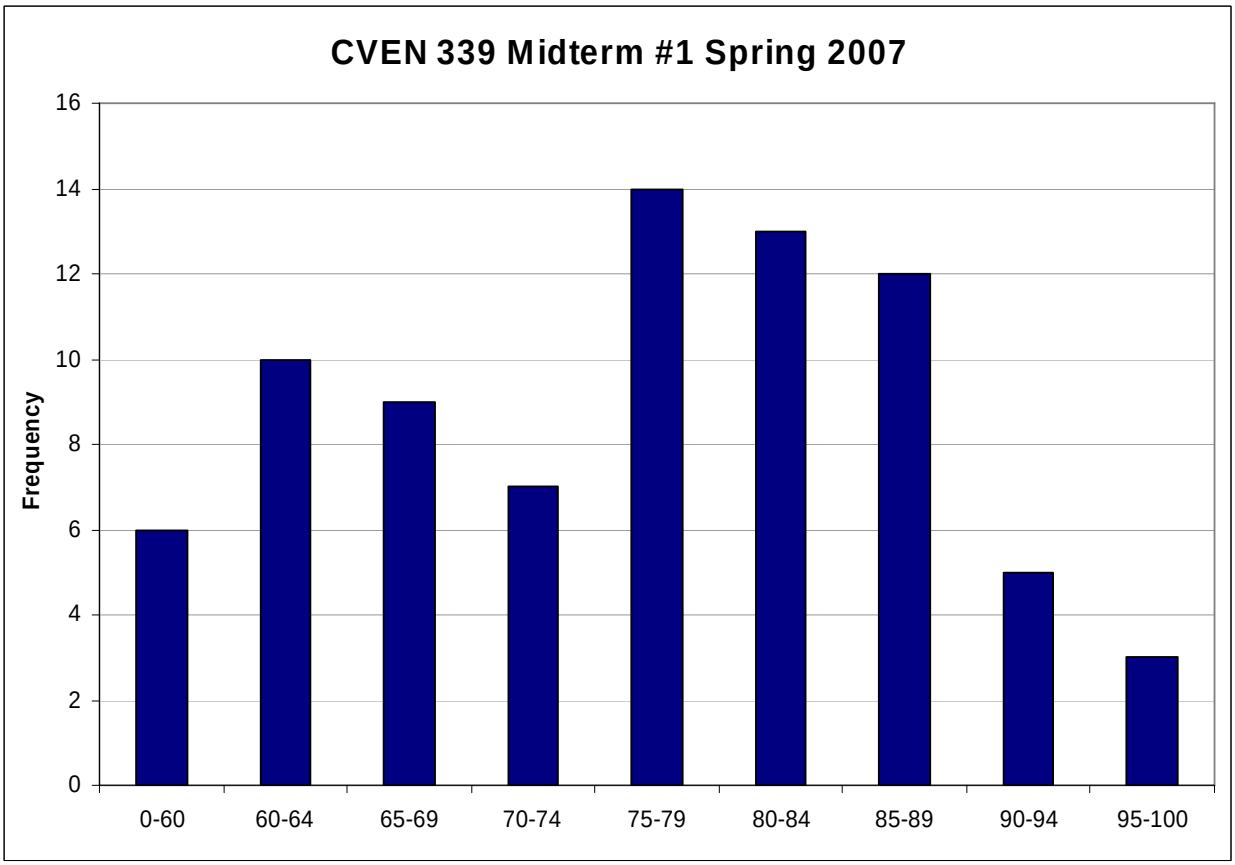
CVEN 339 – Spring 2007
Midterm Exam #1

Median	80
Mean	75.7
St. Dev.	12.0
High	99
Low	44



Name: _____

CVEN 339 – Water Resources Engineering
Spring Semester 2007
Drs. Kelly Brumbelow and Anthony Cahill, Texas A&M University

