Exam 2 Preparation Ch 5 & 6 v01
There will be 25 questions on Exam 2.
Fourteen questions from chapter 5 and eleven questions from chapter 6.
No Book/No Notes/No Ipod/ No Phone/Yes Calculator/55 minutes

Name_____

Find the inverse of the given function.

1) $f(x) = x + 5$

2) $f(x) = -3x$

3) $f(x) = 3x - 8$

4) $f(x) = \frac{5x - 7}{3}$

5) $f(x) = 2(x - 5)$

6) $f(x) = x^3 + 6$

Evaluate.

7) Let $g(x) = 6^x$. Find $g(3)$

8) Let $g(x) = 6^x$. Find $g^{-1}(1296)$

9) Let $f(x) = \log_3(x)$. Find $f(27)$

10) Let $f(x) = \log_5(x)$. Find $f^{-1}(2)$

Solve the problem.

11) Find the ratio of the amplitude of an earthquake with Richter number 7 to the amplitude of an earthquake with Richter number 1.

12) The loudness of sound can be measured on a decibel scale. The sound level L (in decibels) of a sound is given by $L = 10\log\left(\frac{I}{I_0}\right)$, where I is the intensity of the sound (in watts per square meter, W/m^2) and $I_0 = 10^{-12}$ W/m^2. A certain sound has intensity of 6.44×10^{-5} W/m^2. Find the decibel value of this sound? (Round to the nearest whole number.)

13) The pH of a solution ranges from 0 to 14. An acid has a pH less than 7. Pure water is neutral and has a pH of 7. The pH of a solution is given by $pH = -\log(H^+)$ where H^+ represents the concentration of the hydrogen ions in the solution in moles per liter. Find the pH if the hydrogen ion concentration is 1×10^{-6}.

14) The pH of a solution ranges from 0 to 14. An acid has a pH less than 7. Pure water is neutral and has a pH of 7. The pH of a solution is given by $pH = -\log(H^+)$ where H^+ represents the concentration of the hydrogen ions in the solution in moles per liter. Find the pH if the hydrogen ion concentration is 1.6×10^{-13}.

15) The pH of a solution ranges from 0 to 14. An acid has a pH less than 7. Pure water is neutral and has a pH of 7. The pH of a solution is given by $pH = -\log(H^+)$ where H^+ represents the concentration of the hydrogen ions in the solution in moles per liter. Find the pH if the hydrogen ion concentration is 4×10^{-6}.

16) Solve $ab^{cx+d} + k = h$ for x. Assume that $b > 0$, $b \neq 1$, and that the constants have values for which the equation has exactly one real number solution.

17) Solve $ab^{cx-d} = k$ for x. Assume that $b > 0$, $b \neq 1$, and that the constants have values for which the equation has exactly one real number solution.

18) Jeff received a gift from his grandfather of $7000, which he invested at an annually compounded interest rate of 8%. Let V = f(t) represent the value (in dollars)of the account after t years or any fraction thereafter. Find an equation for f. What will be the value of the investment in 17 years?

19) Jeff received a gift from his grandfather of $15,000, which he invested at an annually compounded interest rate of 6%. Let V = f(t) represent the value (in dollars)of the account after t years or any fraction thereafter. Find an equation for f. What will be the value of the investment in 5 years?

20) Bianca borrowed $12,000 at a rate of 8% compounded annually. What was the total amount Bianca owed after 5 years?

21) Bianca borrowed $12,000 at a rate of 9% compounded annually. What was the total amount Bianca owed after 9 years?

Simplify. Write the expression as a single logarithm with a coefficient of 1.

22) $6\log_b(m) - \log_b(n)$

23) $\log_5(x-4) - \log_5(x-8)$

24) $3\log_z(2) + \log_z(2)$

25) $\log_3(x+9) + \log_3(x+5)$

26) $\log_8 10 + \log_8 5 - \log_8 25$

27) $\log_9 10 + \log_9 3 - \log_9 6$

28) $\log_{10} 4 + \log_{10} (x^3 - 4) + \log_{10} 3$

29) $\log_9 2 + \log_9 (x^3 - 2) + \log_9 3$

30) $5 \log_b (2x^7) - 3 \log_b (4x^4)$

31) $\dfrac{\log_4 (x)}{\log_4 (5)}$

Evaluate. Round your result to the fourth decimal place.

