ME 360 – H09 Name _____

USE THIS SHEET AS THE FIRST PAGE OF YOUR HOMEWORK SUBMISSION

1) Torque T for a small marine diesel engine was tested as a function of engine speed n as shown below. Use MATLAB "polyfit" to determine the best-fit quadratic model for torque as a function of engine speed. Use "polyval" to provide a plot of the raw data and your quadratic model. **Provide hardcopy of your code and graph.**

T = _____ n^2 + _____ n + _____

n = engine speed [rpm]	T = engine torque [N.m]
300	1445
400	1885
500	2135
600	2390
700	2560
800	2700
900	2730
1000	2685
1100	2510
1200	2290
1300	1995

2) Use the derivative of the equation in problem 1) to determine maximum engine torque and the engine speed at which it would be produced. DO NOT SIMPLY PICK THE DATA POINT THAT INDICATES MAXIMUM TORQUE.

T_{MAX} = _____ $rpm_{@TMAX}$ = _____

3) Use the equation in problem 1) to predict maximum engine power and the engine speed at which it would be produced. Maximum power does not occur at maximum torque. Provide a plot of data and your power model. DO NOT SIMPLY PICK THE DATA POINT THAT INDICATES MAXIMUM POWER.

P_{MAX} = _____ $rpm_{@PMAX}$ = _____

4) Select a suitable diameter for the output shaft of this engine. **State all assumptions.**

d = _____