Math 102
Quiz 6 Preparation Ch.4.4 to 4.6 v01
NO BOOK/ NO NOTES/YES CALCUATOR
Dressler Fall 2016

Name_____

Solve.

1) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model $A = 9700e^{0.064t}$. How much did you initially invest in the account? 1) _____

2) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model $A = 3700e^{0.057t}$. How much did you initially invest in the account? 2) _____

3) The function $A = A_0e^{-0.00693x}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. If 700 pounds of the material are initially put into the vault, how many pounds will be left after 90 years? 3) _____

4) The function $A = A_0e^{-0.00693x}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. If 900 pounds of the material are initially put into the vault, how many pounds will be left after 30 years? 4) _____

5) The function $A = A_0e^{-0.01155x}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. If 400 pounds of the material are placed in the vault, how much time will need to pass for only 159 pounds to remain? 5) _____

6) The function $A = A_0e^{-0.0077x}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. If 700 pounds of the material are placed in the vault, how much time will need to pass for only 150 pounds to remain? 6) _____

7) The population of a particular country was 24 million in 1980; in 1990, it was 29 million. The exponential growth function $A = 24e^{kt}$ describes the population of this country t years after 1980. Use the fact that 10 years after 1980 the population increased by 5 million to find k to three decimal places. 7) _____

8) The population of a particular country was 22 million in 1984; in 1994, it was 31 million. The exponential growth function $A = 22e^{kt}$ describes the population of this country t years after 1984. Use the fact that 10 years after 1984 the population increased by 9 million to find k to three decimal places. 8) _____

9) The half–life of silicon–32 is 710 years. If 60 grams is present now, how much will be present in 900 years? (Round your answer to three decimal places.) 9) _____

10) The half–life of silicon–32 is 710 years. If 50 grams is present now, how much will be present in 200 years? (Round your answer to three decimal places.) 10) _____

11) A fossilized leaf contains 39% of its normal amount of carbon 14. How old is the fossil (to the nearest year)? Use 5600 years as the half–life of carbon 14. 11) _____

12) A fossilized leaf contains 15% of its normal amount of carbon 14. How old is the fossil (to the nearest year)? Use 5600 years as the half–life of carbon 14. 12) _____

13) An endangered species of fish has a population that is decreasing exponentially ($A = A_0e^{kt}$). The population 8 years ago was 1800. Today, only 700 of the fish are alive. Once the population drops below 100, the situation will be irreversible. When will this happen, according to the model? (Round to the nearest whole year.) 13) _____

14) An endangered species of fish has a population that is decreasing exponentially ($A = A_0e^{kt}$). The population 6 years ago was 1700. Today, only 1000 of the fish are alive. Once the population drops below 100, the situation will be irreversible. When will this happen, according to the model? (Round to the nearest whole year.) 14) _____

15) The population of a certain country is growing at a rate of 1.2% per year. How long will it take for this country's population to double? Use the formula $t = \frac{\ln 2}{k}$, which gives the time, t, for a population with growth rate k, to double. (Round to the nearest whole year.) 15) _____

16) The population of a certain country is growing at a rate of 1.8% per year. How long will it take for this country's population to double? Use the formula $t = \frac{\ln 2}{k}$, which gives the time, t, for a population with growth rate k, to double. (Round to the nearest whole year.) 16) _____

Rewrite the equation in terms of base e. Express the answer in terms of a natural logarithm, and then round to three decimal places.

17) $y = 2(8)^x$ 17) _____

18) $y = 5(2)^x$ 18) _____

19) $y = 13(1.2)^x$ 19) _____

20) $y = 37(5.5)^x$ 20) _____

21) $y = 700(4.3)^x$ 21) _____

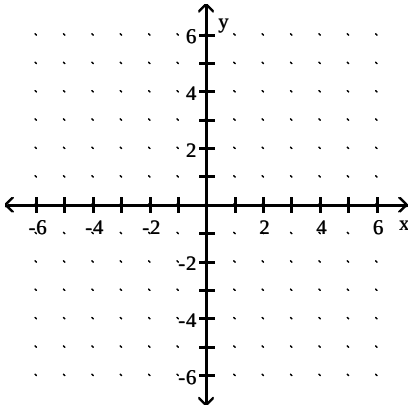
22) $y = 900(6)^x$ 22) _____

23) $y = 2.2(0.4)^x$ 23) _____

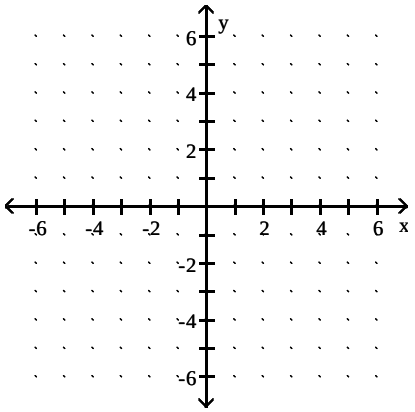
24) $y = 2.2(1.2)^x$ 24) _____

Graph the function.