32) $\log_9 (17)$

33) $\log_2 (13)$

34) $\log_{22} (393)$

35) $\log_{15} (66.4)$

36) $\log_{0.1} (17)$

37) $\log_{0.5} (17)$

38) $\log_{1/5} (2)$

39) $\log_{1/2} (5)$

Find the natural logarithm.

40) $\ln(e^{12})$

41) $\ln(e^{6})$

42) $\ln(e)$

43) $\ln\left(\frac{1}{e^{7}}\right)$

44) $\ln\left(\frac{1}{e^{4}}\right)$

45) $\ln \sqrt[6]{e}$

Solve the equation.

46) $\ln(x) = 3$

47) $3 \ln(4x) = 21$

48) $\ln(15) + \ln(x) = 0$

49) $\ln(5) + \ln(x - 1) = 0$

50) $8 + 6 \ln(x) = 6$

Solve the equation. Round the solution to four decimal places, if necessary.

51) $e^{2x} = 8$

52) $e^{(x + 3)} = 5$

53) $\ln (3x) + \ln (6x) = 4$

54) $-3 \ln (7x^5) - 4 \ln (5x^2) = 4$

55) $e^{4x - 6} \cdot e^{3x} = 120$

56) $9e^x - 12 = 3e^x + 42$

57) $\ln (2x^{13}) - 3 \ln (x^4) = 6$

Use "intersect" on a graphing calculator to solve the equation. Round the solution to the fourth decimal place.

58) $2e^x = 7 - 3x$

59) $2 \ln (x + 5) = -3x + 8$

Solve the problem.

60) The function $y = 300e^{-0.0099x}$ 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 300 pounds of the material are initially put into the vault, how many pounds will be left after 90 years?

61) 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 $f(t) = 2000e^{0.059t}$. How much did you initially invest in the account?

62) 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 $f(t) = 4600e^{0.066t}$. When will the account be worth $7301?

63) The function $y = 700e^{-0.01386x}$ 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 152 pounds to remain?

Perform the addition or subtraction.

64) $(6x^5 - 5x^4) + (2x^5 - 7x^4)$

65) $(6x^6 + 3x^3) + (2x^6 - 8x^3 - 6)$

66) $(7x^6 + 6x^5 - 6x) + (2x^6 + 4x^5 + 2x)$

67) $(6x^6 - 9x^5 + 7x^4 + 1) + (6x^6 - 6x^5 + 6x^4 - 2)$

68) $(x^2 + 3x + 7) + (6x - 5)$

69) $(24y + 13) + (5y^2 - 12y + 13)$

70) $(5x^2y - 8xy + 6) + (-4x^2y + 3xy - 12)$

71) $(7x^2 + 7x + 6) - (4x^2 + 3)$

72) $(-4x^2 - 1) - (-x^3 - 9x^2 - 7)$

Find the function value.

73) If $Q(x) = 2x^2 - 7x + 8$, find $Q(-3)$.

74) If $Q(x) = 2x^2 + 7x - 5$, find $Q(0)$

75) If $P(x) = x^2 - 8x - 8$, find $P(5)$.

76) If $Q(x) = x^2 - 6$, find $Q(2)$.

77) If $P(x) = -9x^2 + 8x$, find $P(-3)$.

Find an equation for the given function.

78) $f(x) = x - 3$; $g(x) = 8x^2$
Find $(f - g)(x)$.

79) $f(x) = x^2 + \frac{4}{3}x + 4$; $g(x) = x^3 + \frac{2}{3}x^2 + x$
Find $(f + g)(x)$.

Evaluate the given function at the indicated value.

80) $f(x) = 3x^2 + 3x - 1$; $g(x) = -3x + 9$
Find $(f + g)(-4)$.

81) $f(x) = 2x^2 - 3$; $g(x) = 3x^2 - 3x - 3$
Find $(f + g)(3)$.

82) $f(x) = 2x^2 - 6x - 2$; $g(x) = -5x + 9$
Find $(f + g)(-2)$.

83) $f(x) = -2x^2 + 1$; $g(x) = x + 7$
Find $(f - g)(5)$.

Find the requested function.

84) If $f(x) = x^2 - 5x - 5$, find $f(x + 6)$.

