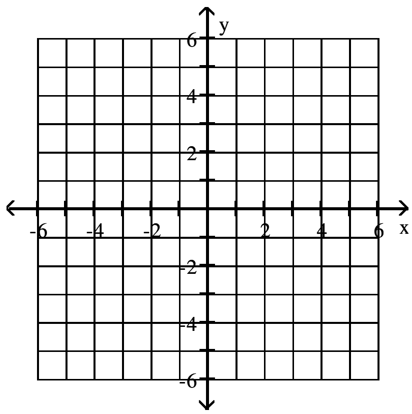
Worksheet Section 8.2 v01
F2009 Math 098
Dressler

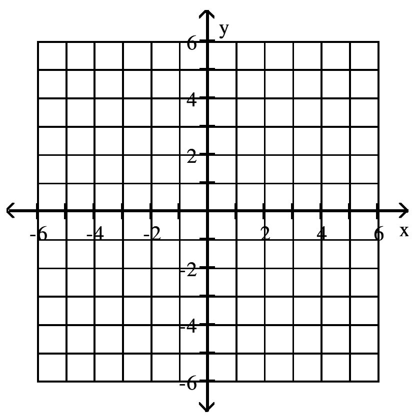
Name________________________________

Graph the function.

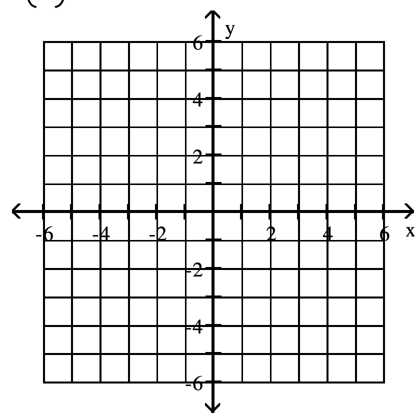
1) $f(x) = 4^x$



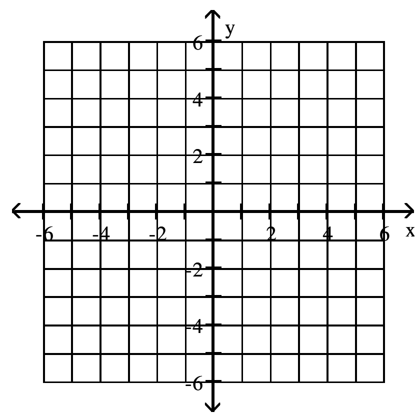
2) $f(x) = 2^x$



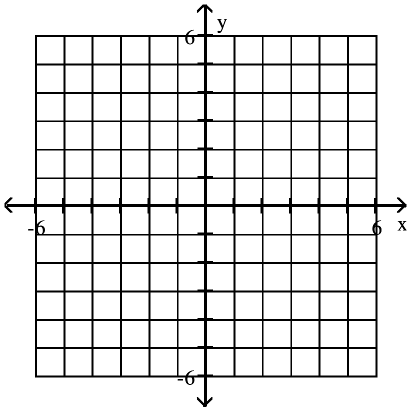
3) $f(x) = \left(\frac{1}{3}\right)^x$



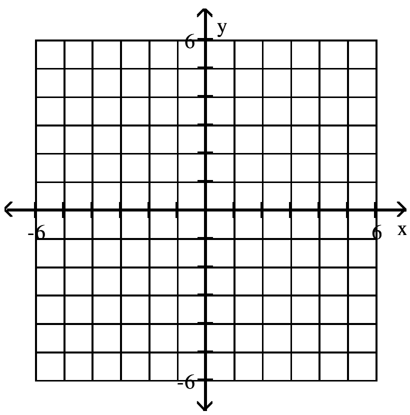
4) $f(x) = -5^x$



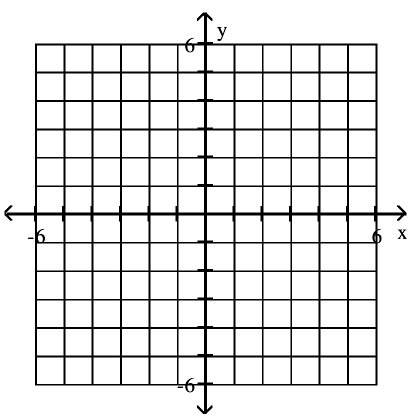
5) $y = 5^{-x}$



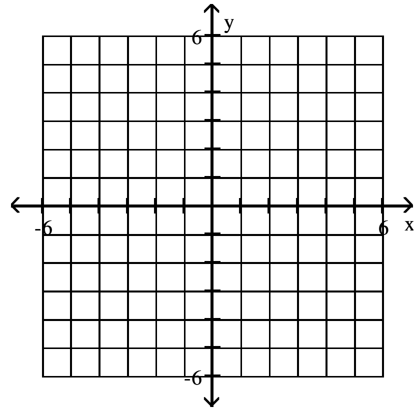
6) $y = 2^{2x - 1}$



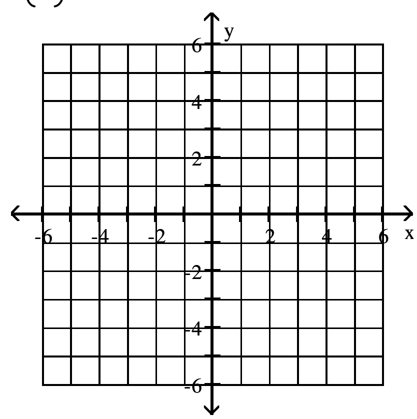
7) $y = 2^{x - 2}$



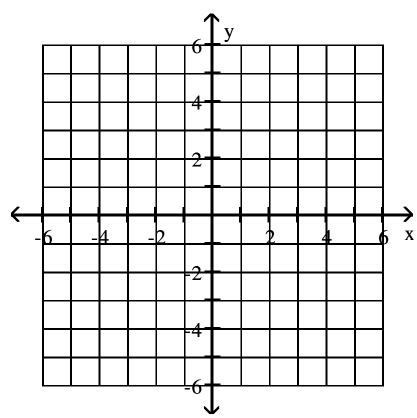
8) $y = \left(\frac{1}{2}\right)^x + 4$



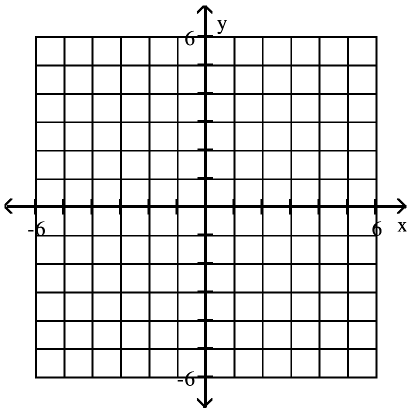
9) $f(x) = \left(\frac{1}{2}\right)^x$



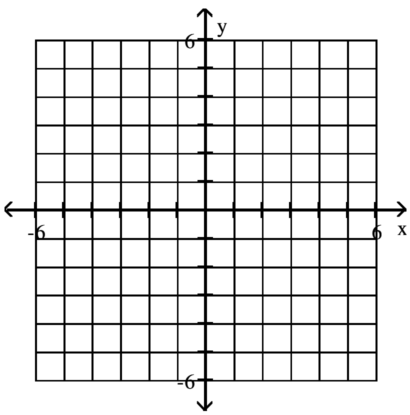
10) $f(x) = -3^x$



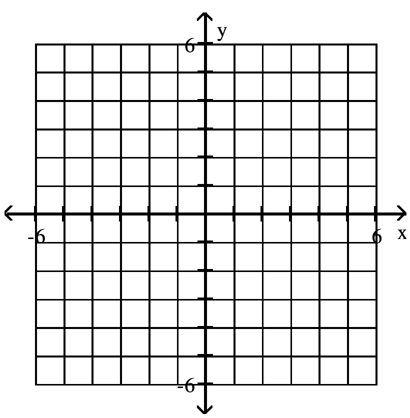
11) $y = 4^{-x}$



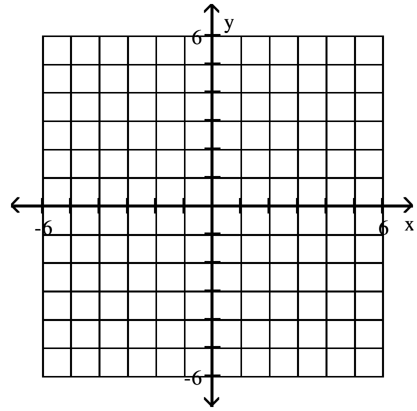
12) $y = 4^{3x - 4}$



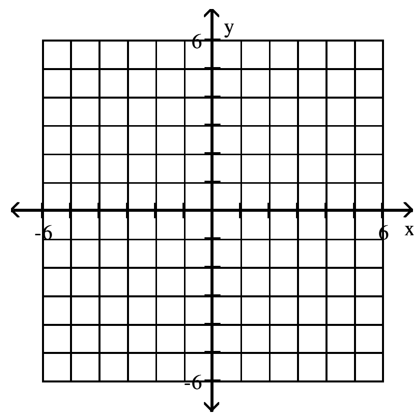
13) $y = 5^{x - 2}$



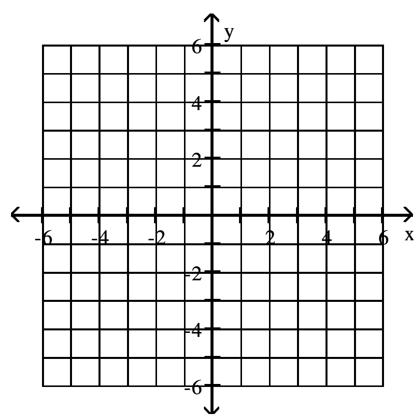
