Final Exam Practice: Part II **Math 11100**

MULTIPLE CHOICE – Choose the one alternative that best completes the statement or answers the question.

Solve.

51) Solve for y: $\dfrac{2y+3}{y}=\dfrac{3}{2}$

A) $\{3\}$ B) $\{0\}$ C) $\{6\}$ D) $\{-6\}$

52) Solve for x: $\dfrac{4}{x-3}+\dfrac{9}{x}=\dfrac{-27}{x^2-3x}$

A) $\{0,3\}$ B) $\{0\}$ C) $\varnothing$ D) $\{-3\}$

53) Tom Quig traveled 280 miles east of St. Louis. For most of the trip he averaged 60 mph, but for one period of time he was slowed to 20 mph due to a major accident. If the total time of travel was 6 hours, how many miles did he drive at the reduced speed?

A) 60 miles B) 40 miles C) 35 miles D) 50 miles

54) Frank can type a report in 3 hours and James takes 7 hours. How long will it take the two of them typing together?

A) $\dfrac{10}{21}$ hr B) $\dfrac{21}{4}$ hr C) $\dfrac{21}{10}$ hr D) 7 hr

Write with radials. Assume that all variables represent positive real numbers.

55) $\left(5py^2\right)^{1/3}$

A) $\sqrt[3]{5py^2}$ B) $\sqrt{5py^2}$ C) $\sqrt[3]{5py}$ D) $\sqrt[5]{5py}$

Simplify by first converting to rational exponents. Assume that all variables represent positive real numbers.

56) $\sqrt[5]{s}\cdot\sqrt{s}$

A) $\sqrt[7]{s^2}$ B) $\sqrt[10]{s^7}$ C) $\sqrt[7]{2s}$ D) $\sqrt[5]{5s^2}$

Use the rule of exponents to simplify the expression. Assume that all variables represent positive real numbers.

57) $\left(\dfrac{x^3}{y^{-6}}\right)^{1/3}$

A) xy^2 B) $\dfrac{x}{y^2}$ C) xy D) $xy^{1/2}$

Express the radial in simplified form.

58) $\sqrt{108}$

A) 6 B) $6\sqrt{3}$ C) $36\sqrt{3}$ D) 10

59) $\sqrt[3]{48}$

A) 3 B) $6\sqrt[3]{2}$ C) 6 D) $2\sqrt[3]{6}$

60) $\sqrt{x^2+y^2}$

A) $x+y$ B) $\sqrt{x^2+y^2}$ C) x^2+y^2 D) $x-y$

Express the radical in simplified form. Assume that all variables represent positive real number

61) $\sqrt[3]{-27a^8b^5}$

A) $3\sqrt[3]{a^2b^2}$ B) $-3a^2b\sqrt[3]{a^2b^2}$ C) $3ab\sqrt[3]{a^3b^3}$ D) $3ab\sqrt[3]{a^2b^2}$

Simplify by first writing the radicals with the same index. Then multiply.

62) $\sqrt{3}\cdot\sqrt[3]{4}$

A) $\sqrt[6]{432}$ B) $\sqrt[6]{12}$ C) $\sqrt[6]{144}$ D) $\sqrt[6]{108}$

Simplify. Assume that all variables represent positive real numbers.

