

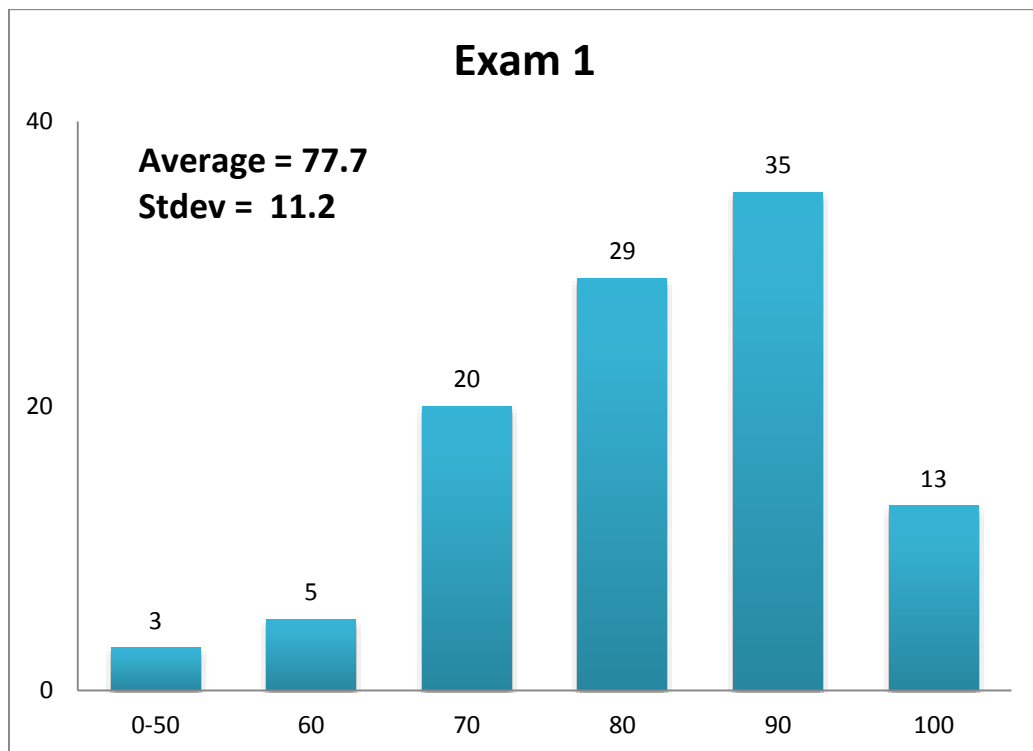
Report of Exam 1

10/20/2015