14) $y = \left(\frac{1}{4}\right)^{x} + 4$



15) $y = \left(\frac{1}{5}\right)^{x} + 3$



16) $f(x) = -4^{x}$



Solve.

17) $5^x = 625$

18) $3^x = 9$

19) $2^x = 8$

20) $5^x = 25$

21) $5^x = 125$

22) $4^x = 64$

23) $2^x = 16$

24) $3^x = 27$

25) $4^x = 16$

26) $3^x = 81$

27) $\frac{1}{8} = 2^{-x}$

28) $\frac{1}{64} = 4^{-x}$

29) $\frac{1}{9} = 3^{-x}$

30) $\left(\frac{1}{2}\right)^x = 16$

31) $\left(\frac{1}{3}\right)^x = 81$

32) $\left(\frac{1}{2}\right)^x = 4$

33) $\left(\frac{1}{2}\right)^x = 8$

34) $256^x = 4$

35) $9^x = 3$

36) $49^x = 7$

37) $16^x = 2$

38) $2^{8 - 2x} = 16$

39) $5^{12 - 2x} = 625$

40) $2^{12 - 2x} = 16$

41) $4^{7+3x} = \frac{1}{16}$

42) $2^{5+3x} = \frac{1}{16}$

43) $3^{6+3x} = \frac{1}{27}$

44) $2^{7+3x} = \frac{1}{4}$

45) $100^{x-10} = 1000^{x}$

46) $10{,}000^{x-4} = 100^{x}$

47) $1000^{x-4} = 10{,}000^{x}$

48) $100{,}000^{x-3} = 10{,}000^{x}$

49) $\left(\frac{25}{9}\right)^{x+1} = \left(\frac{3}{5}\right)^{x-1}$

50) $(16)^{x+1} = \left(\frac{2}{4}\right)^{x-1}$

51) $(8)^{x+1} = \left(\frac{2}{4}\right)^{x-1}$

52) $\left(\frac{625}{81}\right)^{x+1} = \left(\frac{3}{5}\right)^{x-1}$

Solve the problem.

53) A computer is purchased for \$4900. Its value each year is about 76% of the value the preceding year. Its value, in dollars, after t years is given by the exponential function

$$V(t) = 4900(0.76)^{t}$$

Find the value of the computer after 9 years.

54) A computer is purchased for \$4500. Its value each year is about 77% of the value the preceding year. Its value, in dollars, after t years is given by the exponential function

$$V(t) = 4500(0.77)^{t}$$

Find the value of the computer after 4 years.

55) A computer is purchased for \$3200. Its value each year is about 77% of the value the preceding year. Its value, in dollars, after t years is given by the exponential function

$$V(t) = 3200(0.77)^{t}$$

Find the value of the computer after 6 years.

56) The number of bacteria growing in an incubation culture increases with time according to $B(x) = 2700(5)^{x}$, where x is time in days. Find the number of bacteria after 3 days. What was the initial number of bacteria in the incubation culture?

