Expectations for Unit One Dynamics Part Two
*Investigate the forces involved in motion in a plane, and solve related problems.

To enhance your understanding, be sure to complete all readings.

Problems must be solved using proper form (given, required, solution, showing the equation, carrying units) and notation, with the aid of a diagram where appropriate (ex. vector sketch, FBD etc).
Answers must be stated with a unit and the correct number of sig digs and direction where appropriate.

CONCEPTS	**Homework**
8) Forces, FBDs and Newton's Laws Explain force and be able to identify the different types of forces and make FBDs Understand the coefficient of friction. Be able to name and apply Newton's Laws Solve problems related to forces.	***Read pg 62, 63, 70, 71, 73, 75*** Pg 65; 1-3 (omit system diagrams), Pg 69; 1 Pg 74; 1-3 Pg 76; 3a, 4, 7 Pg 89; 2, 7, 8
9) Inclines Explain the forces and draw FBDs for inclines, and solve problems. Explain how to find the coefficient of friction on an incline using tan θ.	***Read pg 80*** Pg 82; 2, 3 Pg 83; 6 Pg 89; 4 Pg 90; 4, 7
10) Bernoulli's Principle Explain Bernoulli's Principle with examples. Explain fluid, fluid friction, laminar flow, eddies, turbulent flow, streamlining.	***Read: Bernoulli's Principle handout*** Questions on Bernoulli's handout
11) Pulleys Explain Atwood machine. Solve problems related to pulleys.	***No reading!*** Pg 90; 6 Extra questions below

Extra questions for Pulleys:
1) A 3.0 kg mass is attached to a 5.0 kg mass by a string that passes over a frictionless pulley. When the masses are allowed to hang freely. (a) find acceleration (b) find the tension in the string
Ans. 2.5 m/s^2, 37 N [up]
2) Two blocks are connected by a string through a pulley over a 90º corner. Block A of mass 2.7 kg is on the surface of a table with the coefficient of friction equal to 0.215. Block B hangs over the corner and has a mass of 3.7 kg. Find the acceleration of the blocks and the tension in the string.
Ans 4.7 m/s^2 [down], 19 N [up]
3) Two masses are connected by a light cord over a frictionless pulley strung on the corner of a table. Mass A is 5.0 kg and is on the table. Mass B is 3.2 kg and hangs over the corner. The coefficient of kinetic friction is 0.18. (a) What is the acceleration of the system? (b) What is the tension in the cord?
Ans. 2.8 m/s/s, 23 N [up]
4) Two spheres of masses 1.5 kg and 3.0 kg are tied together by a light string looped over a frictionless pulley. They are allowed to hang freely. What will be the acceleration of each mass?
Ans. 3.3 m/s/s, 20. N

12) Forces At An Angle Be able to find the components for an angled force. Solve problems related to the normal force and angled forces.	***No reading!*** Pg 69; 9 Pg 82; 4, 5a Pg 83; 5 Pg 89; 5

CONCEPTS	Homework
13) Forces in Elevators and Circular Motion Explain the normal force in elevators and solve related problems. Understand circular motion and be able to indicate the direction of quantities involved. Recognize centripetal force as a net force Solve problems related to circular motion.	***Read: Pg 110 (bottom), 111, 114*** Pg 112; 1, 4 Pg 113; 5, 6 Pg 118; 1, 4, 5, 6 Pg 119; 5, 6
14) Centripetal Force Explain centripetal force. Explain circular motion involving the normal force. Describe how clothoid loops are made. Compare circular and clothoid loops. Explain centrifugal force as a "fictitious" force.	***Read pg 120, 121, 125, 126*** Pg 123; 3, 4 Questions below

Extra Centripetal Force Questions

1) A ball on a string moving in a horizontal circle of radius 2.0 m undergoes a centripetal acceleration of 15 m/s^2. What is the speed of the ball? *Ans. 5.5 m/s*

2) A ball of mass 0.45 kg is attached to the end of a 1.2 m long cord. The ball is whirled in a horizontal circle on a slippery surface (assume frictionless). If the cord can withstand a maximum tension of 30.0 N, what is the maximum speed the ball can have without breaking the cord? *Ans. 8.9 m/s*

3) A rock with a mass of 1.5 kg is attached to a light rod with a length of 2.0 m. It twirls in a vertical circle. The speed of the rock is constant. The tension in the rod is 0 when the rock is at its highest position. Calculate the tension when the rock is at the bottom. Ans. *3.0×10^1 N [up]*

4) How high was a circular loop, if the speed going in was 27 m/s and 0 g's were felt at the top? *Ans. 150 m*

5) What speed is needed to feel 0 g's at the top of a circular loop that is 18.5 m in height? Express in km/h. *Ans. 34 km/h*

Clothoid Loop Assignment

Task: Make a poster on 11 x 17 paper of a scale diagram of a clothoid loop.
Make it so that it is as big as possible ie it should fill the paper.

- Include a circular loop and clothoid loop of the same height.
- Label the loops with measurements and titles.
- Be artistic!

Criteria for marking:

- diagram is accurately drawn to scale and fills the page
- the overall appearance is attractive
  - appropriate for hanging on the wall
  - easy to read
  - has colour

TEST Dynamics Part Two

Make sure you **review your notes** thoroughly.
Complete all of the readings.
Complete all assigned homework questions.

Extra questions:

Multiple Choice Practice: Pg 100; 1-9

Review Problems: Pg 101; 20, 22, 23, 25, 27, 29, 33, 36, 50, 51, 57, 62, 68, 73