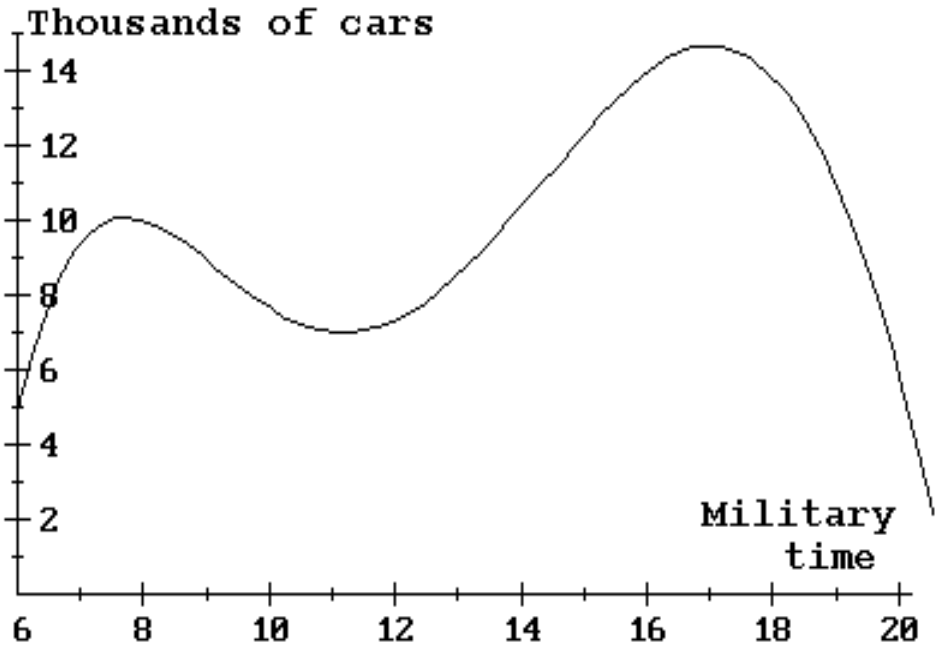
MATH 1306	***Name*** _____
Homework Handout #2 MC	***Student ID*** _____

1. The following graph shows the average number of cars (in thousands) traveling on the Gridlock Expressway in Gotham City during a typical weekday from 6 am to 8 pm (the input axis is marked off in military time). For example, military time 14 corresponds to 2 pm. Suppose C is the number of cars (in thousands) on this expressway at time t (military time).



1a. Write the coordinates of the rightmost turning point of the function C. _____

a. $(6, 5)$
b. $(7, 11.2)$
c. $(21, 0)$
d. $(17, 14.5)$

1b. At what time was traffic most congested on the expressway? _____

a. 6 am
b. 8 am
c. 5 pm
d. 8 pm

How many cars were on the expressway at this time? _____

a. 14.5
b. $10,000$
c. $14,500$
d. $5,000$

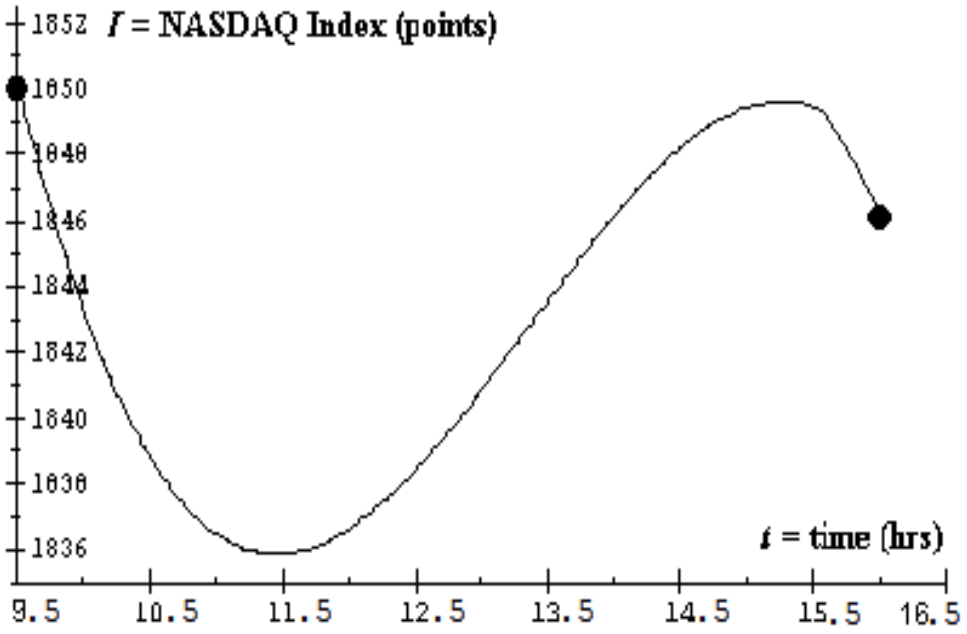
1c. Determine the set of inputs where the function C is decreasing.

