Math 1130 Exam 2 Review  
(This exam review will cover sections 2.4, 4.1-4.4, 5.1-5.3)  
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.  

Provide an appropriate response.

1) The population of a city is given by \( P = 10,000(1.04)^t \) where \( t \) is the number of years after 1988. Find the population in 
   (a) 1988  
   (b) 1989  
   (c) 1990.  

2) If $400 is invested for 2 years at 6\% compounded semiannually, find  
   (a) the compound amount and  
   (b) the compound interest.  

3) A trust fund is being set up by a single payment so that at the end of 5 years there will be $10,000 in the fund. If the interest rate is \( 3\frac{3}{4}\% \) compounded quarterly, how much money should be paid initially into the trust fund?  

4) Write the following in terms of \( \ln x, \ln(x - 3), \) and \( \ln(x + 1): \ln\left[x \sqrt{(x - 3)(x + 1)}\right] / 3 \)  

5) Write the following in terms of \( \ln x, \ln(x - 3), \) and \( \ln(x + 1): \ln\left[\frac{x(x - 3)^2}{\sqrt{x + 1}}\right] \)  

6) Find the inverse of the function: \( f(x) = (x - 3)^2, \) for \( x \geq 3 \)  

7) Find \( x: \log_6 36 = x \)  

8) Find \( x: \log_5 16 = 4 \)  

9) Find \( x: \log_3(4x - 3) = 2 \)  

10) Find \( x \) and express your answer in terms of natural logarithms: \( 2e^{3x} = 6 \)  

11) Solve for \( x: 3^{2x} - 3x + 1 = -2 \)  

Provide an appropriate response.

12) How long will it take for $100 to amount to $200 at an interest rate of 10\% compounded annually? Give your answer to 2 decimal places.  

13) The magnitude (Richter Scale) of an earthquake is given by \( R = \log\left(\frac{I}{I_0}\right) \) where \( I \) is the intensity of the earthquake and \( I_0 \) is the intensity of a zero-level reference earthquake. \( \frac{I}{I_0} \) represents how many times greater the earthquake is than the reference earthquake. Find the magnitude of an earthquake that is 200 times the intensity of a zero-level earthquake.
14) Assume that \( \log 5 = 0.6690 \). Determine the value of \( \log \sqrt[3]{5} \).

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

15) If \( \ln x + \ln 2 = \ln 5 \), then \( x = \)

A) \( \sqrt{5} \). B) 3. C) \( \frac{2}{5} \). D) \( \frac{1}{3} \). E) \( \frac{5}{2} \).

16) If \( \log_4(x + 6) = 2 - \log_4 x \), then \( x = \)


SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

17) Solve for \( x \): \( e^{2\ln(2x)} = 4 \)

18) Write \( \log_2(x + 4) \) in terms of common logarithms.

19) Solve for \( x \): \( \log(x + 1) - \log(x - 2) = 1 \)

20) Solve for \( x \): \( \log_2(x - 4) + \log_2 3 = \log_2 x \)

21) Solve for \( x \): \( 4^{x+1} = 8^{3x} \)

22) Solve for \( x \): \( (2 + x)^5 = 129.3 \)

23) Find the effective rate that corresponds to an interest rate of 5% compounded daily.

24) How many years will it take for a principal to double at a rate of 10% compounded annually? Give your answer to the nearest year.

25) Over a period of 3 years, an original principal of \$1000 \) accumulated to \$1200 \) in an account where the interest rate was compounded monthly. Determine the rate of interest to two decimal places.

26) An initial investment of \$2600 \) grows at an annual rate of 7.5% compounded monthly. Find how long it takes for the investment to amount to \$3500 \).

27) An investment is growing at an effective rate of 12.4%. If the amount invested is currently \$12,000 \), what will the amount be in 6 years?

28) A debt of \$2000 \) due four years from now is to be repaid by a payment of \$1000 \) now and a second payment at the end of two years. How much should the second payment be if the interest rate is 5% compounded annually?
29) For an initial investment of $10,000, suppose a company guarantees the following cash flows at the end of the indicated years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$4000</td>
</tr>
<tr>
<td>3</td>
<td>$8000</td>
</tr>
</tbody>
</table>

Assume an interest rate of 5% compounded annually. (a) Determine the net present value of the cash flows. (b) Is the investment profitable?

30) Find the present value of $3000 due after five years if the interest rate is 9.6% compounded semiannually.

31) A debt of $12,000, which is due 10 years from now, is instead to be paid off by four payments: $3000 now, $2000 in 3 years, $2000 in 6 years, and a final payment at the end of 8 years. What would this payment be if an interest rate of 5.5% compounded semiannually is assumed?

32) Suppose that Tori can invest $13,000 in a business that guarantees her the following cash flows: $6000 at the end of 2 years, $5000 at the end of 4 years, and $4000 at the end of 6 years. Assuming an interest rate of 6% compounded monthly, find the present value of the cash flows. Is the investment profitable?

33) If $200 is deposited into a savings account that earns interest at an annual rate of 8% compounded continuously, find the value of the account at the end of two years.

34) Determine the effective rate equivalent to an annual rate of 10% compounded continuously.

35) Determine the effective rate equivalent to an annual rate of $7\frac{3}{4}$% compounded continuously.

36) At an annual rate of 4% compounded continuously, in how many years would it take for a principal to double?

37) If a person deposits $1000 in a savings account that pays an interest rate of $r$% compounded continuously, and the account has $1400 at the end of 4 years, find the interest rate.

38) A trust fund is to be set up by a single payment so that at the end of 10 years there will be $1,000,000 in the fund. If interest is compounded continuously at an annual rate of 9%, to the nearest dollar, how much money should be paid into the fund initially?
Answer Key
Testname: MATH 1130 EXAM 2 REVIEW (AU 13)

1) (a) 10,000
   (b) 10,400
   (c) 10,816
2) (a) $450.20
   (b) $50.20
3) $8297.54
4) $8297.54
4) \( \ln x + \frac{1}{3} \left[ \ln(x - 3) + 2 \ln(x + 1) \right] \)
5) \( \ln x + 2 \ln(x - 3) - \frac{1}{2} \ln(x + 1) \)
6) \( f^{-1}(x) = \sqrt{x} + 3 \)
7) 2
8) 2
9) 1, 3
10) \( \frac{\ln 3}{3} \)
11) 0 or \( \frac{\ln 2}{\ln 3} \)
12) 7.27 years
13) approximately 2.3
14) 0.2230
15) E
16) D
17) 1
18) \( \frac{\log(x + 4)}{\log 2} \)
19) \( \frac{7}{3} \)
20) 6
21) \( \frac{2}{7} \)
22) \( x = .6443547 \)
23) 5.1267%
24) 7
25) 6.09%
26) 4 years
27) $24,198
28) $711.56
29) (a) $720.23 (b) yes
30) $1877.19
31) $1282.91
32) –$948.19; no
33) $234.70
34) 10.52%
35) 8.058223%
36) 17.3
37) 8.4118059%
38) $406,570