**Reading #3, ‘The French Connection’ and “The Search for Moral Certainty”, Chapters 4 & 7, *Against the Gods: The Remarkable Story of Risk*, (1998) by Peter L. Bernstein.**

These questions are intended to help in your reading and comprehension of this required text. Specific questions will be assigned to specific students for preparation and for submission. The answered assigned questions will be graded for 15% of the total final grade.

Answers should be written in complete sentences and in your own words. If an answer clearly takes the form of a direct quote, the quoted text must be in quotation marks. Answers must be precise and to the point and must clearly address the question.

If you are assigned any of these questions for grades, it is important and necessary to include references to any sources, other than the Reading itself, that you use to answer the questions.

To find some of the answers, it will be necessary to do some research. A search in reference works should turn up the answers needed. This can be done via the Vanier Library using online reference resources, like *Encyclopedia Britannica* or *The Oxford English Dictionary.*

\*\*\*\*Submission guidelines:

1. Write your name on the submission (i.e. the Word copy of this document with your answers).

2. Indicate in highlight which set of questions you were assigned and are answering.

3. Questions which you are ***not*** answering may be deleted from your final submission.

3. Completed assignments must be submitted to the teacher via MIO e-mail as a Word or PDF attachment labelled as follows: “student last name\_student first name or initial\_VoD\_RQs\_Rd3”

\*\*\*\*\*\*

\*\*\*\***Answer guidelines and requirements**

**1.** Answers should take the form of complete, proper sentences expressing complete thoughts. Good answers will be precise, accurate, to the point and clearly stated.

**2.** Any cited text use in an answer must be presented in quotation marks. If an answer contains content from the Reading verbatim (word-for-word) it must be in quotation marks. The page number or, if applicable, the paragraph number of the cited content must be provided.

**3. Authorized** documentary sources for this assignment are: dictionaries, College-subscribed encyclopedias (e.g. *Britannica Academic*), specialized educational web sites (e.g. “World Nuclear Association”), some non-educational web sites that serve educational purposes, academic books and articles.

**4.** Documentary sources, other than the Reading, used in answers must be suitably and correctly referenced. **A reference in the form of a Url alone is not a suitable reference.** Referencing flaws, faults and omissions will give rise to point deductions.

**5.** The Vanier College library webpage gives you access to reference material like dictionaries and encyclopedias.

**6.** Answers will be graded for language proficiency. Spelling, grammar, punctuation and other language formalities will be assessed and will enter into grade outcomes.

**7.** If you are uncertain whether a particular documentary source is valid for the purposes of this assignment, please consult the teacher.

**>>All submissions must be each student’s own individual and independent work.<<**

**Question sets for assignment:**

**Questions 1, 2, 3, 4, 5, 6**

**Questions 1, 5, 6, 7, 8, 9**

**Questions 8, 9,10, 11 12**

**Questions 1, 2, 10, 11, 12**

|  |
| --- |
| **Question Themes** |
| **1. Staging and Setting: Bernstein and *Against the Gods*** |
| **2. “the great leap forward”** |
| **3. Games of Chance, Probability and Risk** |
| **4. The Problem of the Points** |
| **5. “Pascal’s Wager” (*le pari de Pascal*)** |
| **6. 1654 and 1662** |
| **7. Knowing the Future** |
| **8. Giant Steps** |
| **9. Bernoulli’s Contributions** |
| **10. Normal Curves and Curving “Normal”** |
| **11. Probabilities—Prior and Posterior** |
| **12. Chronology: Signal Events in the Development of Probability and Risk Calculation** |

**1. Staging and Setting: Bernstein and *Against the Gods***

Reading 3 consists of two chapters from the book *Against the Gods: The Remarkable Story of Risk* by Peter L. Bernstein.

Who was Peter L. Bernstein? Provide some biographical notes by addressing the following three questions.

The following hyperlinks should be useful sources of information.

[Journal of Portfolio Management: Founding Editor, Peter L. Bernstein](https://jpm.pm-research.com/peter-bernstein)

[“Peter L. Bernstein”. *goodreads*.](https://www.goodreads.com/author/show/73751.Peter_L_Bernstein)

[The New York Times: Obituary](https://www.nytimes.com/2009/06/08/business/08bernstein.html)

[Wiley: *Against the Gods*](https://www.wiley.com/en-ca/Against+the+Gods%3A+The+Remarkable+Story+of+Risk-p-9780471295631)

[Wikipedia](https://en.wikipedia.org/wiki/Peter_L._Bernstein).