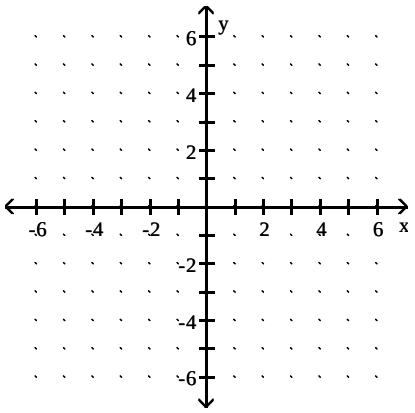
25) $y = \log_3 x$ 25) _____



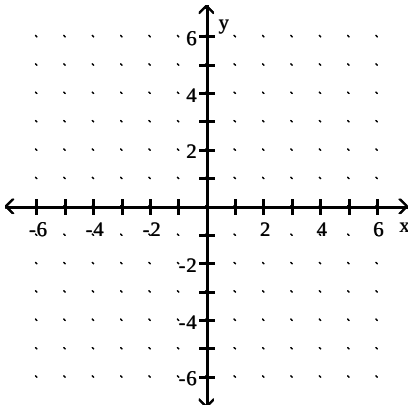
26) $y = \log_{1/5}(x)$ 26) _____



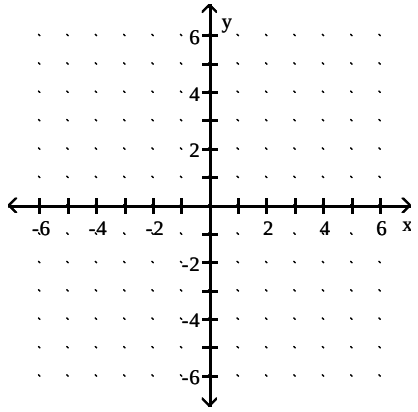
27) $f(x) = \ln(x)$ 27) _____



28) $f(x) = \log_5(x - 4)$ 28) _____



29) $f(x) = \log_3 (x) + 3$ 29) _____



Evaluate.

30) Given that $\log_a 5 = 1.609$, and $\log_a 2 = 0.693$, find $\log_a \frac{5}{2}$. 30) _____

31) Given that $\log_a 5 = 1.609$, and $\log_a 3 = 1.099$, find $\log_a \frac{5}{3}$. 31) _____

32) Given that $\log_a 2 = 0.693$, and $\log_a 7 = 1.946$, find $\log_a \frac{1}{14}$. 32) _____

33) Given that $\log_a 5 = 1.609$, and $\log_a 2 = 0.693$, find $\log_a \frac{1}{10}$. 33) _____

34) Given that $\log_a 2 = 0.301$, and $\log_a 5 = 0.699$, find $\log_a 10$ 34) _____

35) Given that $\log_a 2 = 0.301$, and $\log_a 3 = 0.477$, find $\log_a 6$ 35) _____

36) Given that $\log_a 2 = 0.693$, $\log_a 3 = 1.099$, and $\log_a 4 = 1.386$, find $\log_a 24$. 36) _____

37) Given that $\log_a 2 = 0.693$, $\log_a 6 = 1.792$, and $\log_a 5 = 1.609$, find $\log_a 60$. 37) _____

38) Let $\log_b A = 2.903$ and $\log_b B = 0.193$. Find $\log_b AB$. 38) _____

39) Let $\log_b A = 3.302$ and $\log_b B = 0.375$. Find $\log_b AB$. 39) _____

40) Let $\log_b A = 1.561$ and $\log_b B = 0.21$. Find $\log_b \frac{A}{B}$. 40) _____

41) Let $\log_b A = 2.988$ and $\log_b B = 0.36$. Find $\log_b \frac{A}{B}$. 41) _____