63) $7\sqrt{2}+6\sqrt{18}$

A) $13\sqrt{2}$ B) $-4\sqrt{2}$ C) $-25\sqrt{2}$ D) $25\sqrt{2}$

64) $5\sqrt[3]{m^7p^5}-2m^2p\sqrt[3]{mp^2}$

A) $2m^2p\sqrt[3]{mp^2}$ B) Cannot be simplified C) $3m^2p\sqrt[3]{mp^2}$ D) 3

65) $\left(\sqrt{7}+4\right)\left(\sqrt{2}+7\right)$

A) $12\sqrt{14}+28$ B) $\sqrt{14}+28$

C) $\sqrt{14}+11\sqrt{2}+28$ D) $\sqrt{14}+7\sqrt{7}+4\sqrt{2}+28$

66) $\left(5+\sqrt{3}\right)^2$

A) $28+5\sqrt{3}$ B) $8+10\sqrt{3}$ C) $25+10\sqrt{3}$ D) $28+10\sqrt{3}$

67) $\left(\sqrt{3}+1\right)\left(\sqrt{3}-1\right)$

A) 2 B) $2-2\sqrt{3}$ C) 4 D) $2+2\sqrt{3}$

Rationalize the denominator. Assume that all variables represent positive real numbers.

68) $\dfrac{3}{\sqrt{5}}$

A) $3\sqrt{5}$ B) $\dfrac{9\sqrt{5}}{5}$ C) $\dfrac{3\sqrt{5}}{5}$ D) 28

69) $\dfrac{5-\sqrt{2}}{5+\sqrt{2}}$

A) $\dfrac{27-10\sqrt{2}}{23}$ B) $\dfrac{23-10\sqrt{2}}{27}$ C) $\dfrac{27+10\sqrt{2}}{23}$ D) -1

Solve.

70) Solve for *x*: $\sqrt{8x-7}-3=0$

A) $\left\{\dfrac{5}{4}\right\}$ B) $\{2\}$ C) $\{9\}$ D) $\varnothing$

71) Solve for *x*: $\sqrt{x}+3=0$

A) $\varnothing$ B) $\{-9\}$ C) $\left\{\sqrt{3}\right\}$ D) $\{9\}$

72) Solve for *x*: $\sqrt{x+7}+5=x$

A) $\{9,18\}$ B) $\{9\}$ C) $\{2,9\}$ D) $\{2\}$

73) Solve for *x*: $\sqrt{3x+1}=3+\sqrt{x-4}$

A) $\varnothing$ B) $\{-1\}$ C) $\{5,8\}$ D) $\{-5,-8\}$

Simplify. Write your answer in the form *a* + *bi*.

74) $(5-9i)+(4+6i)$

A) $1+15i$ B) $9-3i$ C) $-9+3i$ D) $9+3i$

75) $(8+7i)-(2+3i)+(2+6i)$

A) $8+16i$ B) $8+10i$ C) $4-2i$ D) $4+10i$

76) $7i(5-9i)$

A) $35i-63i^2$ B) $35i+63i^2$ C) $63+35i$ D) $35i-63$

77) $(8-3i)(2+5i)$

A) $-15i^2+34i+16$ B) $1-46i$ C) $31+34i$ D) $31-34i$

78) $\dfrac{4+3i}{5+3i}$

A) $\dfrac{11}{16}-\dfrac{3}{16}i$ B) $\dfrac{29}{16}-\dfrac{3}{16}i$ C) $\dfrac{11}{34}-\dfrac{27}{34}i$ D) $\dfrac{29}{34}+\dfrac{3}{34}i$

Find the power of *i*.

79) i^{18}

A) $-i$ B) i C) 1 D) -1

80) i^{19}

A) $-i$ B) i C) -1 D) 1

Solve.

81) Solve for *y*: $y^2 = 12$

A) $\left\{2\sqrt{3}, -2\sqrt{3}\right\}$ B) $\left\{\sqrt{12}\right\}$ C) $\{144\}$ D) $\{6\}$

82) Solve for *x*: $(x+4)^2 - 5 = 0$

A) $\{1,\ 9\}$ B) $\left\{-4+\sqrt{5}, -4-\sqrt{5}\right\}$

C) $\left\{-4+i\sqrt{5}, -4-i\sqrt{5}\right\}$ D) $\left\{-2+\sqrt{5}, -2-\sqrt{5}\right\}$