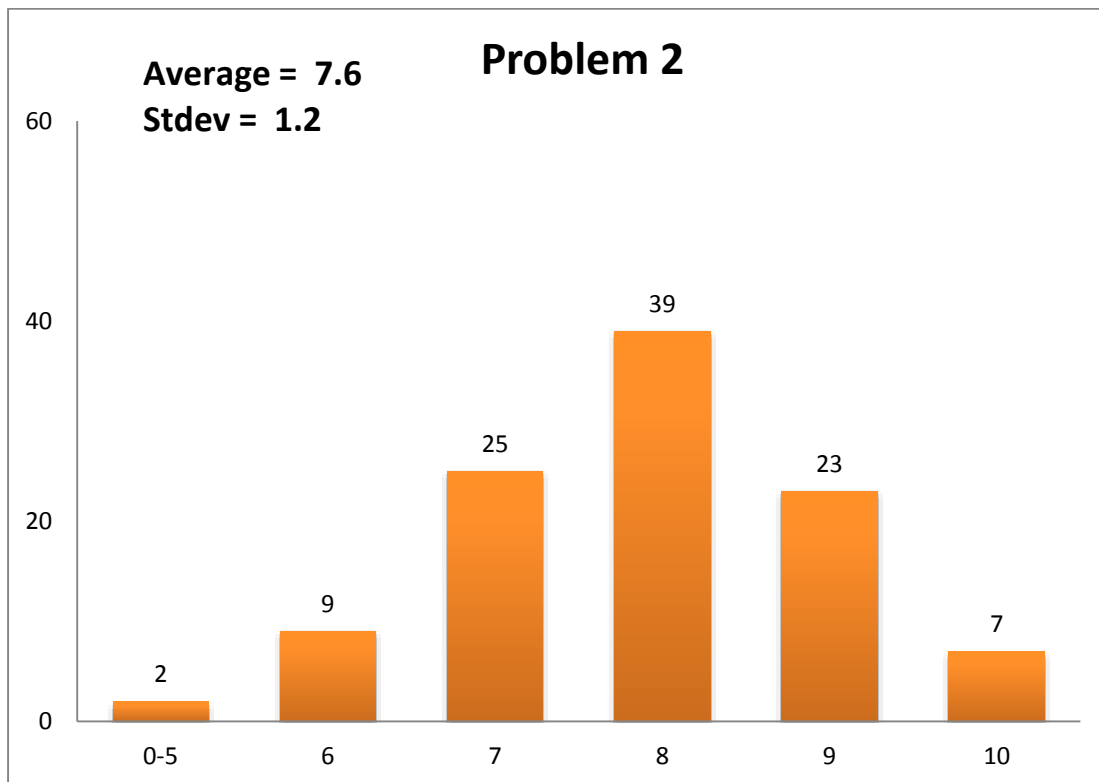
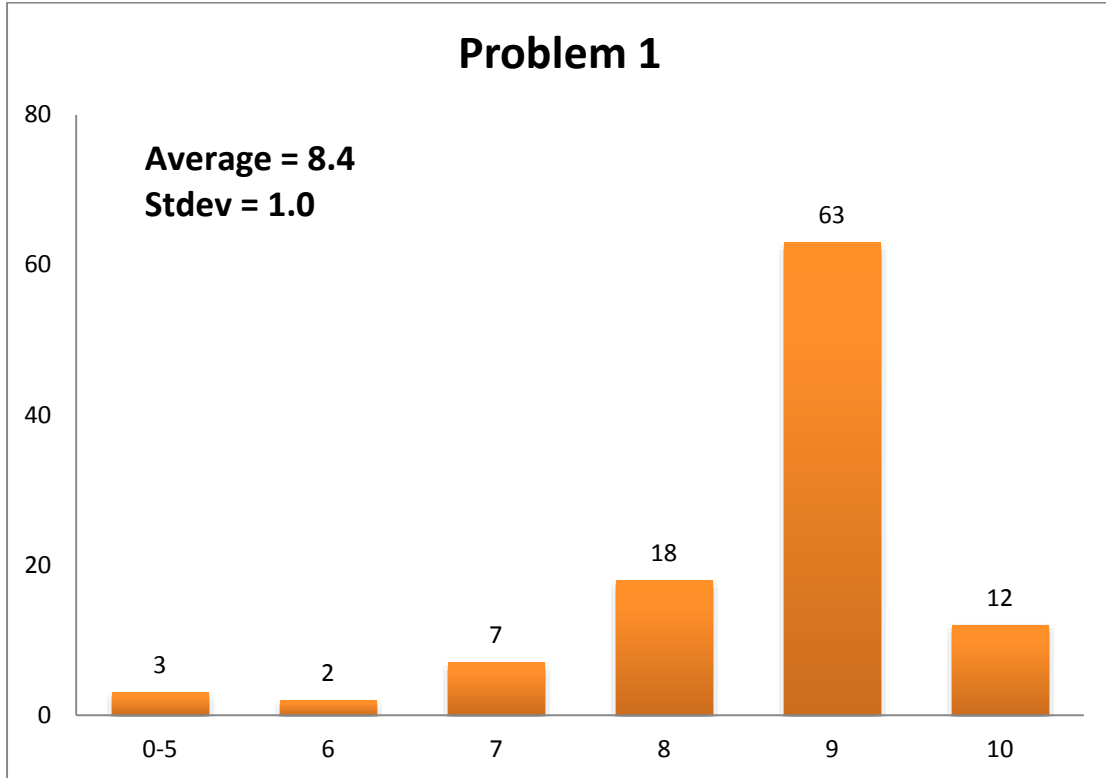
1. Summary

