-coordinates are the profit, in millions, for that year. Use quadratic regression to determine the profit in the fourth year.

17) Wind speed varies in the first twenty meters above the ground. For a particular day, let $f(x) = 3.6 \ln x + 7.4$ model the wind speed x meters above the ground. At what height is the wind speed 9 meters per second? Round results to the nearest hundredth.

Solve the problem.

18) Under ideal conditions, a population of rabbits has an exponential growth rate of 11.5% per day. Consider an initial population of 900 rabbits. Find the exponential growth function.

_____

Solve the problem.

19) Find an exponential function to model the data below and use it to predict what income the company should expect in its seventh year of operation. Round to the nearest tenth when necessary.

Years of Operation	Annual Income (in millions)
1	0.3
2	0.7
3	1.2
4	1.9