29. **(a)** Figure 9.10 shows $g(x)$, a mystery power function. If you learn that the point $(-1, 3)$ lies on its graph, do you have enough information to write a formula for $g(x)$?

(b) If you are told that the point $(1, -3)$ also lies on the graph, what new deductions can you make?

(c) If the point $(2, -96)$ lies on the graph g, in addition to the points already given, state three other points which also lie on it.

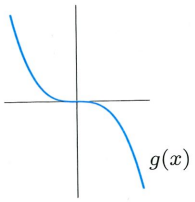

Figure 9.10

30. Figure 9.11 shows the power function $y = c(t)$. Is $c(t) = 1/t$ the only possible formula for c? Could there be others?

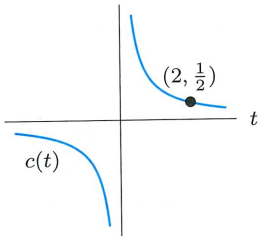

Figure 9.11

31. **(a)** One of the graphs in Figure 9.12 is $y = x^n$ and the other is $y = x^{1/n}$, where n is a positive integer. Which is which? How do you know?

(b) What are the coordinates of point A?

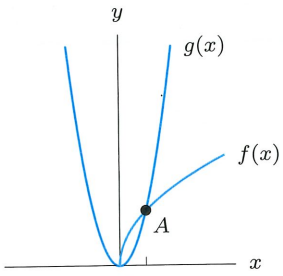

Figure 9.12

32. The circulation time of a mammal—that is, the average time it takes for all the blood in the body to circulate once and return to the heart—is governed by the equation

$$t = 17.4m^{1/4},$$

where m is the body mass of the mammal in kilograms, and t is the circulation time in seconds.[3]

(a) Complete Table 9.4 which shows typical body masses in kilograms for various mammals.[4]

(b) If the circulation time of one mammal is twice that of another, what is the relationship between their body masses?

Table 9.4

Animal	Body mass (kg)	Circulation time (sec)
Blue whale	91000	
African elephant	5450	
White rhinoceros	3000	
Hippopotamus	2520	
Black rhinoceros	1170	
Horse	700	
Lion	180	
Human	70	

33. Three ounces of broiled ground beef contains 245 calories.[5] Is the number of calories directly or inversely proportional to the number of ounces? Explain your reasoning and write a formula for the proportion. How many calories are there in 4 ounces of broiled hamburger?

34. A 30-second commercial during Super Bowl XL in 2006 cost advertisers \$2.5 million. For the first Super Bowl in 1967, an advertiser could have purchased approximately 28.699 minutes of advertising time for the same amount of money.[6]

(a) Assuming that cost is proportional to time, find the cost of advertising, in dollars/second, during the 1967 and 2006 Super Bowls.

(b) How many times more expensive was Super Bowl advertising in 2006 than in 1967?

35. A group of friends rent a house at the beach for spring break. If nine of them share the house, it costs \$150 each. Is the cost to each person directly or inversely proportional to the number of people sharing the house? Explain your reasoning and write a formula for the proportion. How many people are needed to share the house if each student wants to pay a maximum of \$100 each?

[3] K. Schmidt-Nielsen, *Scaling, Why is Animal Size so Important?* (Cambridge: CUP, 1984).

[4] R. McNeill Alexander, *Dynamics of Dinosaurs and Other Extinct Giants.* (New York: Columbia University Press, 1989).

[5] The World Almanac Book of Facts, 1999 p. 718

[6] money.cnn.com/2006/01/03/news/companies/superbowlads, accessed January 15, 2006.