

Exam 1

Student Information (print neatly)

Name: _____

Purdue email: _____

Directions:

- You have 60 minutes to complete this exam. If you open the test before stated or do not turn it in on time you will lose 20 points.
- This exam is closed book and notes. You will receive a zero for this exam for using books, notes, electronic devices (cell phone, ipad, calculator, laptop, etc.). You will also be reported and appropriate disciplinary action will be taken.
- Your answers must be legible. Circle, underline, or leave sufficient white-space to distinguish your answers from intermediate work.
- Show all your work.

Grade:

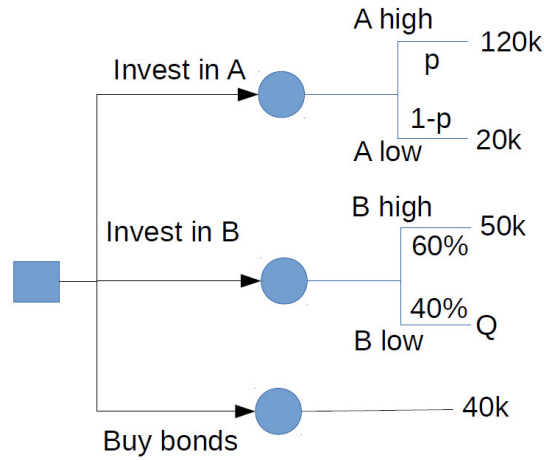
1. [30] _____

2. [20] _____

3. [50] _____

Total: _____

Problem 1. [30 points] Consider the following decision tree.



There are two parameters, p and Q , which are not known precisely.

	low	base	high
p	10%	30%	50%
Q	25k	30k	40k

Conduct sensitivity analysis. First, determine the expected earnings as a function of the variables p and Q :

$$E[\text{earnings of } A] =$$

$$E[\text{earnings of } B] =$$

$$E[\text{earnings of } C] =$$

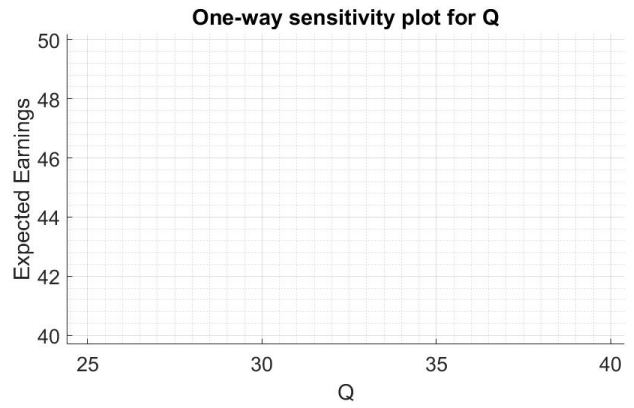
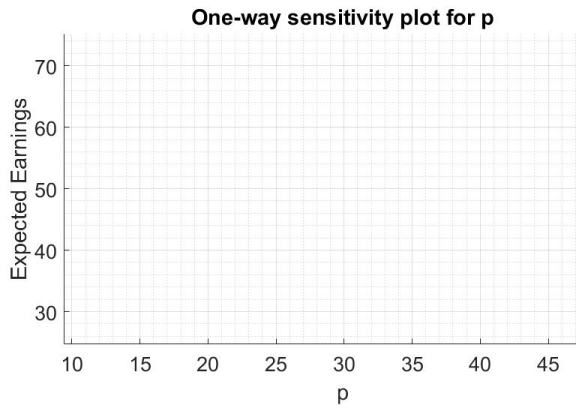
Second, determine the expected earnings using the base-case values for p and Q :

$$E[\text{earnings of } A] =$$

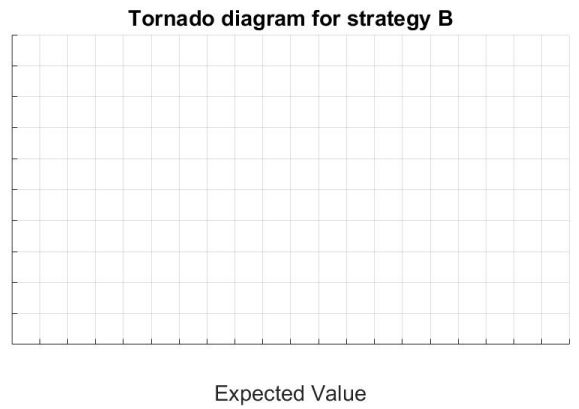
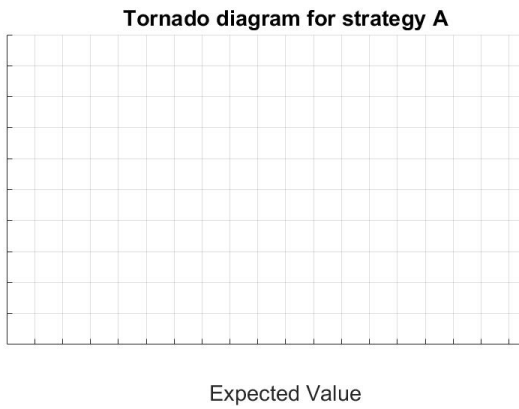
$$E[\text{earnings of } B] =$$

