

# MATH 120: Quantitative Reasoning

Name: KEY

Quiz 4  
Summer I 2011

Clearly indicate your final answer(s) and follow all instructions. Explain your reasoning where appropriate. Partial credit may be awarded for answers containing only minor mistakes.

1. In an experiment to determine the effectiveness of a new allergy drug, 500 patients were selected to participate in a study. The table below summarizes the results of the study. **All answers should be given as decimals rounded to three decimal places, or as fractions in lowest terms.**

	Given Allergy Drug	Given Placebo	Total
Shown Improvement	192	183	375
No Improvement	64	61	125
Total	256	244	500

- (a) [2 points] What is the probability that a randomly selected individual in this study will experience the “placebo effect” (i.e. they were given a placebo, but showed improvement)?

$$P(GP \cap SI) = \frac{183}{500} = 0.366 + 2$$

- (b) [2 points] What is the probability that a randomly selected individual in this study was given the placebo **OR** improved?

+2 .872

$$\frac{436}{500} = \frac{109}{125} \quad P(GP \cup SI) = P(GP) + P(SI) - P(GP \cap SI) = \frac{244}{500} + \frac{375}{500} - \frac{183}{500}$$

- (c) [2 points] What is the probability that a randomly selected individual in this study was given the placebo and did not improve **OR** was given the allergy drug and improved?

+2

$$P(A \cup B) = P(A) + P(B) \text{ (no overlap)} = \frac{61}{500} + \frac{192}{500} = \frac{253}{500} = .506$$

- (d) [2 points] What are the odds against a person showing improvement while on the allergy drug?

+2

$$64:192 \longrightarrow 1:3 \quad \text{don't count off if this is not reduced}$$

*reduced*

- (e) [2 points] What is the probability a person was given either a placebo **OR** an allergy drug **OR** showed improvement?

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap C) - P(B \cap C)$$

the probability  $P(A \cap B) = 0$

$$= \frac{244}{500} + \frac{256}{500} + \frac{375}{500} - \frac{183}{500} - \frac{192}{500}$$

+2

$$= \frac{500}{500}$$

$$= 1$$

→ makes sense right ☺  
(wink, wink)