85) If $f(x) = x^2 - 7x$, find $f(x + h)$.

86) If $f(x) = x^2 - 9x - 9$, find $f(x + h)$.

87) If $f(x) = x^2 - 6x - 6$, find $f(x + h) - f(x)$.

Find the requested product.

88) $f(x) = 7x + 8$, $g(x) = 8x - 2$
Find $(f \cdot g)(x)$.

89) $f(x) = x + 8$, $g(x) = x^2 + 9$
Find $(f \cdot g)(x)$.

90) $f(x) = 6x - 8$, $g(x) = -3x + 5$
Find $(f \cdot g)(-1)$.

91) $f(x) = x - 1$, $g(x) = 3x^2 + 14x + 7$
Find $(f \cdot g)(-4)$.

92) $f(x) = x + 1$, $g(x) = x - 5$
Find $(f \cdot g)(x)$ and $(f \cdot g)(-11)$.

93) $f(x) = x + 3$, $g(x) = x^2 - 7x - 10$
Find $(f \cdot g)(x)$ and $(f \cdot g)(5)$.

Factor when possible.

94) $7x^2 - 7x - 42$

95) $3x^2 - 18x + 24$

96) $48y^2 + 140y + 100$

97) $243x^2 - 108x + 12$

98) $50x^2 + 60x + 18$

99) $48a^2b + 222ab - 90b$

100) $24y^2 + 46y + 20$

101) $x^3 - x^2 - 12x$

102) $8x^2 - 8x - 48$

103) $6x^2 - 18xy - 24y^2$

104) $3y^3 - 6y^2 - 45y$

105) $5x^3 + 15x^2 - 50x$

106) $-w^2 + 9w - 20$

107) $12x^3 - 300x$

108) $x^2 - 12x + 144$

109) $9x^3 - 9$

110) $5x^3 + 135$

111) $11x^5 - 11xy^2$

112) $2x^5 - 2x$

Solve.

113) $x(5x + 8) = 4$

114) $3x^2 - 27x + 60 = 0$

115) $2x^3 + 5x^2 = 18x + 45$

116) $2x(x - 1) = 6x^2 - 3x$

117) $x^2 - \frac{43}{11}x = \frac{x}{11}$

118) $x^2 - \frac{19}{5}x = \frac{x}{5}$

Find all x–intercepts.

119) $g(t) = t^2 + 2t - 99$

120) $s(p) = 3p^2 - 5p - 8$

121) $f(x) = x^3 + x^2 - 6x$

122) $f(x) = x^3 + 8x^2 - x - 8$

Solve the problem.

123) If the cost, C(x), for manufacturing x units of a certain product is given by $C(x) = x^2 - 40x + 2100$, find the number of units manufactured at a cost of $8100.

124) A manufacturer determines that the profit in dollars for manufacturing n units is $P = 2n^2 - 60n - 400$. (Assume that n is a positive integer) How many units are produced when the profit is $400?

125) The net income y (in millions of dollars) of Pet Products Unlimited from 1997 to 1999 is given by the equation $y = 9x^2 + 15x + 52$, where x represents the number of years after 1997. Assume this trend continues and predict the year in which Pet Products Unlimited's net income will be $256 million.

126) A window washer accidentally drops a bucket from the top of a 144–foot building. The height h of the bucket after t seconds is given by $h = -16t^2 + 144$. When will the bucket hit the ground?

127) An object is thrown upward from the top of a 160–foot building with an initial velocity of 48 feet per second. The height h of the object after t seconds is given by the quadratic equation $h = -16t^2 + 48t + 160$. When will the object hit the ground?

