#### MA 341 – Review Assignment 2

Question 1

The position of a car is given by the values in the table below.

t (seconds)	0	1	2	3	4	5
s (feet)	0	10	32	70	119	178

(a) Find the average velocity for the time period beginning when t = 2 and lasting 3 seconds.

Find the average velocity for the time period beginning when t = 2 and lasting 2 seconds.

Find the average velocity for the time period beginning when t = 2 and lasting 1 second.

(b) Use the graph of *s* as a function of *t* to estimate the instantaneous velocity when t = 2.

Question 2

Evaluate the limit, if it exists.

$$\lim_{t \to 0} \left[ \frac{1}{t} - \frac{1}{t^2 + t} \right]$$

Question 3

The gravitational force F exerted by Earth on a unit mass at distance r from the center of the planet is given below where M is the mass of the Earth, R is its radius, and G is the gravitational constant.

$$F(r) = \begin{cases} \frac{GMr}{R^3} & \text{if } r < R \\ \frac{GM}{r^2} & \text{if } r \ge R \end{cases}$$

Is *F* a continuous function of *r*?

Find an equation of the tangent line to the curve at the point (x, y) = (-1, 3).

$$y = 2x^3 - 5x$$

Question 5

# If $G(x) = \frac{x}{1+2x}$ , find G'(a). Then, use G'(a) to find an equation of the tangent line to the curve $y = \frac{x}{1+2x}$ at the point $(x, y) = \left(-\frac{1}{4}, -\frac{1}{2}\right)$ .

#### Question 6

The graph of g is given below.



- (a) At what numbers is g discontinuous?
- (b) That what numbers is g not differentiable?

#### Question 7

The graph of the derivative of f' of a continuous function f is shown below.



- (a) On what interval(s) is f increasing?
- (b) On what interval(s) is f decreasing?
- (c) At what value(s) of x does f have a local maximum?
- (d) At what value(s) of x does f have a local minimum?
- (e) On what interval(s) is f concave up?
- (f) On what interval(s) is f concave down?
- (g) Determine the x-coordinate(s) of the point(s) of inflection.

Question 8

Evaluate the indefinite integral.

$$\int t^2 \cos(6-t^3) dt$$

### Question 9

Evaluate the integral.

$$\int x^5 \ln x \ dx$$

## Question 10

Evaluate the integral.

$$\int_{0}^{4} \frac{x-1}{x^{2}+3x+2} \, dx$$

Question 11

Find the derivative of the function.

$$y = 5^{(1-x^2)}$$