Name_____ Polynomial Applications

Use the appropriate window and sketch the graph. Label and number the axes. Answer the questions. Round answers to one decimal place if necessary.

Snowboarding From 1992 to 2003, the number of people in the United States who participated in snowboarding can be modeled by

$$S = 0.0013t^4 - 0.021t^3 + 0.084t^2 + 0.037t + 1.2$$

where S is the number of participants (in millions) and t is the number of years since 1992.

a.) How many people participated in snowboarding in the year 1995?

b.) How many people participated in snowboarding in the year 2002?

c.) Between 1992 and 1999 there is a local maximum. What year did that occur and how many snowboarders were there in that year?

d.) When did the number of snowboarders reach 2 million?

Movie Screens From 1987 to 2003, the number of indoor movie screens M in the United States can be modeled by

$$M = -11.0t^3 + 267t^2 - 592t + 21{,}600$$

where t is the number of years since 1987.

a.) How many movie screens were there in the year 1995?

b.) Between 1987 and 1991 there was a local minimum. What year did that occur and how many movie screens were there in that year?

c.) When did the number of movie screens reach 30,000?

d.) Between 1999 and 2003 there is a local maximum. What year did that occur and how many movie screens were there in that year?

Baseball From 1994 to 2003, the average salary ***S*** (in thousands of dollars) for major league baseball players can be modeled by

$$S(x) = -4.10x^3 + 67.4x^2 - 121x + 1170$$

where ***x*** is the number of years since 1994.

a.) Find the average salary in the year 2000.

b.) Between 1994 and 1997, there is a local minimum. What year did that occur and what was the average salary?

c.) What year did the average salary go above $2,000,000?

Pineapples From 1970 to 2002, the average yearly pineapple consumption P (in pounds) per person in the United States can be modeled by the function

$$P(x) = 0.0000984x^4 - 0.00712x^3 + 0.162x^2 - 1.11x + 12.3$$

where x is the number of years since 1970.

a.) What was the per person pineapple consumption in 1984?

b.) In what year(s) was the pineapple consumption 13 pounds per person?

c.) In what years was pineapple consumption *below* 11 pounds per person?

d.) Between 1970 and 2002, what was the maximum pineapple consumption and when did it occur?

Fish From 1990 to 2002, the amount of fish F (in millions of pounds) caught for human consumption in the United States can be modeled by

$$F = -0.907t^4 + 28.0t^3 - 258t^2 + 902t + 12{,}700$$

where t is the number of years since 1990.

a.) How much fish was caught in 1999?

b.) When did the fish catch reach 15,000,000,000 pounds?

c.) In which years was the fish catch below 14,000,000,000 pounds?

Retail Shopping Space The retail space in shopping centers in the United States from 1986 to 2003 can be modeled by

$$S = -0.0388t^4 + 1.723t^3 - 28t^2 + 309t + 3481$$

where S is the amount of retail space (in millions of square feet) and t is the number of years since 1986.

a.) How much retail space was there in 1990?

b.) When did the retail space reach 4,000,000,000 square feet?

c.) How many square feet of retail space was there in 1986?

Bottled Water per Capita From 1990 to 1999, the per capita consumption B of bottled water (in gallons) can be modeled by

$$B = 0.0977t^2 + 0.186t + 7.86$$

where t is the number of years since 1990.

a.) What was the per capita bottled water consumption in 1997?

b.) When did bottled water consumption reach 15 gallons per person?

c.) During which years was water consumption *below* 12 gallons per person?

Total Fuel Consumption From 1995 to 2002, the total fuel consumption T (in billions of gallons) by cars in the United States can be modeled by

$$T = -0.003x^3 - 0.02x^2 + 1.3x + 68$$

where x is the number of years since 1995.

a.) What was the total fuel consumption in 1998?

b.) When did total fuel consumption reach 70,000,000,000 gallons?

c. During which years was total fuel consumption between 72 and 74 billion gallons?

Mail From 1995 to 2003, the amount of mail M (in billions of pieces) handled by the US Postal Service can be modeled by

$$M = 0.05(t^4 - 18t^3 + 89t^2 - 32t + 3680)$$

where t is the number of years since 1995.

a.) How much mail was handled in 2001?

b.) During which years were there fewer than 190,000,000,000 pieces of mail handed?

c.) During which years was the amount of handled mail above 205 billion pieces?

d.) What is the maximum amount of amil handled between 1995 and 2003, and when did this occur?

Sporting Goods For 1998 through 2005, the sales S (in billions of dollars) of sporting goods can be modeled by

$$S = 0.007t^3 + 0.1t^2 + 1.4t + 70$$

where t is the number of years since 1998.

a.) What was the total sales of sporting goods in 2002?

b.) During which years was the total sales of sporting goods below 80 billion dollars?

c.) When did total sporting goods sales reach 82,000,000,000?

Eggs The average number of eggs E eaten per person each year in the United States from 1970 to 2000 can be modeled by

$$E = 0.000944t^4 - 0.052t^3 + 0.95t^2 - 9.4t + 308$$

where t is the number of years since 1970.

a.) What was the per capita egg consumption in 1975?

b.) During which years was per capita egg consumption *decreasing?*

c.) Between 1970 and 2000, what was the lowest per capita egg consumption and when did it occur?

d.) When was per capita egg consumption below 230?

Space Shuttle The average speed y (in feet per second) of a space shuttle t seconds after launch can be modeled by the equation

$$y = 0.007t^3 - 0.74t^2 + 49t - 236$$

a.) What is the speed of the space shuttle 60 seconds after launch? Give your answer in feet per second and also convert it to miles per hour.

b.) When the space shuttle reaches a speed of approximately 4400 feet per second, its booster rockets fall off. How long after launch does this happen?

c.) How many seconds does it take the space shuttle to actually start moving up after it is launched?