83) Solve for *z*: $z^2 + 18z + 63 = 0$

A) $\left\{9+3\sqrt{2}\right\}$ B) $\left\{-9+3\sqrt{2}, -9-3\sqrt{2}\right\}$

C) $\left\{9+3\sqrt{7}, 9-3\sqrt{7}\right\}$ D) $\left\{-18+3\sqrt{7}\right\}$

84) Solve for *p*: $p^2 + 3p - 9 = 0$

A) $\left\{-3+3\sqrt{5}, -3-3\sqrt{5}\right\}$ B) $\left\{\dfrac{-3-3\sqrt{5}}{2}\right\}$

C) $\left\{\dfrac{-3+3\sqrt{5}}{2}, \dfrac{-3-3\sqrt{5}}{2}\right\}$ D) $\left\{\dfrac{3+3\sqrt{5}}{2}\right\}$

85) Solve for *n*: $2n^2 = -12n - 3$

A) $\left\{\dfrac{-6+\sqrt{42}}{2}, \dfrac{-6-\sqrt{42}}{2}\right\}$ B) $\left\{\dfrac{-6+\sqrt{30}}{4}, \dfrac{-6-\sqrt{30}}{4}\right\}$

C) $\left\{\dfrac{-12+\sqrt{30}}{2}, \dfrac{-12-\sqrt{30}}{2}\right\}$ D) $\left\{\dfrac{-6+\sqrt{30}}{2}, \dfrac{-6-\sqrt{30}}{2}\right\}$

86) Solve for *x*: $5x^2 - 9x + 7 = 0$

A) $\left\{\dfrac{9+i\sqrt{59}}{10}, \dfrac{9-i\sqrt{59}}{10}\right\}$ B) $\left\{\dfrac{-9+i\sqrt{59}}{10}, \dfrac{-9-i\sqrt{59}}{10}\right\}$

C) $\left\{\dfrac{9+\sqrt{59}}{10}, \dfrac{9-\sqrt{59}}{10}\right\}$ D) $\left\{\dfrac{-9+\sqrt{59}}{10}, \dfrac{-9-\sqrt{59}}{10}\right\}$

87) Solve for x: $1 - \frac{8}{x} - \frac{33}{x^2} = 0$

A) $\{-11, 3\}$ B) $\{-11, -3\}$ C) $\{-3, 11\}$ D) $\{11, 3\}$

88) Solve for x: $x^4 + 720 = 89x^2$

A) $\{-4\sqrt{5}, -3, 3, 4\sqrt{5}\}$ B) $\{-80, -9, 9, 80\}$ C) $\{3, 4\sqrt{5}\}$ D) $\{9, 80\}$

89) Solve for c: $E = mc^2$

A) $c = \pm\frac{\sqrt{Em}}{m}$ B) $c = \pm\sqrt{Em}$ C) $c = \frac{E}{m}$ D) $c = Em$

Find the vertex of the parabola with <u>vertical</u> axis of symmetry.

90) $y = -(x+5)^2 + 6$

A) $(6, -25)$ B) $(-6, 5)$ C) $(6, -5)$ D) $(-5, 6)$

91) $y = 3x^2 + 18x + 25$

A) $(2, 3)$ B) $(3, 2)$ C) $(-3, -2)$ D) $(-2, -3)$

Find the vertex of the parabola with <u>horizontal</u> axis of symmetry.

92) $x = y^2 - 8y + 21$

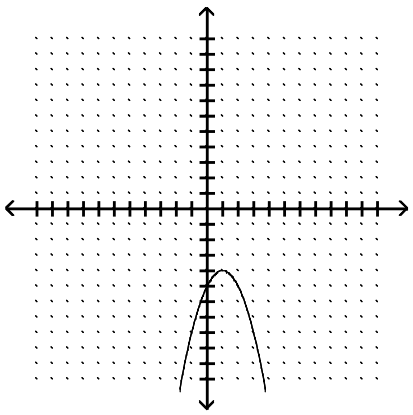
A) $(5, 4)$ B) $(4, 0)$ C) $(4, 5)$ D) $(0, 5)$

Solve.