57) The number of bacteria growing in an incubation culture increases with time according to $B(x) = 3400(4)^{x}$, where x is time in days. Find the number of bacteria after 2 days. What was the initial number of bacteria in the incubation culture?

58) The number of bacteria growing in an incubation culture increases with time according to $B(x) = 7000(4)^x$, where x is time in days. Find the number of bacteria after 2 days. What was the initial number of bacteria in the incubation culture?

59) The half–life of a certain radioactive substance is 8 years. Suppose that at time $t = 0$, there are 28 g of the substance. Then after t years, the number of grams of the substance remaining will be

$$N(t) = 28\left(\frac{1}{2}\right)^{t/16}$$

How many grams of the substance (to the nearest tenth of a gram) will remain after 24 years?

60) The half–life of a certain radioactive substance is 23 years. Suppose that at time $t = 0$, there are 26 g of the substance. Then after t years, the number of grams of the substance remaining will be

$$N(t) = 26\left(\frac{1}{2}\right)^{t/46}$$

How many grams of the substance (to the nearest tenth of a gram) will remain after 184 years?

61) The half–life of a certain radioactive substance is 21 years. Suppose that at time $t = 0$, there are 22 g of the substance. Then after t years, the number of grams of the substance remaining will be

$$N(t) = 22\left(\frac{1}{2}\right)^{t/42}$$

How many grams of the substance (to the nearest tenth of a gram) will remain after 105 years?

62) Susan Johnson invested \$3000 at 6% compounded quarterly . How much will be in the account in 3 years? (Round to the nearest cent.)

63) Sun Woo Kim invested \$1500 at 6% compounded monthly . How much will be in the account in 6 years? (Round to the nearest cent.)

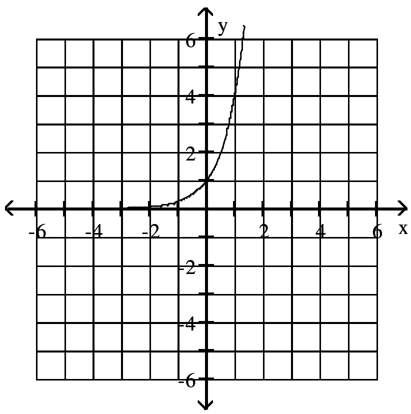
64) Binal Patel invested \$7000 at 10% compounded monthly . How much will be in the account in 5 years? (Round to the nearest cent.)

65) The number of books in a small library increases according to the function $B = 4000e^{0.03t}$, where t is measured in years. How many books will the library have after 7 years?

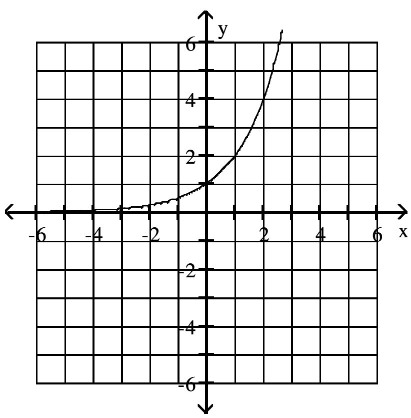
66) How long will it take a sample of radioactive substance to decay to half of its original amount, if it decays according to the function $A(t) = 550e^{-0.154t}$, where t is the time in years? (Round to the nearest hundredth year.)

67) The population of a particular city is increasing at a rate proportional to its size. It follows the function $P(t) = 1 + ke^{0.1t}$ where k is a constant and t is the time in years. If the current population is 15,000 , in how many years is the population expected to be 37,500 ? (Round to the nearest year.)