42) Given $\log_b 5 = 1.2301$ and $\log_b 7 = 1.4873$, evaluate $\log_b 5b$. 42) _____

43) Given $\log_b 2 = 0.5298$ and $\log_b 7 = 1.4873$, evaluate $\log_b 2b$. 43) _____

44) Given that $\log x = 3$ and $\log y = 6$, find $\log xy^3$. 44) _____

45) Given that $\log x = 5$ and $\log y = 4$, find $\log xy^4$. 45) _____

46) Given that $\log x = 3$ and $\log y = 4$, find $\log \sqrt[5]{x^3y^4}$. 46) _____

47) Given that $\log x = 3$ and $\log y = 5$, find $\log \sqrt[5]{x^3y^2}$. 47) _____

Write the expression in expanded form.

48) $\log_x 6yz$ 48) _____

49) $\log_x 9yz$ 49) _____

50) $\log_a x^2yz^6$ 50) _____

51) $\log_a x^2yz^5$ 51) _____

52) $\log \frac{x^4z}{y^3}$ 52) _____

53) $\log \frac{x^3z}{y^2}$ 53) _____

54) $\ln\sqrt{x^6y}$ 54) _____

55) $\ln\sqrt{x^8y}$ 55) _____

56) $\log_b\sqrt{\frac{x^5y^2}{z^7}}$ 56) _____

57) $\log_b\sqrt{\frac{x^5y^2}{z^4}}$ 57) _____

58) $\ln[x(x - 7)]$ 58) _____

59) $\ln[x(x - 1)]$ 59) _____

60) $\log_7\left(\frac{x^2 - 25}{(x + 1)^2}\right)^3$ 60) _____

61) $\log_2\left(\frac{x^2 - 1}{(x + 4)^2}\right)^3$ 61) _____

62) $\log_5 \left(\frac{x^2 - 16}{(x+5)^2} \right)^3$ 62) _____

63) $\log_8 \left(\frac{x^2 - 25}{(x+2)^2} \right)^3$ 63) _____

Use the change–of–base formula and a calculator to evaluate each logarithm. (Round to 4 decimals.)