93) The area of a square is 81 cm^2. If the same amount is added to one dimension and removed from the other, the resulting rectangle has an area 9 cm^2 less than the area of the square. How much is added and subtracted?

A) Cannot be determined without additional information
B) 3 cm
C) 4 cm
D) 9 cm

94) Choose the equation that matches the graph.



A) $y = -(x+1)^2 - 4$

B) $y = (x-1)^2 + 4$

C) $y = -(x-1)^2 - 4$

D) $y = (x+1)^2 + 4$

Solve.

95) A projectile is thrown upward so that its distance above the ground after t seconds is given by the quadratic function below. After how many seconds does it reach its maximum height?

$h(t) = -13t^2 + 494t$

A) 9 seconds B) 19 seconds C) 38 seconds D) 28.5 seconds

Use the graph of the quadratic function to find the inequality. Write your solution in interval notation.

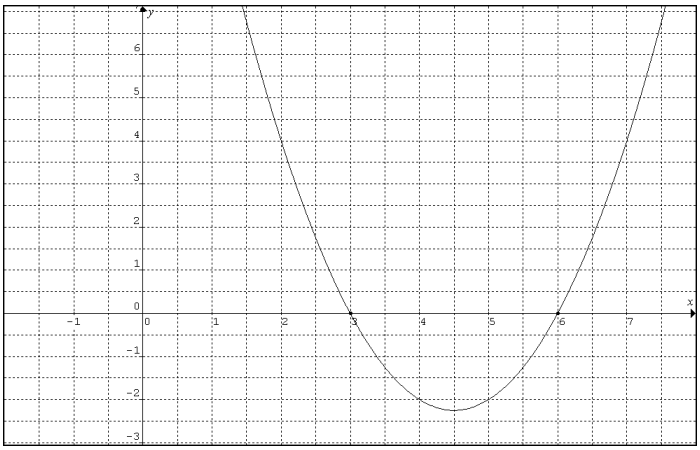
96) $x^2 - 9x + 18 \le 0$

A) $(3,\ 6)$

B) $(-\infty,\ 3) \cup (6,\ \infty)$

C) $[3,\ 6]$

D) $(-\infty,\ 3] \cup [6,\ \infty)$



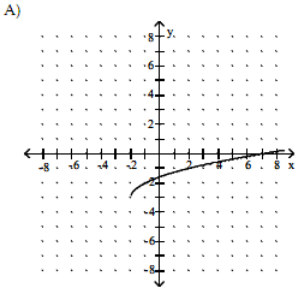
Solve the quadratic inequality. Write your solution in interval notation.

97) $x^2 + 8x + 15 \ge 0$

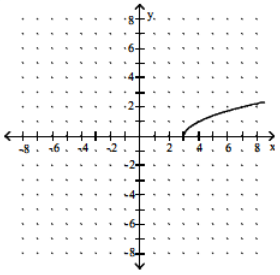
A) $[-5, -3]$ B) $(-\infty, -5] \cup [-3, \infty)$ C) $[-5,\ 3]$ D) $(-\infty, -5) \cup (-3, \infty)$

98) Graph the function. $f(x) = \sqrt{x-3} + 2$

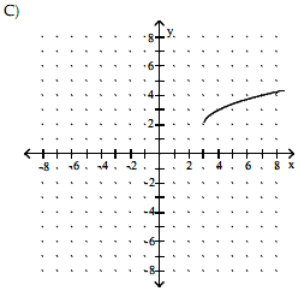
A)



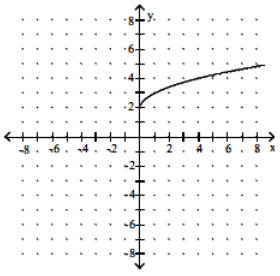
B)



C)



D)



Evaluate the composition of functions.