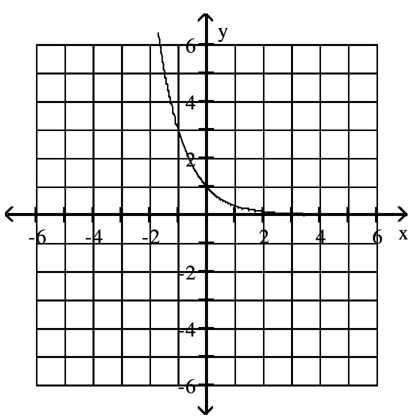
1)



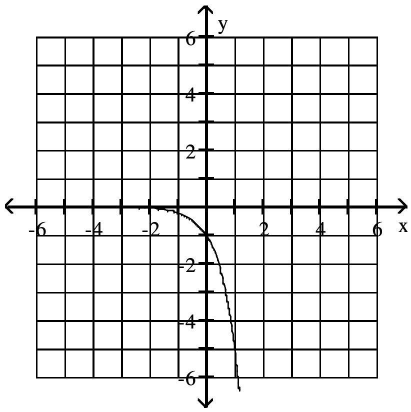
2)



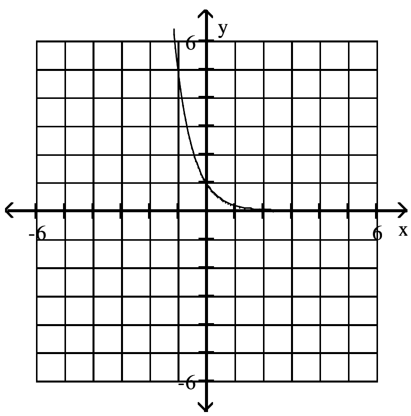
3)



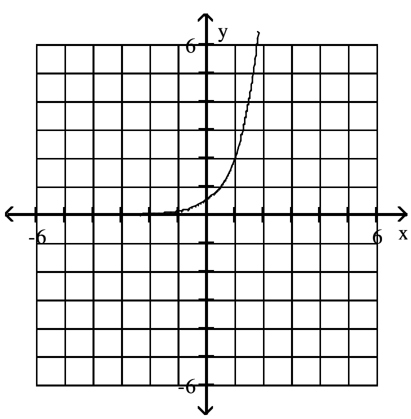
4)



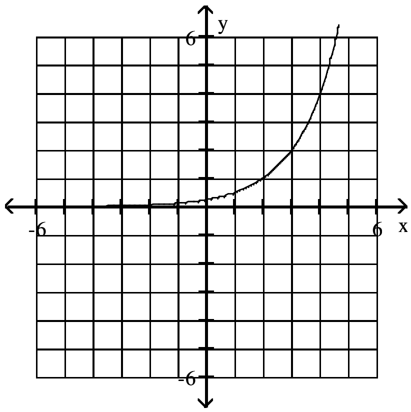
5)



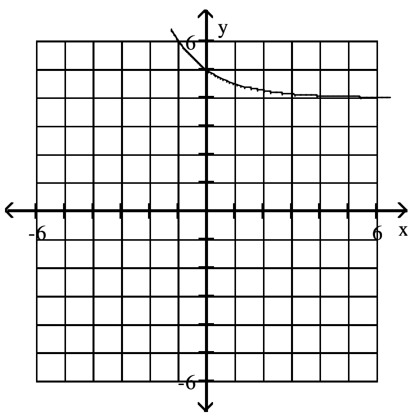
6)



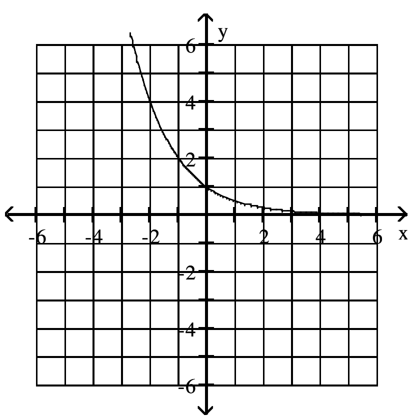
7)



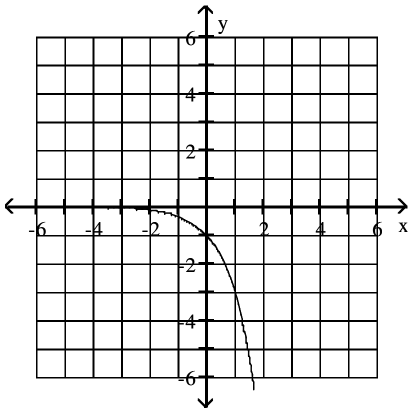
8)