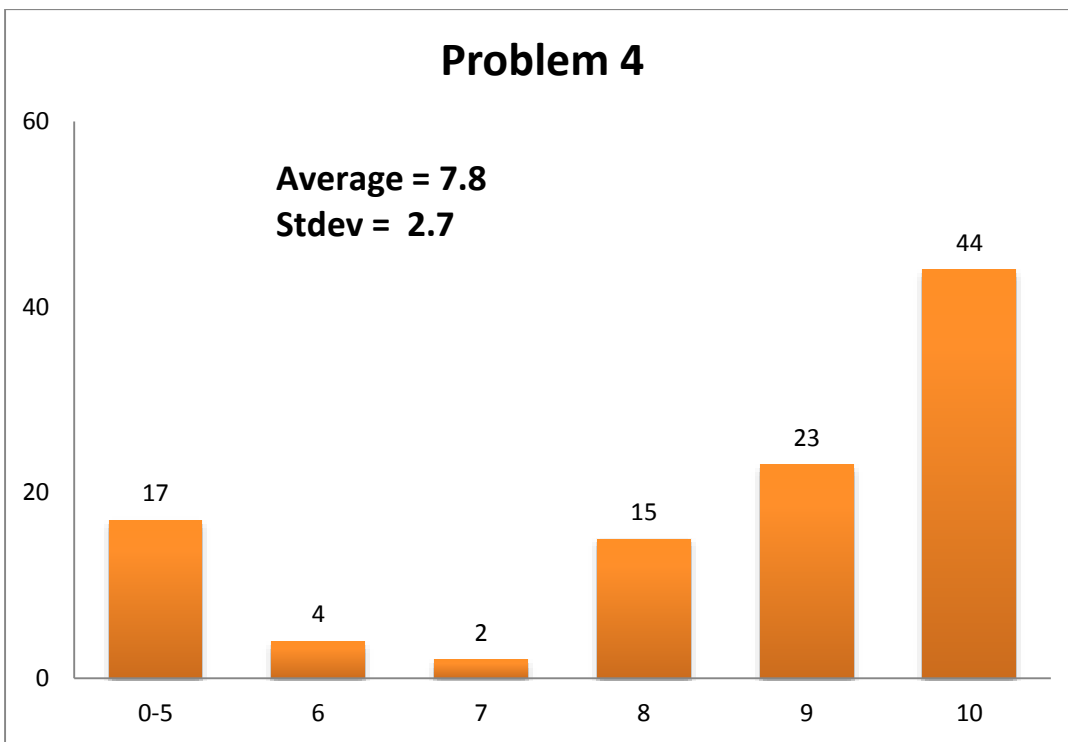
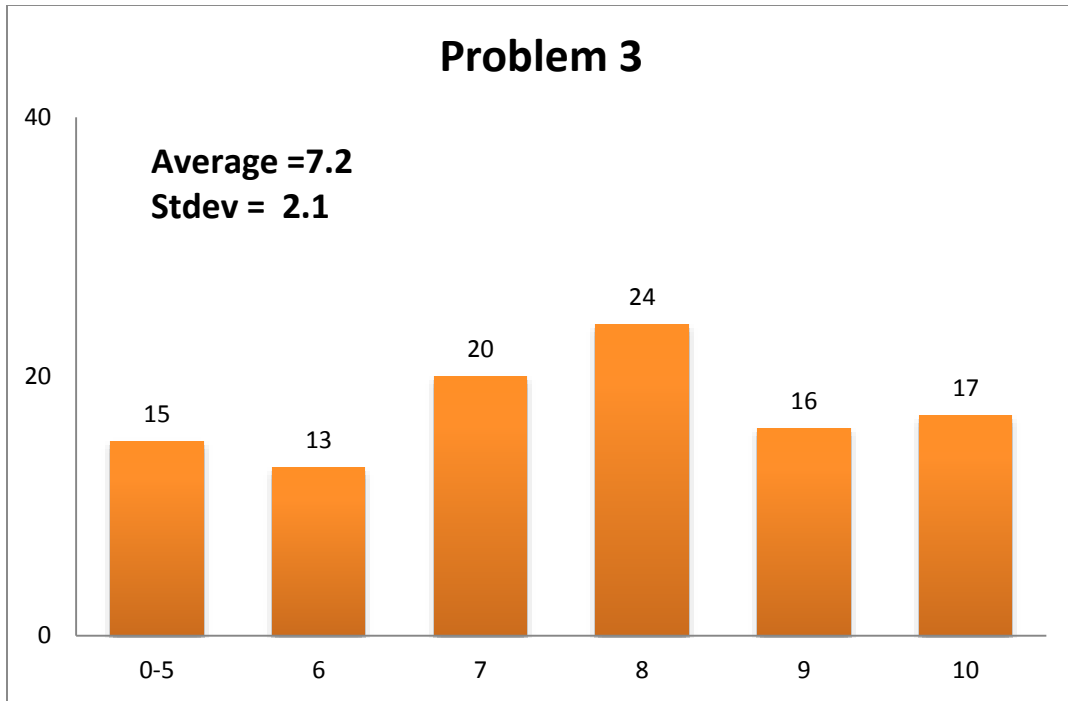
	Number of Students
Total	105
Attended	105
Missed	0
Makeup	0