99) Let $f(x)=x^2+3$ and $g(x)=4x+7$. Find $(g\circ f)(5)$

A) 105 B) 732 C) 35 D) 119

100) Let $f(x)=5x+3$ and $g(x)=x+6$. Find $(f\circ g)(4)$

A) 29 B) 53 C) 230 D) 33

Find $(f\circ g)(x)$ for the given functions *f* (*x*) and *g*(*x*).

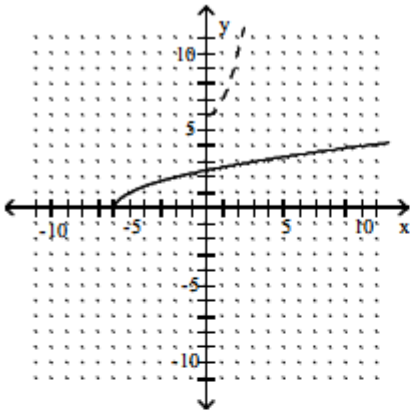
101) $f(x)=6x+3$ and $g(x)=x^2-4$.

A) $6x^2-21$ B) $36x^2+12x-3$ C) x^2+6x-1 D) x^2-6x-7

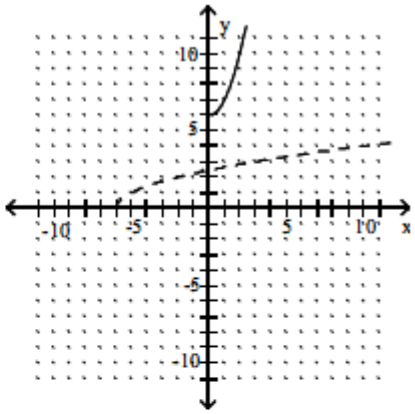
Graph the given function as a solid curve and its inverse as a dashed curve, on the same set of axes.

102) $f(x)=\sqrt{x+6}$

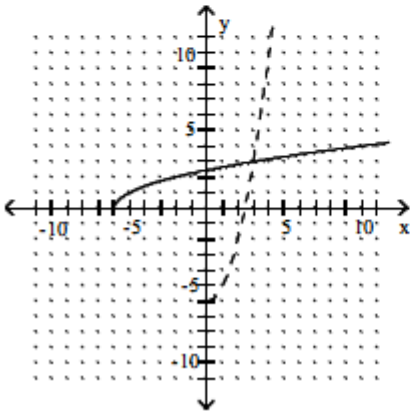
A)



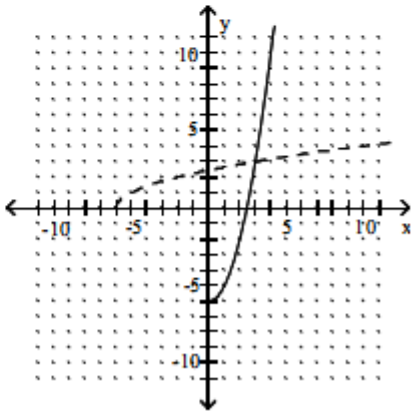
B)



C)



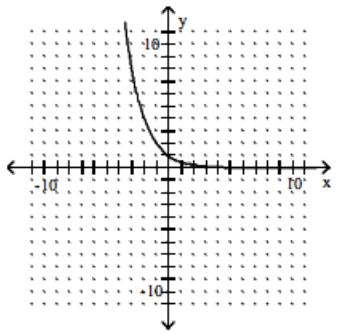
D)



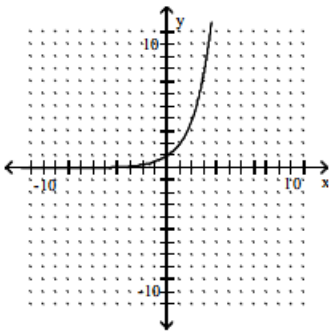
Graph the exponential function.