**1.1** What was Peter L. Bernstein’s main occupation during his lifetime? That is, what did he do for a living during the greater part of his professional life?

|  |
| --- |
| 1.1 Answer  **Economic consultant and historian** |

**1.2** In which areas of professional activity was he most engaged during his lifetime? That is, professionally, in which areas of economic life was he most engaged and involved?

|  |
| --- |
| 1.2 Answer  **He developed the efficient-market hypothesis** |

**1.3** Approximately how many books did Bernstein write and publish.? Which are the best known and best selling of his books?

|  |
| --- |
| 1.3 Answer  **10 books**  **Against The Gods: The Remarkable Story of Risk**  **Capital Ideas: The Improbable Origins of Modern Wall Street**  **Streetwise: The Best of The Journal of Portfolio Management** |

1.4 1.4 What do the main title and subtitle *Against the Gods: The Remarkable Story of Risk* suggest to us about what the author, Peter L. Bernstein, sees as the legacy of risk across human history? To answer, state what the book title (main title and subtitle combined) appear to suggest to us (the readers) about what role risk, and the human perception and contemplation of risk, have played in the long story of the human experience.

The question can be answered from your own understanding of the title’s meaning. If any documentary sources are used to answer this question, the reference(s) MUST be provided. A couple of sentences will be sufficient (approx. 50-60 words)

Optional source:

[“Description: Against the Gods: The Remarkable Story of Risk.” Wiley.](https://www.wiley.com/en-ca/exportProduct/pdf/9780471295631)

|  |
| --- |
| 1.4 Answer  **He thinks that risk should not be feared, as managing risk can grant challenges and great opportunities for the future. In the title, “Against the Gods” symbolizes us trying to face risks (gods) and overcoming them through various solutions.** |
| Reference  [“Description: Against the Gods: The Remarkable Story of Risk.” Wiley.](https://www.wiley.com/en-ca/exportProduct/pdf/9780471295631) |

**5. “Pascal’s Wager” (*le pari de Pascal*)**

**5.1** In what work by Pascal were the thoughts known as “Pascal’s Wager” published? (p. 69, para. 1) In which year was the work published? (see a relevant reference source like *Encyclopeadia Britannica* online)

|  |
| --- |
| 5.1 Answer  1657-1658 |
| Reference <https://www.britannica.com/topic/Pascals-wager#ref1040630> |

**5.2**“Pascal’s Wager” is an attempt to address or resolve a particular question or problem. What is that question or problem? You may answer by quoting Bernstein quoting from Pascal’s work *Pensées*. (p. 69, first full para.)

|  |
| --- |
| 5.2 Answer  “God is, or he is not. Which way should we incline? Reason cannot answer” |

**5.3** In addressing this question, Pascal drew on his work of trying to solve another famous probability problem. What was that problem? (p. 69, para. 2)

|  |
| --- |
| 5.3 Answer  Whether you get heads (God is) or tails (God is not); is God real? |

**5.4** What are the various gains and losses (if any) that may arise from the four those bets that make up “Pascal’s Wager”? (p. 69, bottom para & p. 70, top para. & first full para.)

Pascal treats the question of whether or not a person should believe in God (the Christian God) as similar to a wager or a bet. It is a bet or wager on whether God exists. That is, a person chooses to bet that God exists, and, therefore, to live a life consistent with a belief in God’s existence, in order to achieve some gain and avoid some loss or negative consequence. Or, a person bets that God doesn’t exist and lives accordingly. In the answer indicate the various consequences (gains and losses) from each of combinations of bets on God’s existence and the possible outcomes on the bets. The outcomes or gains and losses must be inserted in the cells in the right-hand column.

|  |  |
| --- | --- |
| 5.4 Answer | |
| Combinations of bets on God’s existence and outcomes on the bets | Possible consequences or gains and losses on the bets |
| Betting that God exists, and God does actually exist | You get the possibility of salvation |
| Betting that God exists, and God doesn’t actually exist | Whether you live piously or sinfully doesn’t matter |
| Betting that God doesn’t exist, and God does actually exist | You run the risk of eternal damnation |
| Betting that God doesn’t exist, and, actually, God doesn’t exist | Whether you live piously or sinfully doesn’t matter |

