Math 1311

**Homework 11 (Section 6.1- Section 6.5)**

Record your answers to all the problems in the EMCF titled **“ Homework 11”** .

1. A car is driving at a constant velocity of 74 miles per hour. A perspective has been chosen so that directed distance is increasing. Since the velocity is constant, we know that directed distance is a linear function. What is the slope of that linear function?

a. 74 miles per hour

b. 37 miles per hour

c. -74 miles per hour

d. -37 miles per hour

1. The price P of gasoline increases to a maximum and then stays at a fixed price. What is the rate of change $\frac{dP}{dt}$ and how is it changing at the time when the price reaches a maximum?
2. $\frac{dP}{dt}$ is negative at the maximum and is decreasing.
3. $\frac{dP}{dt}$ is equal to zero at the maximum and remains the same.
4. $\frac{dP}{dt}$ is positive at the maximum and is decreasing.
5. $\frac{dP}{dt}$ is negative at the maximum and is increasing.
6. What is rate of change in directed distance?

a. Speed

b. Acceleration

c. Velocity

d. Displacement

1. When the graph of directed distance is decreasing, is the graph of velocity above or below the horizontal axis?

a. Below the Horizontal Axis

b. Above the Horizontal Axis

c. At the Horizontal Axis

d. This is not the correct answer

1. A graph of directed distance reaches a maximum. What is the velocity there?

a. Positive

b. Negative

c. Zero

d. This is not the correct answer

1. A car is driving at a constant velocity of 60 miles per hour. A perspective has been chosen so that directed distance is increasing. Since velocity is constant, we know that the directed distance is a linear function. What is the slope of that linear function?

a. 40 miles per hour

b. 50 miles per hour

c. 60 miles per hour

d. 70 miles per hour

1. If from ground level we toss a rock upward with a velocity of 30 feet per second, we can use elementary physics to show that the height in feet of the rock above the ground t seconds after the toss is given by $S=30t-16t^{2}. $How high does the rock go?

a. 18.06

b. 17.06

c.15.06

d. 14.06

1. If from ground level we toss a rock upward with a velocity of 30 feet per second, we can use elementary physics to show that the height in feet of the rock above the ground t seconds after the toss is given by $S=30t-16t^{2}.$ When does the rock strike the ground?

a. 3.88 seconds after it is tossed

b. 2.88 seconds after it is tossed

c. 1.88 seconds after it is tossed

d. 0.88 seconds after it is tossed

1. The following table shows the cumulative number of cases of SARS (severe acute respiratory syndrome) on selected days during the outbreak in 2003. Here t is time in days since the beginning of April and N is the cumulative number of cases reported by time t.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| t | 19 | 22 | 24 | 29 |
| N | 3547 | 3947 | 4439 | 5642 |

Approximate the value of $\frac{dN}{dt}$ at t=19 using the average rate of change from t=19 to t=22.

a. 155.55 cases per day

b. 144.44 cases per day

c. 133.33 cases per day

d. 122.22 cases per day

1. If $\frac{df}{dx}$ has a constant value of 10, we know that *f* is a linear function. What is the slope of

 *f* ?

a. 10

b. 20

c. 30

d. 40

1. Suppose $f=f(x)$ satisfies$f\left(3\right)=8$ and $f\left(3.005\right)=7.972$. Estimate the value of $\frac{df}{dt}$ at x=3.

a. - 7.6

b. - 6.6

c. - 5.6

d. - 4.6

1. By direct calculation, estimate the value of $\frac{df}{dx}$ for $f\left(x\right)= \frac{1}{x^{2}}$ at x=4. Use an increment of 0.0001.

a. - 0.01

b. - 0.02

c. - 0.03

d. - 0.04

1. If *f* satisfies the equation of change $\frac{df}{dt}=5$, then *f* is a linear function. What is the slope of *f* ?

a. 5

b. 6

c. 7

d. 8

1. The water level in a tank rises 4 feet every minute. Write an equation of change that describes the height *H*, in feet, of the water level at time $t$ in minutes.
2. $\frac{dH}{dt}=3$
3. $\frac{dH}{dt}=4$
4. $\frac{dH}{dt}=5$
5. $\frac{ dH}{dt}=6$
6. A balloon leaks air (changes in volume) at a rate of one-third the volume per minute. Write an equation of change that describes the volume V of air in balloon at time *t* in minutes.

a. $\frac{ dV}{dt}=\frac{-1}{3}V$

b. $\frac{ dV}{dt}=\frac{-1}{4}V$

c. $\frac{ dV}{dt}=\frac{-1}{5}V$

d. $\frac{ dV}{dt}=\frac{-1}{6}V$

1. What is the common mathematical term for an equation of change?

a. Constant Equation

b. Differential Equation

c. Irrational Equation

d. None of the above

1. Solve the equation of change $\frac{df}{dx}=3$ if the initial value of *f* is 7.

a. $f=4x+8$

b. $f=3x+7$

c. $f=2x+6$

d. $f=x+5$

1. Find an equilibrium solution $\frac{df}{dx}=2f-6.$

a. $f=2$

b. $f=3$

c. $f=4$

d. $f=5$

1. Water flows into a tank, and a certain part of it drains out through a valve. The volume $v$ (in cubic feet) of water in the tank at time t satisfies the equation $\frac{dv}{dt}=5-(\frac{v}{3})$. If the process continues for a long time, how much water will be in the tank?

a. 13 cubic feet

b. 14 cubic feet

c. 15 cubic feet

d. 16 cubic feet

1. For the equation of change $\frac{df}{dx}=5f-7$, determine whether f is increasing or decreasing when f = 1.

a. Increasing

b. Decreasing

c. Stays the same

d. This is not the correct answer