

Extra Problems - ANOVA

- 1) A researcher is interested in determining the affect that prolonged practice has on a mouse's ability to sustain and use information that it has learned. He trains 18 mice on a laboratory maze. Each mouse runs the maze twice per day for two weeks. At the end of this initial training period the mice are randomly separated into three groups. The first group continues to run the maze twice per day for another week. The second group runs a brand new maze twice per day for one week. Mice from the third group remain in their home cage for the week, running no mazes. At the end of the week all mice are tested on their ability to complete the first maze. Each mouse runs the maze once and its time (in seconds) is recorded below. Determine if there are significant effects of the treatments.

Group One	10	12	18	15	16	12
Group Two	25	22	27	30	28	25
Group Three	15	17	20	21	19	18

- 2) Children are tested to determine their problem solving skills at three different ages (6, 8 and 10 years old). The scores on their problem solving tasks are given below. What conclusions can be drawn?

6 year olds	25	30	29	40	33	36	42	39
8 year olds	65	70	42	45	56	62	49	55
10 year olds	70	85	76	65	69	72	81	78

- 3) Following the experiment in question two, researchers begin to wonder if instruction in problem solving could vary the results. To test this they find ten new subjects from each age group. These ten subjects, per age, are randomly assigned to instruction or no instruction groups. Perform a 2-way ANOVA to identify any age and/or instruction effects.

6 year olds		8 year olds		10 year olds	
no instr.	instr.	no instr.	instr.	no instr.	instr.
40	43	70	75	78	92
35	38	65	77	85	97
32	24	69	85	80	88
24	46	80	90	92	82
32	35	60	87	87	94

- 4) A group of clinical psychologists and psychiatrists is interested in the effectiveness of drug intervention, psychotherapy and a combination of the two for the treatment of depression. They are also concerned that their results may be different for individuals who are hospitalized versus those who are not. Thirty hospitalized patients are divided into three treatment groups of equal size. Another 30 patients receiving outpatient care are also divided into 3 equal groups. After three months all patients fill out a questionnaire concerning their current state of depression. On the survey, high scores indicate positive progress in lessening depression. Below is a summary table of the experimental results. Group totals are represented. The sum of squares within is computed to be 3550. Evaluate the outcome using a two way ANOVA.

	drug	psychotherapy	drug and therapy
hospital	190	150	250
no hospital	210	200	289