Exam #1

Open-book, Open-notes (5 pages, 2 questions); Time allowed: 60 minutes

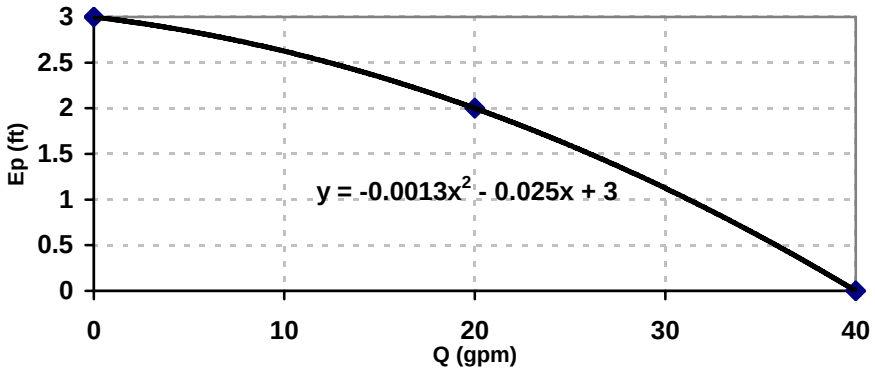
1. Dr. Cahill is planning his new "Tony's Authentic New York Honkytonk" to be located just over the county line. The water supply will be an onsite well (see the drawing on the next page). He needs to choose a well pump and has found several models in a catalogue, and the pump properties are given below. He estimates that the maximum demand in the establishment will be 25 gallons per minute (gpm), and he is concerned about having adequate water pressure.

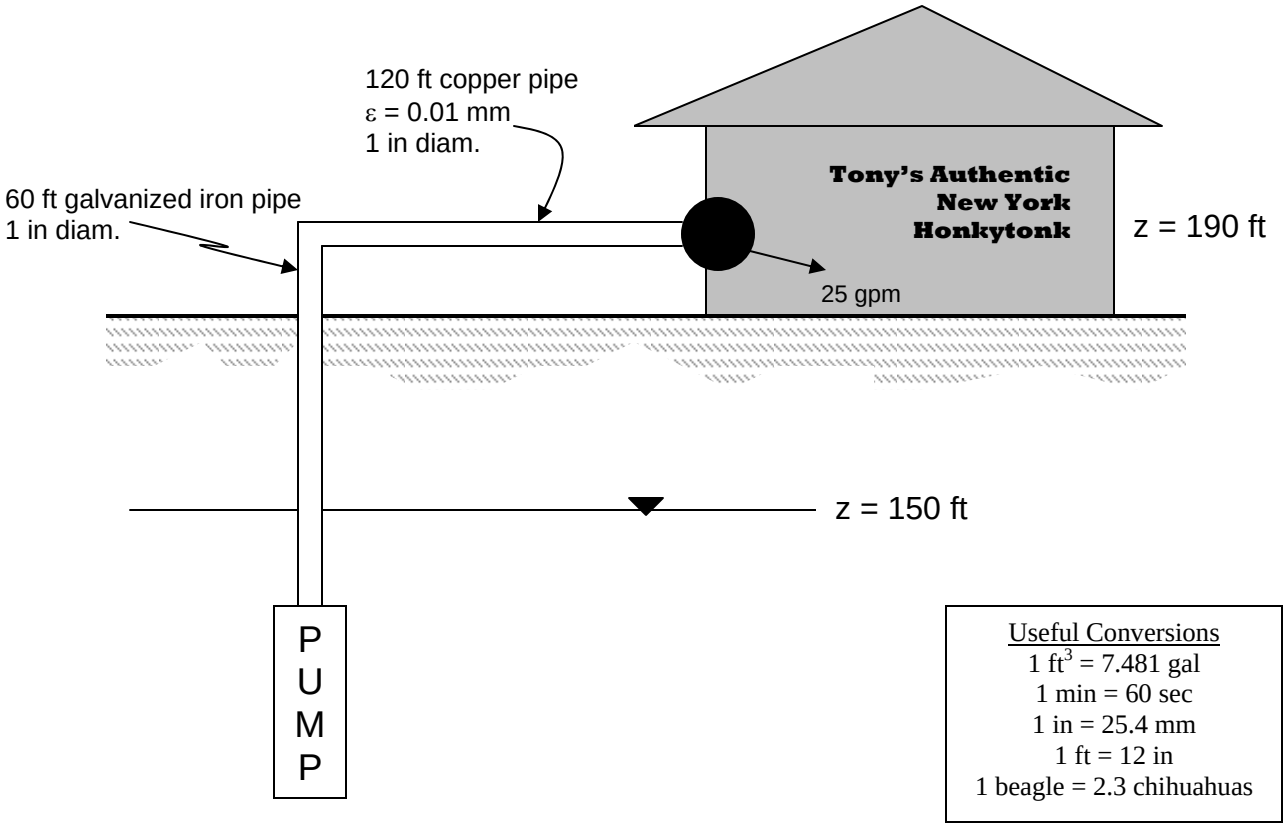
For each pump model described below, determine whether the pump would be capable of supplying the needed flowrate and the water pressure in the Honkytonk if that model were used. (66 points)