64) $\log_3 7$ 64) _____

65) $\log_5 6$ 65) _____

66) $\log_{200} 30$ 66) _____

67) $\log_{100} 30$ 67) _____

68) $\log_\pi 200$ 68) _____

69) $\log_\pi 100$ 69) _____

70) $\log_5 20.91$ 70) _____

71) $\log_7 55.55$ 71) _____

72) $\log_{2.8} 230$ 72) _____

73) $\log_{6.2} 117$ 73) _____

74) $\log_{31} 92.18$ 74) _____

75) $\log_{24} 63.03$ 75) _____

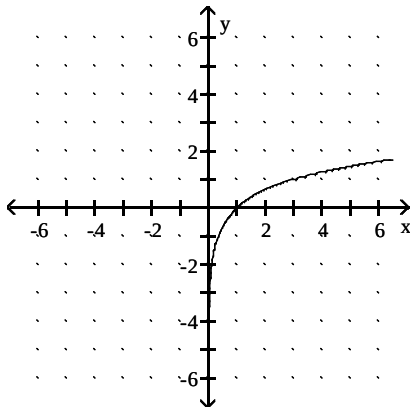
76) $\log_{\sqrt{7}} 31.4$ 76) _____

77) $\log_{\sqrt{8}} 157.4$ 77) _____

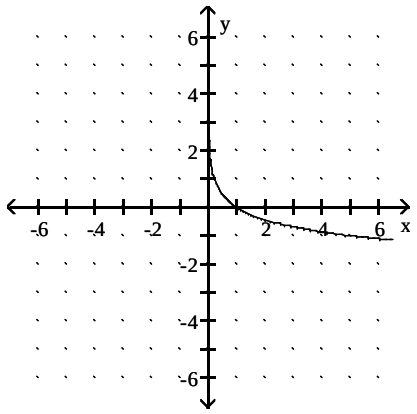
78) $\log_2 6 + \log_5 10$ 78) _____

79) $\log_3 7 + \log_8 11$ 79) _____

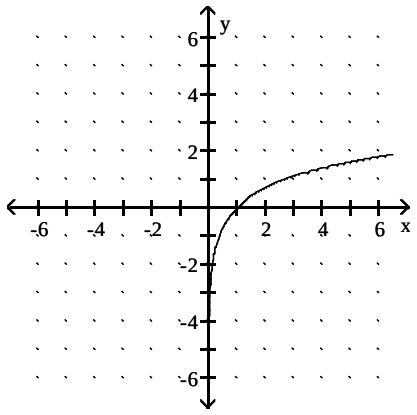
1) $9700.00
2) $3700.00
3) 375 pounds
4) 731 pounds
5) 80 years
6) 200 years
7) 0.019
8) 0.034
9) 24.921
10) 41.131
11) 7594
12) 15,299
13) 16 years from today
14) 26 years from today
15) 58 years
16) 39 years
17) $y = 2e^{x \ln 8}$, $y = 2e^{2.079x}$
18) $y = 5e^{x \ln 2}$, $y = 5e^{0.693x}$
19) $y = 13e^{x \ln 1.2}$, $y = 13e^{0.182x}$
20) $y = 37e^{x \ln 5.5}$, $y = 37e^{1.705x}$
21) $y = 700e^{x \ln 4.3}$, $y = 700e^{1.459x}$
22) $y = 900e^{x \ln 6}$, $y = 900e^{1.792x}$
23) $y = 2.2e^{x \ln 0.4}$, $y = 2.2e^{-0.916x}$
24) $y = 2.2e^{x \ln 1.2}$, $y = 2.2e^{0.182x}$
25)



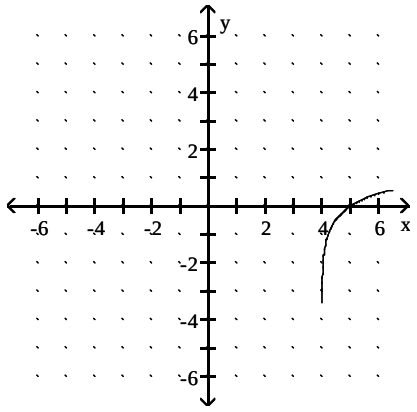
26)



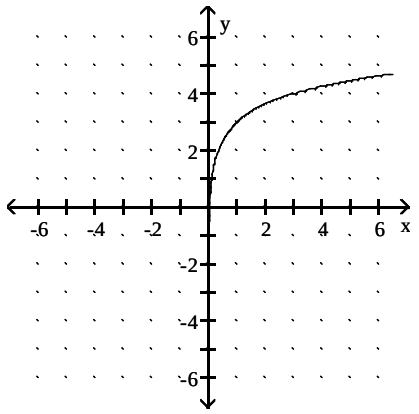
27)



28)



29)



30) 0.916
31) 0.51
32) −2.639
33) −2.303
34) 1
35) 0.778
36) 3.178
37) 4.094
38) 3.095
39) 3.677
40) 1.349
41) 2.628
42) 2.2301
43) 1.5298
44) 21
45) 21
46) 5
47) $\frac{19}{5}$
48) $\log_x 6 + \log_x y + \log_x z$
49) $\log_x 9 + \log_x y + \log_x z$
50) $2\log_a x + \log_a y + 6\log_a z$
51) $2\log_a x + \log_a y + 5\log_a z$
52) $4 \log x + \log z - 3 \log y$
53) $3 \log x + \log z - 2 \log y$
54) $3 \ln x + \frac{1}{2} \ln y$
55) $4 \ln x + \frac{1}{2} \ln y$
56) $\frac{5}{2}\log_b x + \log_b y - \frac{7}{2}\log_b z$
57) $\frac{5}{2}\log_b x + \log_b y - 2\log_b z$
58) $\ln x + \ln(x - 7)$
59) $\ln x + \ln(x - 1)$

60) $3 \log_7(x - 5) + 3 \log_7(x + 5) - 6 \log_7(x + 1)$
61) $3 \log_2(x - 1) + 3 \log_2(x + 1) - 6 \log_2(x + 4)$
62) $3 \log_5(x - 4) + 3 \log_5(x + 4) - 6 \log_5(x + 5)$
63) $3 \log_8(x - 5) + 3 \log_8(x + 5) - 6 \log_8(x + 2)$
64) 1.7712
65) 1.1133
66) 0.6419
67) 0.7386
68) 4.6284
69) 4.023
70) 1.8890
71) 2.0645
72) 5.2816
73) 2.6101
74) 1.3173
75) 1.3038
76) 3.5426
77) 4.8655
78) 4.0156
79) 2.9244