1) $f^{-1}(x) = x - 5$

2) $f^{-1}(x) = -\frac{1}{3}x$

3) $f^{-1}(x) = \frac{x + 8}{3}$

4) $f^{-1}(x) = \frac{3x + 7}{5}$

5) $f^{-1}(x) = \frac{1}{2}x + 5$

6) $f^{-1}(x) = \sqrt[3]{x - 6}$

7) 216

8) 4

9) 3

10) 25

11) 1,000,000

12) 78 decibels

13) 6

14) 12.8

15) 5.4

16) $x = \frac{\log\left(\frac{h - k}{a}\right) - d \log (b)}{c \log (b)}$

17) $x = \frac{\log\left(\frac{k}{a}\right) + d \log (b)}{c \log (b)}$

18) $V = 7000(1.08)^t$; \$25,900.13

19) $V = 15{,}000(1.06)^t$; \$20,073.38

20) \$17,631.94

21) \$26,062.72

22) $\log_b\left(\frac{m^6}{n}\right)$

23) $\log_5\left(\frac{x - 4}{x - 8}\right)$

24) $\log_z (16)$

25) $\log_3(x + 9)(x + 5)$

26) $\log_8 2$

27) $\log_9 5$

28) $\log_{10} (12x^3 - 48)$

29) $\log_9 (6x^3 - 12)$

30) $\log_b\left(\frac{x^{23}}{2}\right)$

31) $\log_5 (x)$

32) 1.2895

33) 3.7004
34) 1.9326
35) 1.5493
36) –1.2304
37) –4.0875
38) –0.4307
39) –2.3219
40) 12
41) 6
42) 1
43) –7
44) –4
45) $\frac{1}{6}$
46) e^3
47) $\frac{e^7}{4}$
48) $\frac{1}{15}$
49) $\frac{6}{5}$
50) $e^{-1/3}$
51) 1.0397
52) –1.3906
53) 1.7416
54) 0.4928
55) 1.5411
56) 2.1972
57) 201.7144
58) 0.8199
59) 1.4264
60) 123 pounds
61) $2000.00
62) 2007
63) 110 years
64) $8x^5 - 12x^4$
65) $8x^6 - 5x^3 - 6$
66) $9x^6 + 10x^5 - 4x$
67) $12x^6 - 15x^5 + 13x^4 - 1$
68) $x^2 + 9x + 2$
69) $5y^2 + 12y + 26$
70) $x^2y - 5xy - 6$
71) $3x^2 + 7x + 3$
72) $x^3 + 5x^2 + 6$
73) 47
74) –5
75) –23

76) –2
77) –105
78) $(f - g)(x) = -8x^2 + x - 3$
79) $(f + g)(x) = x^3 + \frac{5}{3}x^2 + \frac{7}{3}x + 4$
80) 56
81) 30
82) 37
83) –61
84) $x^2 + 7x + 1$
85) $x^2 + 2xh + h^2 - 7x - 7h$
86) $x^2 + 2xh + h^2 - 9x - 9h - 9$
87) $2xh + h^2 - 6h$
88) $56x^2 + 50x - 16$
89) $x^3 + 8x^2 + 9x + 72$
90) –112
91) 5
92) $(f \cdot g)(x) = x^2 - 4x - 5$; $(f \cdot g)(-11) = 160$
93) $(f \cdot g)(x) = x^3 - 4x^2 - 31x - 30$; $(f \cdot g)(5) = -160$
94) $7(x + 2)(x - 3)$
95) $3(x - 2)(x - 4)$
96) $4(3y + 5)(4y + 5)$
97) $3(9x - 2)^2$
98) $2(5x + 3)^2$
99) $6b(8a - 3)(a + 5)$
100) $2(4y + 5)(3y + 2)$
101) $x(x + 3)(x - 4)$
102) $8(x + 2)(x - 3)$
103) $6(x + y)(x - 4y)$
104) $3y(y + 3)(y - 5)$
105) $5x(x - 2)(x + 5)$
106) $-(w - 4)(w - 5)$
107) $12x(x + 5)(x - 5)$
108) Prime
109) $9(x - 1)(x^2 + x + 1)$
110) $5(x + 3)(x^2 - 3x + 9)$
111) $11x(x^2 + y)(x^2 - y)$
112) $2x(x^2 + 1)(x + 1)(x - 1)$
113) $x = \frac{2}{5}, -2$
114) $x = 4, 5$
115) $x = -3, -\frac{5}{2}, 3$
116) $x = 0, \frac{1}{4}$
117) $x = 0, 4$

118) $x = 0, 4$
119) $(-11, 0), (9, 0)$
120) $\left(\frac{8}{3}, 0\right), (-1, 0)$
121) $(0, 0), (-3, 0), (2, 0)$
122) $(-1, 0), (1, 0), (-8, 0)$
123) 100 units
124) 40 units
125) 2001
126) 3 sec
127) 5 sec