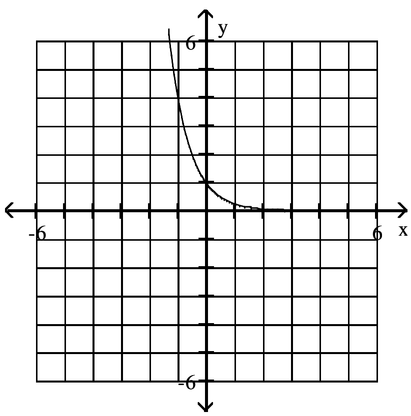
9)



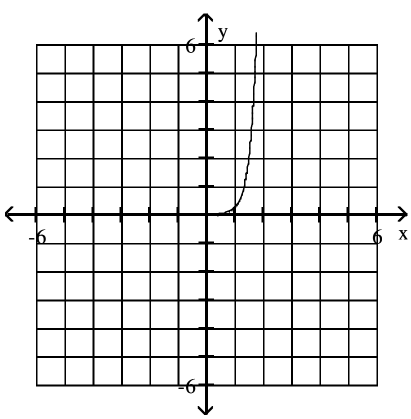
10)



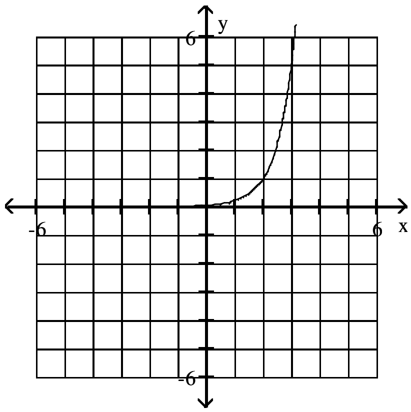
11)



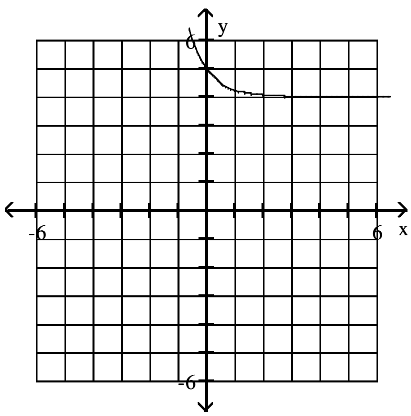
12)



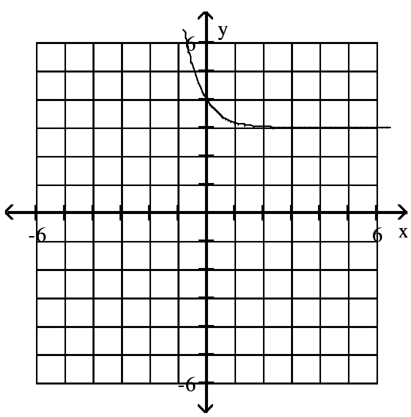
13)



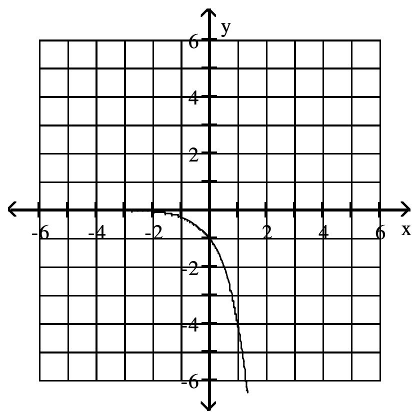
14)



15)



16)



17) 4
18) 2
19) 3
20) 2
21) 3
22) 3
23) 4
24) 3
25) 2
26) 4
27) 3
28) 3
29) 2
30) -4
31) -4
32) -2
33) -3
34) $\frac{1}{4}$
35) $\frac{1}{2}$
36) $\frac{1}{2}$
37) $\frac{1}{4}$
38) 2
39) 4
40) 4
41) -3
42) -3
43) -3
44) -3
45) -20
46) 8
47) -12
48) 15

49) $-\frac{1}{3}$

50) $-\frac{3}{5}$

51) $-\frac{1}{2}$

52) $-\frac{3}{5}$

53) $414.49
54) $1581.89
55) $666.95
56) 337,500 ; 2700
57) 54,400; 3400
58) 112,000; 7000
59) 9.9 g
60) 1.6 g
61) 3.9 g
62) $3586.85
63) $2148.07
64) $11,517.16
65) 4935
66) 4.50 yr
67) 9 yr