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

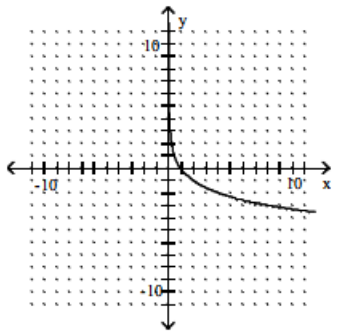
A)



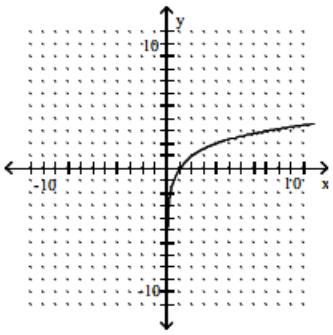
B)



C)

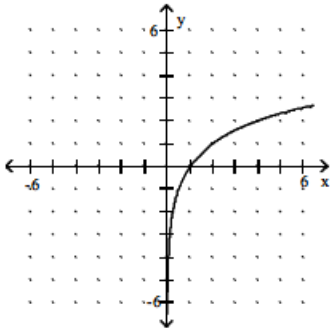


D)

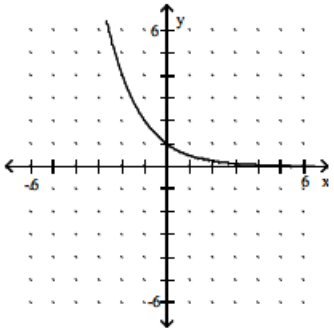


104) $f(x) = \left(\frac{1}{2}\right)^x$

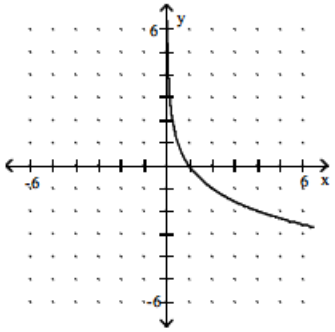
A)



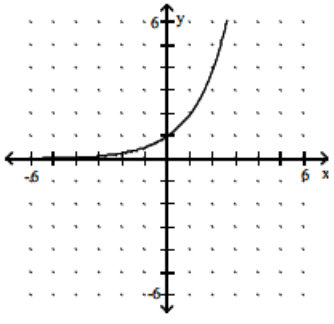
B)



C)



D)



Solve.

105) Solve for x: $4^x = 16$

A) $\{3\}$ B) $\{2\}$ C) $\{4\}$ D) $\{1\}$

106) Solve for x: $(4)^{5-3x} = \frac{1}{256}$

A) $\{3\}$ B) $\{-3\}$ C) $\left\{\frac{1}{64}\right\}$ D) $\{8\}$

107) Solve for x: $(2)^{1+2x} = 8$

A) $\{2\}$ B) $\{4\}$ C) $\{-1\}$ D) $\{1\}$

Write in logarithmic form.

108) $2^3 = 8$

A) $\log_3(8) = 2$ B) $\log_8(2) = 3$ C) $\log_2(3) = 8$ D) $\log_2(8) = 3$

Write in exponential form.

109) $\log_3\left(\frac{1}{9}\right) = -2$

A) $\left(\frac{1}{9}\right)^2 = 3$ B) $3^9 = 2$ C) $2^3 = \frac{1}{9}$ D) $3^{-2} = \frac{1}{9}$

Solve.

110) $\log_3(x) = -2$

A) $\{1\}$ B) $\{-6\}$ C) $\left\{\frac{1}{9}\right\}$ D) $\left\{\frac{1}{8}\right\}$

111) $\log_2(8) = x$

A) $\{4\}$ B) $\{16\}$ C) $\{3\}$ D) $\{10\}$

Use the change-of-base rule (with either common or natural logarithms) to find the given logarithm. Approximate to three decimal places.

