Please try to show your work and give justifications for your answers. It is permitted to
use calculators on the quiz. Try not to spend too much time on any single problem; if you
get stuck on a problem leave a partial answer and move on to the next.

(1) (15 points) Suppose that for some event \( E \), \( P(E) = 0.04 \). What is \( P(E) \)?

(2) (20 points) What is the probability of getting at least one head in five flips of a
coin?

(3) Consider an experiment in which you roll two dice watching for the following two
outcomes:

\[ E = \text{You roll doubles} \]
\[ F = \text{The sum of the numbers shown on the dice is 4} \]

a) (15 points) Assuming you roll doubles, what is the probability that the sum is
4? In other words, what is \( P(F|E) \)?

b) (15 points) Are the two events \( E \) and \( F \) dependent or independent? Why?

c) (15 points) What is \( P(E \text{ or } F) \)?

(4) (20 points) What is the expected value of the following game: You pay $1 to draw
one card from a standard deck of 52 cards. If it is the ace of spades you win $50. If
it is any other card you win nothing.

(5) (5 points extra credit) You pay $1 to mark off 3 of the 80 numbers on a Keno
card (the game Keno is very similar to Mass Cash). The state picks 20 of those 80
numbers to be winning numbers. What is the probability that 2 of the numbers you
picked are winning numbers?