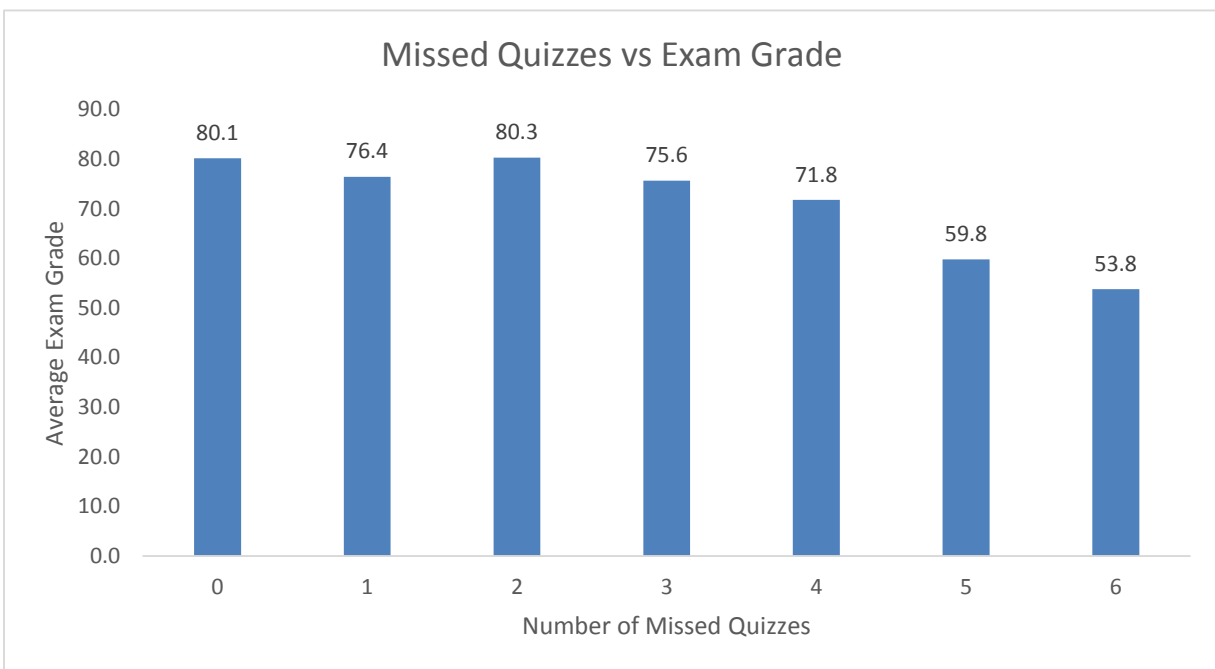
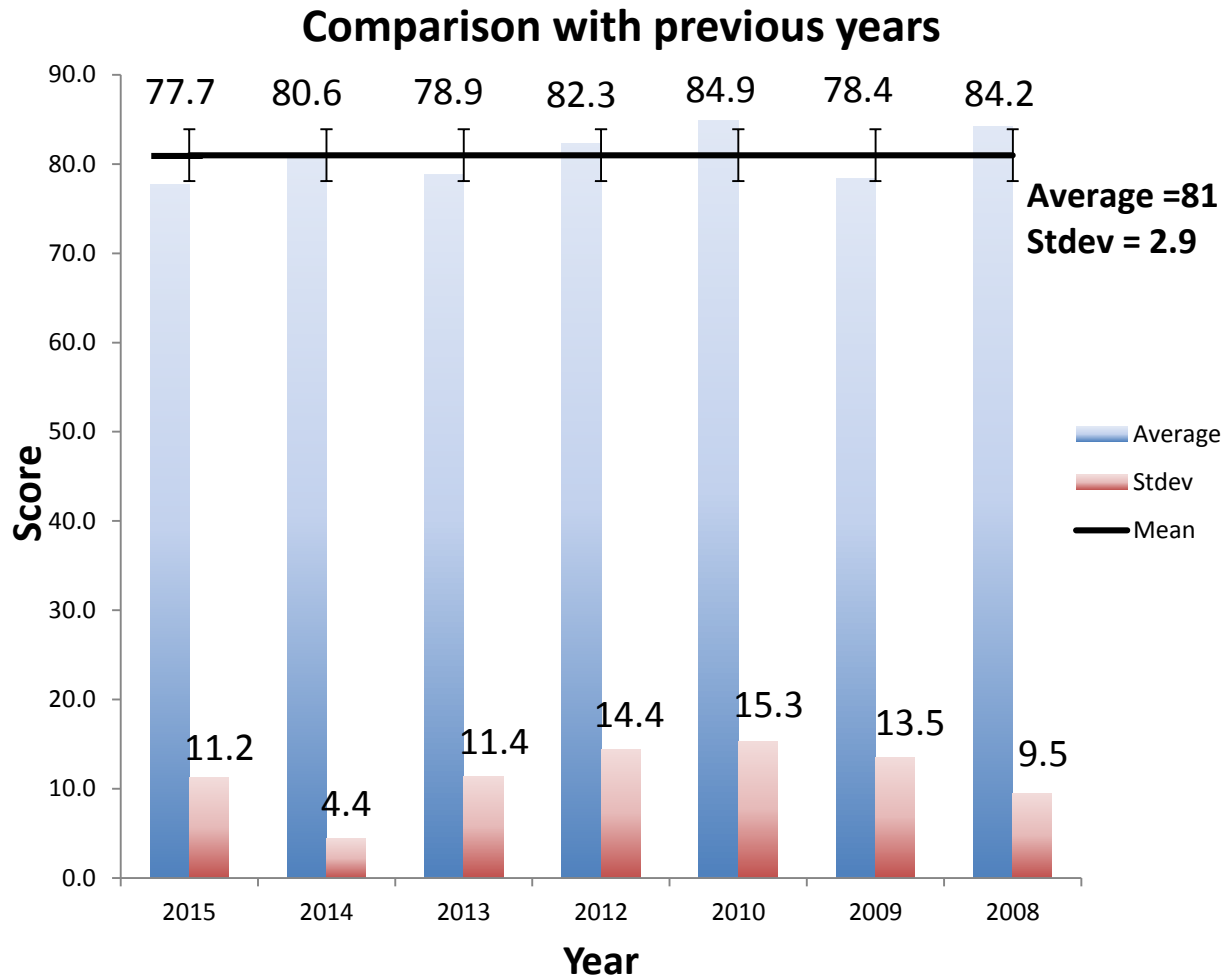
2. Overall distribution