112) $\log_2(33.27)$

A) 1.522 B) 0.198 C) 5.056 D) 16.635

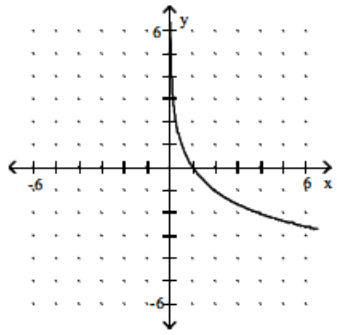
113) $\log_3(0.663)$

A) 4.525 B) –2.673 C) –0.178 D) –0.374

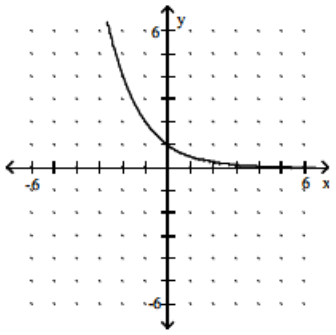
Graph the given logarithmic function.

114) $f(x) = \log_2(x)$

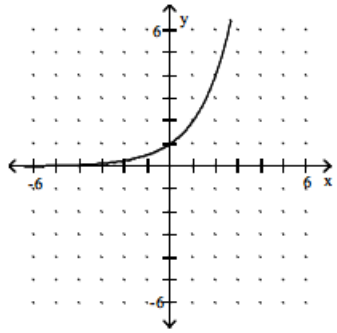
A)



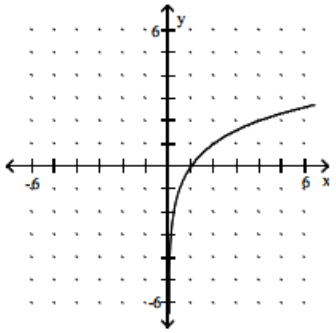
B)



C)

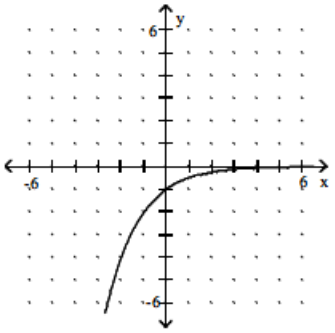


D)

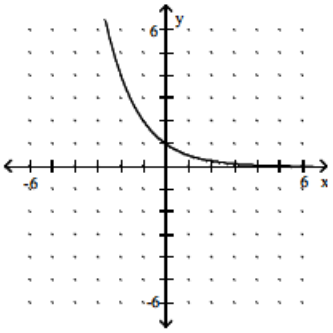


115) $f(x) = \log_{1/2}(x)$

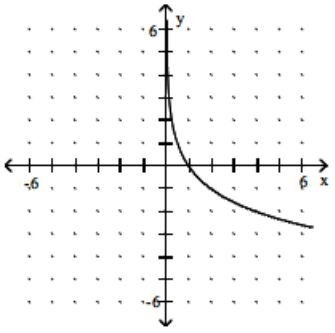
A)



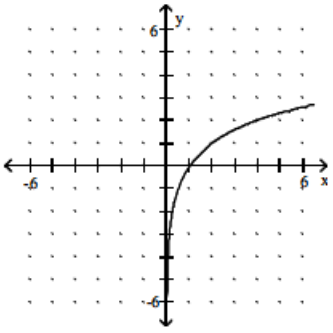
B)



C)



D)



Express the given logarithm as a sum and/or difference of logarithms. Simplify, if possible. Assume that all variables represent positive real numbers.

116) $\log_5\left(\frac{16\sqrt{m}}{n}\right)$

A) $\log_5(n)-\log_5(16)-\frac{1}{2}\log_5(m)$ B) $\log_5(16)\cdot\frac{1}{2}\log_5(m)\div\log_5(n)$

C) $\log_5(16)+\frac{1}{2}\log_5(m)-\log_5(n)$ D) $\log_5\left(16\sqrt{m}\right)-\log_5(n)$

117) $\log_3\left(\sqrt{\frac{xy}{7}}\right)$

A) $\frac{1}{2}\log_3(x)\cdot\frac{1}{2}\log_3(y)\div\frac{1}{2}\log_3(7)$ B) $\frac{1}{2}\log_3(xy)-\frac{1}{2}\log_3(7)$

C) $\frac{1}{2}\log_3(x)+\frac{1}{2}\log_3(y)-\log_3(7)$ D) $\frac{1}{2}\log_3(x)+\frac{1}{2}\log_3(y)-\frac{1}{2}\log_3(7)$

Express the given expression as a single logarithm. Assume that all variables are defined in such a way that variable expressions are positive and bases are positive number not equal to 1.