a. all real numbers between 10 and 7
b. all real numbers beween 11 and 17
c. all real numbers between 6 and 9, and between 14 and 20
d. all real numbers between 8 and 11.2, and between 17 and 20

1d. During what time period(s) is traffic on the expressway becoming more congested?

a. between 9 am and 1 pm
b. between 6 am and 8 am, and between 11:12 am and 5 pm
c. between 6 am and 9 am, and between 2 pm and 8 pm
d. between 8 am and 11:12 am, and between 5 pm and 8 pm

2. The NASDAQ Composite Index is a numerical value that roughly measures the price of all stocks traded on the NASDAQ Stock Exchange. This exchange has become more important in recent years, since the stocks of many high-tech companies are traded there. The following graph depicts the value of the NASDAQ index (I) over the course of a recent trading day. The input axis is marked off in military time, where $t = 9.5$ corresponds to 9:30 am and $t = 16$ corresponds to 4 pm.



2a. Write the coordinates of all turning points of the function I.

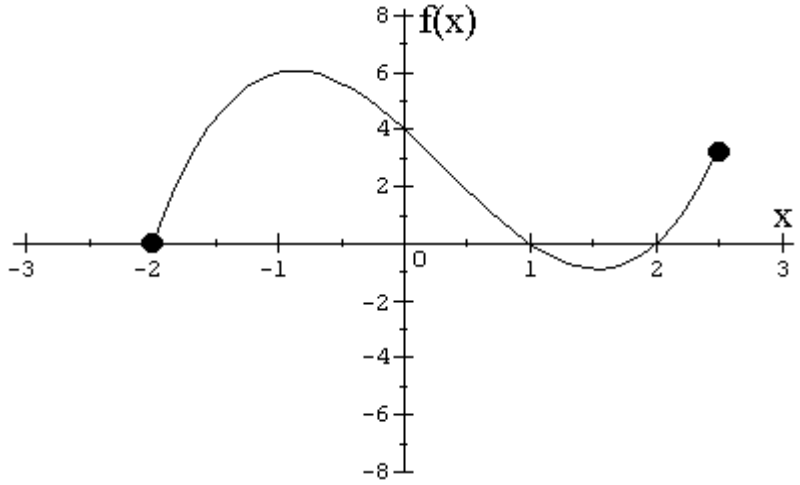
2b. At what time did the NASDAQ index reach its lowest value?

What was the value of the NASDAQ index at this time?

2c. Determine the set of inputs where the function I is increasing.

2d. During what time period(s) was the NASDAQ index falling?

3. A function named f is graphed below. Each of following parts 3a–3f pertains to this function.



3a. Write the coordinates of all turning points of f.

3b. Write the set where f is increasing.

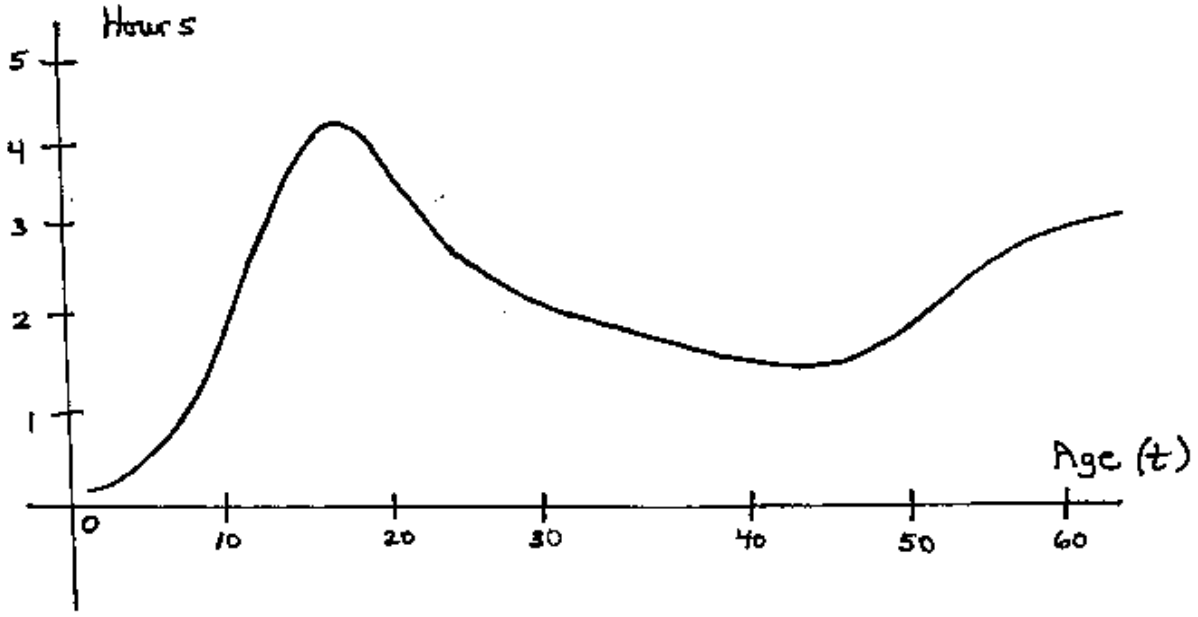
3c. Write the set where f is decreasing.

