**MTH210 Final Exam Sample Name:**

**Duration: 120 minutes Point: /100**

Your birthday: **dd/mm**

Let **d**= sum of digits of **dd** and **m**=sum of digits of **mm**.

**Question 1.** (10 points) The weights of certain machine components are normally distributed with a mean of (80+**m**) g and a standard deviation of **d** g. Find the two weights that separate the top **d**% and the bottom **m**%. (*Theses weights could serve as limits used to identify which components should be rejected.*)

**Question 2.** (10 points) A study of the amount of time it takes a mechanic to rebuild the transmission for a new model of Chevrolet Cavalier shows that the mean is (8 + 1/**d**) hours and the standard deviation is (2 – 1/**m**) hours. If 40+**m** mechanics are randomly selected, find the probability that their mean rebuild time is less than (8- 1/**d)** hours.

**Question 3.** (10 points) In a survey of 5400 T.V. viewers, 30% said they watch network news programs. Find the margin of error for the 95% confidence interval used to estimate the population proportion.

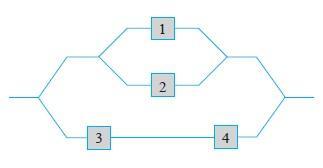
**Question 4.** (10 points) A laboratory tested 80+**m** chicken eggs and found that the mean amount of cholesterol was 200+**m** milligrams with the standard deviation s = (10 + **d**/10) milligrams. Construct a (90+**m**) percent confidence interval for the true mean cholesterol content, μ, of all such eggs.

**Question 5.** (10 points) Consider the system of components connected as in the accompanying picture. Components 1 and 2 are connected in parallel, so that subsystem works iff either 1 or 2 works; since 3 and 4 are connected in series, that subsystem works iff both 3 and 4 work. If components work independently of one another and

*P*(component 1 works) = *P*(component 2 works) = 1-**d**/40

*P*(component 3 works) = *P*(component 4 works) = 1-**m**/20

Calculate *P*(system works).



**Question 6.** (10 points) A recent study indicated that (20+**d**)% of the 100**m** women over age 55 in the study were widows.

*a.* How large a sample must you take to be (90+**m**)% confident that the estimate is within **m**/200 of the true proportion of women over age 55 who are widows?

*b.* If no estimate of the sample proportion is available, how large should the sample be?

**Using data:** [**https://docs.google.com/spreadsheets/d/1tfGZLMuc5XasBjfiTDcIZakoGuQ-oL1cPw4f8lhFIQY/edit?usp=sharing**](https://docs.google.com/spreadsheets/d/1tfGZLMuc5XasBjfiTDcIZakoGuQ-oL1cPw4f8lhFIQY/edit?usp=sharing)

**For 2 question 7 & 8.**

**Question 7.** (20 points) Find the equation for this data in 2 models:

1. Linear
2. Quadratic

Choose the better model and predict the next 5 values.

**Question 8.** (20 points) Given the time-series (in quarter) in the data. Find the model and predict the next 4 values.