Model	Number of Impellers	Capable of Supplying Flowrate? (Yes/No)	Water Pressure in Honkytonk (lb/in^2)
WP-2007-20	20		
WP-2007-60	60		
WP-2007-100	100		

Please write answers in the boxes

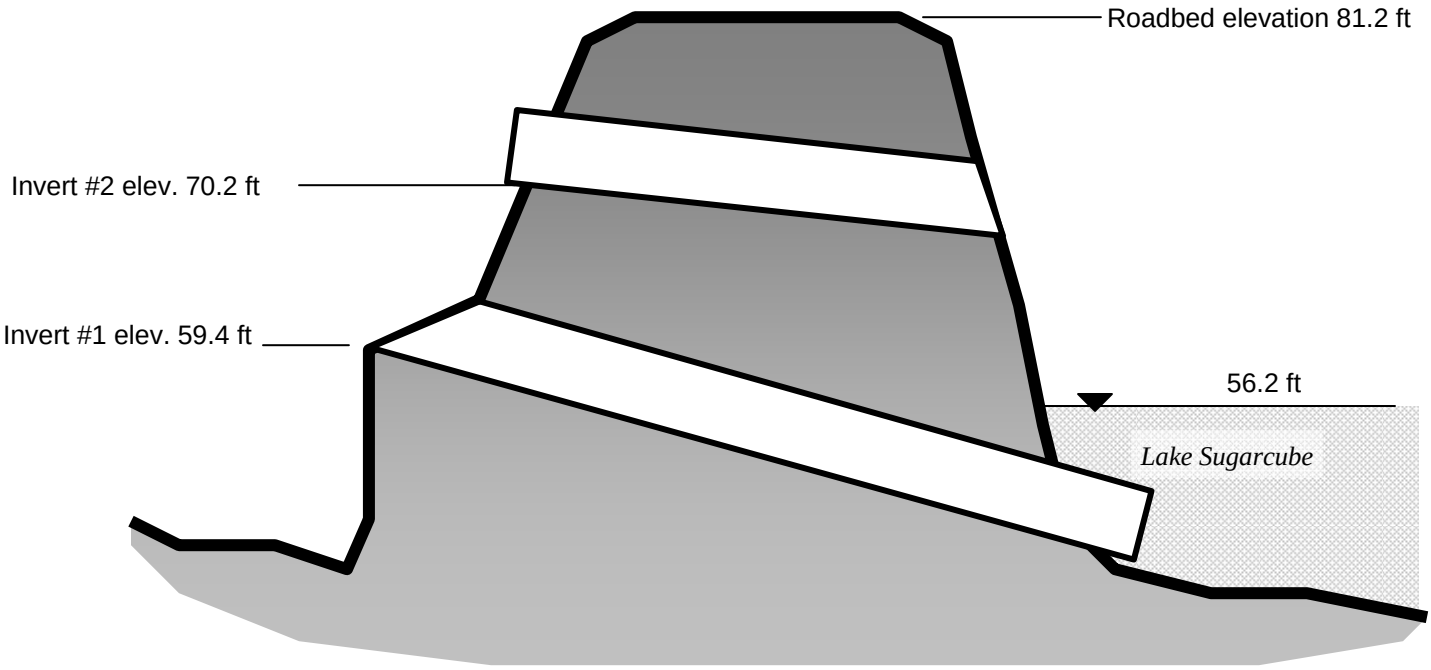
The WP-2007-XX well pump series are multi-stage (multi-impeller) pumps like the one shown in class. Each impeller has the following characteristic curve:





Useful Conversions
$1\ ft^3 = 7.481$ gal
1 min = 60 sec
1 in = 25.4 mm
1 ft = 12 in
1 beagle = 2.3 chihuahuas

2. Highway 321 is built along the shore of Lake Sugarcube as shown in the drawing below. As shown in the drawing, two culverts have been installed under the highway to allow water to flow into the lake from the left side of the picture. *What is the maximum flow that may pass through the two culverts together without water overtopping the roadway?* (34 points)



Culvert #1 (bottom): 24 in diameter reinforced concrete pipe (ε = 2.2 mm)
167.4 ft long
mitered entrance, projecting exit

Culvert #2 (top): 24 in diameter corrugated metal pipe
144.3 ft long
projecting entrance, mitered exit