Math 1311
Homework 1 (Section 1.1 – Section 1.2)

Record your answers to all the problems in the EMCF titled "**Homework 1**."

For exercises 1-5 evaluate the given functions as required.

1. $f(x) = (3 + x^{1.2})^{x+3.8}$ at $x = 4.3$

    a. 52,852,123.02
    b. 42,943,441.08
    c. 38,568,225.03
    d. 40,365,985.07

2. $g(x, y) = \frac{x^3+y^3}{x^2+y^2}$ at $x = 4.1, y = 2.6$

    a. 4.57
    b. 3.67
    c. 2.37
    d. 8.96

3. Calculate $f(1.3)$ if $f(t) = 87.1 - e^{4t}$

    a. -94.17
    b. 93.25
    c. 96.32
    d. -96.32

4. Evaluate the formula $(x+y)^{-x}$ using $x = 2$ and $y = 3$. Round your answer to four decimal places.
    a. 2.11
    b. 3.00
    c. 0.04
    d. 0.01

5. You have just received word that your original investment of $1950 has increased in value by 11%. What is the value of your investment today?
    a. $2264.50
    b. $2364.50
    c. $2164.50
    d. $2184.00

6. A ball is tossed upward from a tall building, and its upward velocity V in feet per second, is a function of time t, in seconds, since the ball was thrown. The formula is $V(t) = 80 - 32t$ if we ignore air resistance. Express using functional notation the velocity 4 seconds after the ball is thrown and then calculate that value. Is the ball rising or falling then?

a. $V(4) = -32 \, ft/sec$; ball is falling
b. $V(4) = 32 \, ft/sec$; ball is rising
c. $V(4) = 48 \, ft/sec$; ball is rising
d. $V(4) = -48 \, ft/sec$; ball is falling

7. Using the information from problem 6, find the velocity change from one second to the next?

a. The velocity changes by -80 feet per second for each second that passes.
b. The velocity changes by -32 feet per second for each second that passes.
c. The velocity changes by 80 feet per second for each second that passes.
d. The velocity changes by 32 feet per second for each second that passes.

8. Section 1.1 Exercise 6a

a. In 1904, the winning height is 3.5 m.
b. In 1994, the winning height is 5.5 m.
c. In 1904, the winning height is 5.5 m.
d. In 1994, the winning height is 3.5 m.

9. Section 1.1 Exercise 8a

a. 3.66
b. 4.56
c. 7.65
d. 2.88

10. Section 1.1 Exercise 8b

a. C(3); 2.05
b. C(3); 1.02
c. C(180); 3.25
d. C(180); 1.86

For exercises 11-15 use the table below:

t	$N = N(t)$
10	17.6
20	23.8
30	44.6
40	51.3
50	53.2
60	53.7
70	53.9

11. Use averaging to estimate the value of $N(15)$.

a. 15.4
b. 18.2
c. 23.5
d. 20.7

12. Use averaging to estimate the value of $N(35)$.

a. 55.85
b. 49.63
c. 80.32
d. 47.95

13. Use averaging to estimate the value of $N(55)$.

a. 53.45
b. 60.59
c. 59.60
d. 63.52

14. Calculate the average rate of change from $t = 10$ to $t = 20$. Use your answer to estimate the value of $N(13)$.
a. Average rate of change = 0.99; $N(13) = 20.58$
b. Average rate of change = 1.57; $N(13) = 15.87$
c. Average rate of change = 0.62; $N(13) = 19.46$
d. Average rate of change = -1.02; $N(13) = 23.65$

15. Calculate the average rate of change from $t = 30$ to $t = 40$. Use your answer to estimate the value of $N(36)$.

a. Average rate of change $= 0.67$; $N(36) = 48.62$
b. Average rate of change $= 1.33$; $N(36) = 52.63$
c. Average rate of change $= 0.12$; $N(36) = 45.36$
d. Average rate of change $= -1.18$; $N(36) = 37.52$

16. Using the table below, find the average rate of change in N from $t = 69$ to $t = 82$. Round the answer to the nearest hundredth.

t	30	43	56	69	82	95	108
$N(t)$	93.06	133.69	174.31	214.94	255.56	296.19	336.81

a. 4.35
b. 4.55
c. 1.45
d. 3.12

17. The following table shows the value B, in billions of dollars, of new construction put in place in the United States during year t. Determine over what period was the growth in value of new construction the greatest?

t = Year B = Value
               (billions of dollars)

t = Year	B = Value (billions of dollars)
1995	617.9
1998	766.5
2001	874.8
2004	1144.7

a. 1995 to 1998
b. 1998 to 2001
c. 2001 to 2004
d. 1995 to 2004

18. If you borrow P dollars at a monthly interest rate of r (as a decimal) and wish to pay off the note in t months by monthly payments of M, then $P = P(M, r, t)$, the functional relationship between these variables can be defined by the following formula:

$$P = M \times \frac{1}{r} \times \left(1 - \frac{1}{(1+r)^t}\right).$$

Suppose you can afford to pay $460 per month for 5 years. How much money can you afford to borrow for the purchase of a car if the prevailing monthly interest rate is 0.32%? Express the answer in functional notation, and then calculate it.

a. $P(46, 35, 0.032) = \$250{,}757.64$
b. $P(460, 0.0032, 60) = \$25{,}075.76$
c. $P(5520, 1.032, 48) = \$25{,}836.74$
d. $P(0.0032, 480, 4.17) = \$2122.30$

19. Section 1.2 Exercise 6b

a. $G(2006) = 13.12$
b. $G(2006) = 14.15$
c. $F(2006) = 13.12$
d. $G(2006) = 14.76$

20. Section 1.2 Exercise 8c

a. 42.5
b. 54.8
c. 48.6
d. 50.2