118) $5\log_m(m)-\log_m(n)$

A) $\frac{\log_m(m^5)}{\log_c(n)}$ B) $\log_m(m^5-n)$ C) $\log_m\left(\frac{5m}{n}\right)$ D) $\log_m\left(\frac{m^5}{n}\right)$

119) $\frac{1}{2}\log_2(x^4)+\frac{1}{4}\log_2(x^4)-\frac{1}{6}\log_2(x)$

A) $\frac{7}{6}\log_2(x^8)$ B) $\log_2\left(x^{17/6}\right)$ C) $\log_2(x^7)$ D) $\log_2\left(x^{9/2}\right)$

Solve the equation. Give final answers to three decimal places (do not use decimals until the final answer)

120) Solve for *x*: $8^x=12$

A) $\{0.837\}$ B) $\{1.927\}$ C) $\{2.752\}$ D) $\{1.195\}$

121) Solve for *x*: $(9)^{x-1}=25$

A) $\{2.465\}$ B) $\{0.465\}$ C) $\{5.416\}$ D) $\{3.782\}$

122) Solve for *x*: $e^{0.412x}=23$

A) $\{3.135\}$ B) $\{1.292\}$ C) $\{0.131\}$ D) $\{7.610\}$

Solve the equation. Give the exact solution(s).

123) Solve for x: $\log_5(4x+4) = \log_5(4x+7)$

A) $\varnothing$ B) $\{4\}$ C) $\{-3\}$ D) $\{0\}$

124) Solve for x: $\log_6(x^2) = \log_6(2x+15)$

A) $\{-3\}$ B) $\{5\}$ C) $\varnothing$ D) $\{-3, 5\}$

Solve the problem.

125) Find the amount of money in an account after 6 years if \$4500 is deposited at 7% annual interest compounded quarterly. Round your answer to two decimal places.

A) \$6,823.99 B) \$6,799.81 C) \$6,840.47 D) \$6,753.29

126) \$2000 is invested at 6% compounded quarterly. In how many years will the account have grown to \$8000? Round your answer to one decimal place.

A) 1.3 years B) 23.8 years C) 23.3 years D) 19.7 years

127) What will be the amount in an account with initial principal \$7000 if interest is compounded continuously at an annual rate of 7.25% for 5 years? Round your answer to two decimal places.

A) \$7,000.00 B) \$10,058.42 C) \$7,526.35 D) \$2,909.24

128) How long would it take \$8000 to grow to \$32,000 at 7% compounded continuously? Round your answer to one decimal place.

A) 20.0 years B) 19.8 years C) 22.3 years D) 20.4 years

PART II: ANSWERS

51) D
52) C
53) B
54) C
55) A
56) B
57) A
58) B
59) D
60) B
61) B
62) A
63) D
64) C
65) D
66) D
67) A
68) C
69) A
70) B
71) A
72) B
73) C
74) B
75) B
76) C
77) C
78) D
79) D
80) A
81) A
82) B
83) B
84) C
85) D
86) A
87) C
88) A
89) A
90) D
91) C
92) A
93) B
94) C
95) B
96) C
97) B
98) C
99) D
100) B
101) A
102) C
103) B
104) B
105) B
106) A
107) D
108) D
109) D
110) C
111) C
112) C
113) D
114) D
115) B
116) C
117) D
118) D
119) B
120) D
121) A
122) D
123) A
124) D
125) A
126) C
127) B
128) B