$$E[\text{earnings of } C] =$$

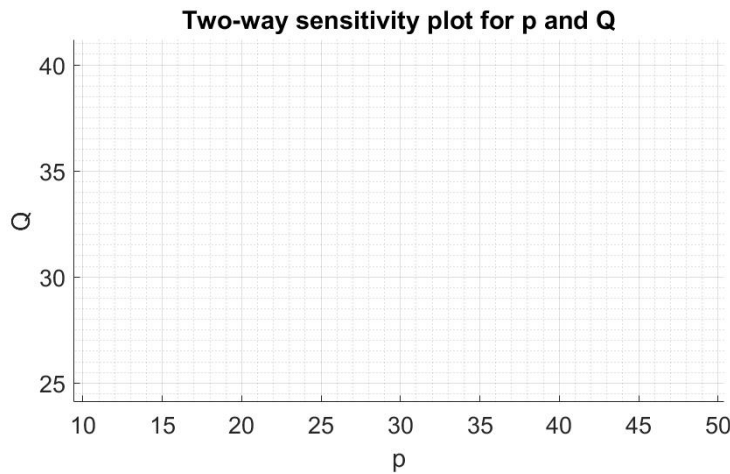
Draw the one-way sensitivity plots for p and Q . Label the curves.



Draw the tornado diagrams for strategies A and B . Label the axes.



Draw the two-way sensitivity plot for p and Q . For each boundary denote which strategy is preferred and for each region denote the preferred strategy.



Problem 2. [20 points] The following questions involve calculating how money changes value over time. You do not need to calculate the final answer. You do need to simplify your answer so the quantity of interest is on the left hand side and all numbers are on the right. For instance, if asked to find a return rate r , your final answer should look like “ $r = \dots$ ” Recall the formula $FV = PV(1 + r)^n$.

A. 10 years ago, you invested \$1000 in a savings account with 5% yearly compounded interest. Inflation has been stable at 2%.

1. What is the current dollar amount of your investment?

2. What is the current purchasing power in 2007 dollars?

B. Your friend asks to borrow \$10,000. He says he'll pay you back \$5000 after five years and \$7500 after 10 years. Suppose inflation is 2%. What is the net present value of this deal?

C. You have \$1000 to invest. Inflation is 2%.

1. You invest in a savings account with 5% interest. How many years n of compounding will it take for the dollar amount to double?

2. What interest rate r should you invest at so the purchasing power of your money will double after 25 years?

Problem 3. [50 points] **Show your work, even if you cannot finish the calculations.**

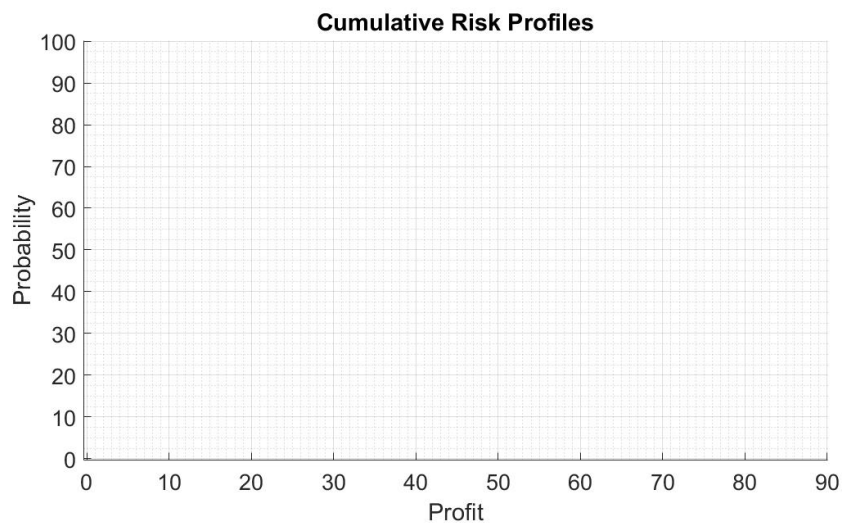
Using the profit matrix below (rows correspond to strategies $\{A_i\}$ and columns correspond to scenarios $\{S_j\}$), as well as the table of scenario probabilities, determine which strategy is preferred for each of the following criteria (if any):

	S_1	S_2	S_3	S_4
Probability (%):	20	40	30	10

	S_1	S_2	S_3	S_4
A_1	10	50	50	30
A_2	40	30	70	40
A_3	20	20	40	60

A. Expected value

B. Risk profile dominance (label the curves)



	S_1	S_2	S_3	S_4
A_1	10	50	50	30
A_2	40	30	70	40
A_3	20	20	40	60

C. Laplace

D. Maximax

E. Maximin

	S_1	S_2	S_3	S_4
Probability (%):	20	40	30	10

	S_1	S_2	S_3	S_4
A_1	10	50	50	30
A_2	40	30	70	40
A_3	20	20	40	60

	S_1	S_2	S_3	S_4
A_1				
A_2				
A_3				

F. Minimax regret

G. Minimum expected regret