3. Distribution for each problem







4. Common mistakes

1) Problem 1

- Students used the x velocity instead of du/dy
- Incorrect area calculation for cylinder

2) Problem 2

- Calculation mistake for h_c
- Assuming $h_c = y_c$
- Using wrong moment arm for hydrostatic force for calculation of force required to hold gate in place
- Some student decomposed horizontal and vertical component of hydrostatic force. Most of them did not calculate the vertical component correctly

3) Problem 3

- Using only Bernoulli equation without manometer equation
- Mistakes on manometer equation. It seemed like they took an example manometer equation from cheat sheet and did not understand the concept very well
- Wrong assumption for Bernoulli equation (e.g. $V_1 = V_2 / V_2 = 0 / z_1 = z_2$)
- Wrong unit convergence

4) Problem 4

- Not including units in their answer
- Error in calculation derivatives
- It seemed like some student ran out of time and rushed problem 4

5. Effect of Following Homework Format (Z-test)

For two samples X_1 and X_2 of sample means \bar{X}_1 and \bar{X}_2 , respectively, and sample standard deviation s_{X_1} and s_{X_2} , respectively,

$$Z = \frac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{\sigma_{X_1}^2 + \sigma_{X_2}^2}}$$

where, $\sigma_X = s_X/\sqrt{N}$ is the standard error of the mean and N is the sample size. In general,

Z	Two samples are
< 2	the same
$2 \sim 2.5$	marginally different
$2.5 \sim 3$	significantly different
> 3	highly significantly different

For exam 1,

Sample (Students who)	X_1 (Did not follow format)	X_2 (Followed format)
\bar{X}	79.8	74.8
s_X	10.6	11.6
N	64	45
σ_X	1.33	1.73
Z	2.3	

The Z-test shows that the two score distributions are marginally different (or likely the same) between the group who followed the format and the other group who did not follow the format. Thus, it is not likely that the use of the answer format might have significantly affected the exam scores.