3d. What is the maximum output of f?

3e. What is the minimum output of f?

3f. Is the value -2 in the range of f? Yes ☐ No ☐ Explain.

4. The function V graphed here depicts the number of hours each day that typical Americans from age 3 years to age 60 years spend watching TV.



4a. Estimate the coordinates of each turning point of the function V.

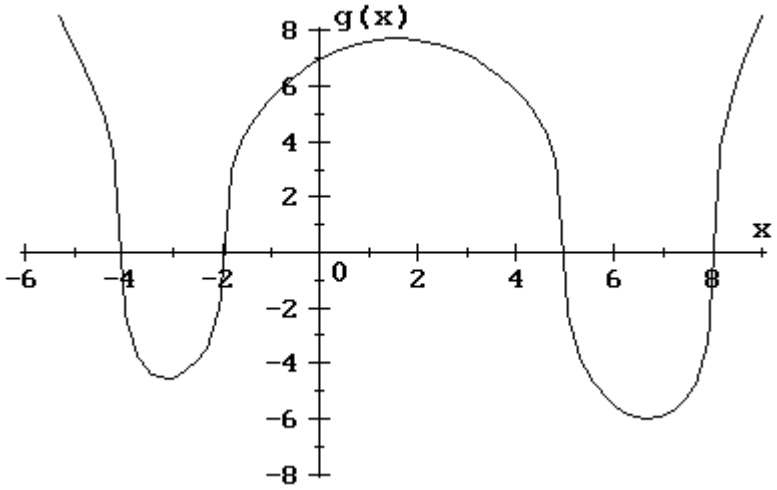
4b. At what age does a typical American watch the most number of hours of TV in a day?

At that age, what is the maximum number of hours spent watching TV?

4c. For what range(s) of ages is the amount of time spent viewing TV each day increasing?

4d. Write the set where the function V is decreasing.

5. A function named f is graphed here. Each of following parts 5a–5f pertains to this function.



5a. Write the coordinates of the turning points of g.

5b. What is the maximum output of g?

5c. What is the minimum output of g?

5d. Write the set where g is increasing.

5e. Write the set where g is decreasing.

5f. Is the value 20 in the range of g? Yes ☐ No ☐ Explain.

MATH 1306 – Handout # 2
Answers To Odd-numbered Problems

1a. Part d, (17, 14.5)

1b. Traffic most congested at $t = 17$ which is 5 p.m.
Number of cars at this time is 14.5 thousand or 14,500.

1c. Part d: Function is decreasing between 8 and 11.2, and between 17 and 20

1d. Part b: Function is increasing between 6 and 8, that is, between 6 am and 8 am,
And between 11.2 and 17, that is, between 11:12 am and 5 pm

3a. Approximate coordinates of turning points: (-0.8, 6) and (1.6, -1)

3b. Intervals where function is increasing (use *x*-coordinates of turning points from part 3a):
All real numbers between -2 and -0.8, and between 1.6 and 2.5

3c. Intervals where function is decreasing (use *x*-coordinates of turning points from part 3a):
All real numbers between -0.8 and 1.6

3d. Maximum output: 6

3e. Minimum output: -1

3f. -2 is NOT in the range since no input in the domain has -2 as an output.
(Note that the horizontal line through -2 on y-axis does not touch a point on the graph)

5a. Approximate coordinates of turning points: (-3, -4.9), (1.5, 7.9), (6.5, -6)

5b. Maximum output: None

5c. Minimum output: -6

5d. Intervals where function increasing (use *x*-coordinates of turning points from part 5a):
All real numbers between -3 and 1.5, and greater than 6.5

5e. Intervals where function decreasing (use *x*-coordinates of turning points from part 5a):
All real numbers less than -3, and between 1.5 and 6.5

5f. 20 is in the range of the function which includes all numbers greater than -6, inclusive.

(The graph is understood to keep extending upward and so a horizontal line through 20 on the y-axis would touch at least one point on the graph.)