**5.5** What is Pascal’s answer to his question about God’s existence (in **4.2**)? According to Pascal, which way “should we incline” (p. 70, 1st full para.)

|  |
| --- |
| 5.5 Answer  He says the the correct decision is to act on the basis that God exists as it is preferable to eternal damnation |

**5.6** According to Bernstein, drawing on Hacking, the line of analysis and inquiry pursued by Pascal in the “Wager” argument marks a significant beginning. It marks the beginnings of a way of examining, conceptualizing and explaining modes of thinking about and calculating uncertain outcomes and of choosing between them (for questions other than the existence of God). What is the name of this way of examining, conceptualizing and explaining outcomes and choices for a wide variety of questions and problems? (p. 69, third para.)

|  |
| --- |
| 5.6 Answer  “Decision theory”; where you decide what to do when it is uncertain what will happen |

**6. 1654 and 1662**

**6.1** Bernstein states that 1654 is an historical turning point in humans’ thinking and strategizing about future events and outcomes. What did Pascal and de Fermat construct in 1654 that was so significant to prediction and forecasting future outcomes? (p. 63, 4th full para.)

|  |
| --- |
| 6.1 Answer  A systematic method for analyzing future outcomes |

**6.2** According to Bernstein, the achievement of 1654, made it possible to have the achievements in probability thinking of 1662. What are the three notable contributions of the Port Royal *Logic* to probability and decision analysis? Identify these three contributions. Key notions of each of the contributions are provided.

|  |  |
| --- | --- |
| 6.2 Answer | |
| **Contributions of the Port Royal *Logic* to probability and decision analysis** | |
| **Key notion of the contribution** | **Contribution in full** |
| inference (p. 70, 3rd full para.) |  |
| measurement (pp. 70-71) |  |
| decision making (p. 71, 1st full para.) |  |

**6.3** According to Bernstein, in what areas of business and managerial activity are Pascal and de Fermat’s and the *Port Royal Logic*’s findings, contributions and discoveries considered to be pioneering (path breaking) developments? (p. 71, bottom para.) There are three areas of business and managerial activity.

|  |
| --- |
| 6.3 Answer  1. Business management  2. Risk management  3. Insurance |

**7. Knowing the Future**

**7.1** What did Fermat and Pascal and the Port Royal *Logic* help to make irrelevant or invalid in forecasting the future and thinking about unknown future events? (p. 72)

|  |
| --- |
| 7.1 Answer  They inserted the key into the lock by having systematic method for calculating the probabilities of future events |

**7.2** What is Bernstein’s view about the potential of using mathematical probability to know the future? That is, what does he say is a fact or a property of the future that always puts a limit on our ability to mathematically predict future outcomes? (p. 72)

|  |
| --- |
| 7.2 Answer  The unavoidable uncertainty of the future will always stop us from “completely banishing the fates from our hope and fears” |

**7.3** What does Bernstein say is the challenge or difficulty faced in forecasting using probability theory? (“The Search for Moral Certainty”, p. 117, first full para.)

|  |
| --- |
| 7.3 Answer  The challenge lies in the detail of information that forms the basis of probability estimates |

**8. Giant Steps**

**8.1** According to Bernstein, in what two ways did the “giant steps” in probability and information, in the 18th century in Europe, have a revolutionary impact? (p. 117, first full para.).

In the first section of chapter entitled “The Search for Moral Certainty”, Bernstein states that the purpose of the chapter is to “describe a sequence of giant steps” in the areas of probability and information gathering and analysis that were revolutionary in their impact. State what he says these “giant steps” revolutionized.

|  |  |
| --- | --- |
| 8.1 Answer | |
| Revolutionary impact of the “giant steps” in probability and information, 18th century | |
| 1. | It revolutionizes the uses of information |
| 2. | The way probability theory can be applied to decisions and choices in the modern |

**8.2** Bernstein says that Jacob Bernoulli was the first person to consider a matter and question having to do with probability. **What is that consideration?** It is presented in two ways in the text. Provide both versions of the consideration as presented by Bernstein. You may quote from the text, but include the quote in a proper sentence. (p. 117 & p. 118 top) Answer by filling in the table below.

|  |  |
| --- | --- |
| 8.2 Answer | |
| **Bernoulli’s pioneering considerations on probability:** | |
| p. 117, 2nd full para | Bernoulli was the first person that considered there was a connection between probability and the quality of the information |
| p. 118, 1st full para | He states that we don’t know the “probability that a man of twenty will outlive a man of sixty |

**8.3** Bernstein tells us that Bernoulli first asked his pioneering question about probability in a letter to Leibniz and then discussed it in a book. When did he write to Leibniz, when was his book published and what was the title of the book? (p. 118) Answer with full sentences.

|  |
| --- |
| 8.3 Answer  Bernoulli wrote this letter to Leibniz in 1703 |

**8.4** What reservation or qualification did Leibniz express in response to Bernoulli’s question, on finding patterns in events and occurrences and predicting outcomes from them? (p. 118, second full para.)

|  |
| --- |
| 8.4 Answer  That a limited amount of experiments is to small of an sample for a precise calculation of nature’s intentions |

**8.5** Who are the three persons discussed at length in the Chapter whose inquiries and achievements in the area of probability make up the “Giant Steps”? (p. 133)

|  |
| --- |
| 8.5 Answer  These three people are Jacob Bernoulli, Abraham de Moivre, and Thomas Bayes |

**8.6** The “Giant Steps” in probability are summed up by Bernstein on p. 133. He says that the achievements all grapple with a common or shared big idea. What is that idea?

|  |
| --- |
| 8.6 Answer  On how to infer previously unknown probabilities from the empirical faces of the reality |

**9. Bernoulli’s Contributions**

**9.1** What limitation did Jacob Bernoulli note in reference to the uses of probability in the early 18th century? (pp. 118-119)

In the early 18th century, Jacob Bernoulli noted a limitation in the uses of probability and probability theory. He said probability and probability theory were being used in only limited ways. State that limitation.

|  |
| --- |
| 9.1 Answer  He drew a distinction between reality and abstraction |

**9.2** What did Bernoulli ask about the possible use of probability that opened up new horizons in thinking about it? (p. 119, bloc quote) State the specific question he asks in your own words.

|  |
| --- |
| 9.2 Answer  How can we find all the possible diseases, sickness and more in the human body |

**9.3** What *limitation* did J. Bernoulli note in reference to the uses of probability calculation for *real life* events?

In the early 18th century, Jacob Bernoulli raised a question and concern about the limitation that was present in calculations of probabilities. Specifically, he observed that probability calculations about future outcomes for “real-life” circumstance necessarily faced a limitation. The limitation has three inter-connected parts to it. State what each of these parts of the limitation are. Key words are provided to guide you in finding and identifying the three parts. One answer is provided. Write in the others in the right-hand column.

|  |  |
| --- | --- |
| 9.3 Answer | |
| **The three parts of the limitation in the uses of probability, acc. to J. Bernoulli** | |
| **Guiding Key Words** | **Limitation in full** |
| 1. (p. 119, fourth full para.) quantity and availability of information | We never have all the information we would like; either we have the information or we dont |
| 2. (p. 120, bottom para.)going from sample to universe | It is very rare that life will replicate games of chance |
| 3. (p. 120, bottom para.)*: a posteriori* or “after the fact” probabilities | *In most instances, we have to calculate the probabilities from what happened “after the fact” (a posteriori). Jacob noted the limitation of being able to calculate the probabilities before an event occurs. I can know the probability of passing a test without studying because of the outcome the last time I did a test without studying.* |

**9.4** Bernstein says that Bernoulli made a twofold contribution to the problem of making probability claims from limited amounts of information. What **two** contributions did he make? (p. 121, first paragraph)

|  |
| --- |
| 9.4 Answer  1. He defined the problem in this fashion before anyone else had even recognized the need for a definition  2. He suggested a solution that demands only one requirement |

**9.5** What issue, with respect to the use of data, did Bernoulli raise? (p. 121)

|  |
| --- |
| 9.5 Answer  Probabilities from limited amounts of real-life information was twofold |

**9.6** What is the name of Bernoulli’s theorem for calculating probabilities *a posteriori*? (p. 122)

|  |
| --- |
| 9.6 Answer  The Law of Large Numbers |

**9.7** According to Bernstein, Bernoulli’s “jar of pebbles” experiment for testing his theorem is famous for being a first. In what respect was it a first in the history of probabilistic thinking and calculation? (p. 124)

|  |
| --- |
| 9.7 Answer  It was the first attempt to measure uncertainty and to calculate the probability that  An empirically determined number is close to a true value even when the true value is an unknown |

**++END++**