Math and Religion Outline

Rather than follow a timeline of events, this outline will be divided into cultures to illustrate how the role / view of mathematics has changed over the centuries

ANCIENT EGYPT

- Scholars were mostly priests…. therefore it was the priests that laid the foundations of Egyptian science (including mathematics) (3, pg. 179)
- Legend says the Egyptian god of Wisdom, Learning, and Magic, named Thoth, invented the sciences around 18,000 B.C. (3, pg 179)
- The priestly caste was responsible for administration and religious functions (3, pg. 179)
- Horus, the Falcon God, had his eye torn out in a battle. The Eye of Horus became a symbol for fractions of measures and represented the various parts of Egypt. In addition, the Eye of Horus' fractional pieces were used in calculating volumes and areas. From a religious standpoint, the eye of Horus represented wholeness, clear vision, abundance, and fertility. (2, pg. 13-14)
- Little more is actually known about the true connection of math and religion due to the fact that Egyptians used papyrus when recording documents

BABYLON

- Most of the studying was done by priests (3, pg. 256)
- Combined math with religion to develop astrology and later astronomy (3, pg. 256)
- Used math to chart the stars and planets – each of which stood for a god (3, pg. 256)

JAINS

- The Jain religion of Ancient India flourished around 300B.C.
- The Jains studied math, specifically, probability in an effort to understand their religion and the world around them (2, pg. 154)
- They used combinations and permutations and they discussed the concept of infinity and the handling of large numbers (2, pg. 154)

ANCIENT ARAB WORLD – HINDUS, MUSLIMS, AND INDIANS

- Work in the mathematical and scientific fields began as an interest of priests (3, pg. 526)
- The greatest mathematician of this time was Aryabhata, a Hindu priest. He influenced those to come after him, including Al Kwharizmi. (3, pg. 526)
- Math was used for astronomy – each planet corresponded to a Muslim prophet (i.e. Moses, Abraham, etc) (2, pg. 46-47)
- The priests used trig tables, which they constructed, to create astronomical tables. The Islamic calendar and prayer rituals were based on these. (2, pg. 49-50)
- Inspired by the prophet Muhammad, Arabs conquered other locations in an attempt to spread their religion. Eventually their empire bordered Christendom….which led to cross-cultural connections and sharing of mathematical ideas (rather than battles) (2, pg. 52)

ANCIENT GREEKS

- Pythagoras' mysticism was a religion of its own. His "religious thoughts" are similar to those of Buddha, Confucius, Mahavira, Laozi, and Zoroaster. His main philosophy was based on the fact that mathematics was the one-true source of knowledge. He was especially fond of the number ten because he believed that exactly 10 points were necessary to generate the universe. (2, pg. 24-26)
- The Greeks created a view of the world in which math and religion were completely linked (1, pg. 1)
- Math translated into music which was the Greek idea of beauty (1, pg. 1)
- Held the mystical belief that the Earth was a sphere because it was the most perfect shape (1, pg. 1)
- Never before or since has math played so large a role in life and religion (1, pg. 1)
- Plato and Aristotle were the two most influential Greek philosophers to impact Christianity. (1, pg. 2)

- Plato's theory of creation described a good god who turned disorder into order and created an eternal world. God put intelligence into the soul….and the soul into man. (1, pg. 2)
- Aristotle gave a proof for God's existence using metaphysics. But, he did not believe that God created the world…it always existed. (1, pg. 2)

ANCIENT CHINESE
- Magic squares were a popular past time because they were believed to be related to divination. Their puzzling nature related to the secrets of god. (2, pg. 34)

ROMAN EMPIRE – CHRISTIANITY – MEDIEVAL TIME
- There is a widespread belief that Christianity and mathematics were on opposing sides, but this is not always true. The most famous mathematicians and scientists of this time period (Galileo, Kepler, Newton, and Copernicus) were deeply religious (1, pg. 1)
- Augustine, a convert to Christianity (and later a Saint in the Catholic Church), said that the Holy Scriptures are true and that correct descriptions of the world cannot conflict with the scriptures. (386 A.D.) (1, pg. 2)
- The Christian Church continued to believe this. Charlemagne (circa 800A.D) instituted cathedral schools to help with "Christendom's intellectual inferiority." He also closed "pagan" schools, including Plato's Academy, to prevent them from teaching concepts that were not approved by the Holy Scriptures. This ended the era of Greek mathematics. (2, pg. 53)
- The Christian schools taught the quadrivium: geometry, arithmetic, astronomy, and music. Math was mostly used to maintain the calendar and to calculate the date of Easter. (2, pg. 53)
- Thomas Aquinas (later named a Saint in the Catholic Church) brought Aristotle's philosophy to Christianity. He said that math and science contribute to Christianity, not oppose it. (1, pg. 3)
- Bishop Robert Grosseteste (who was probably declared a heretic) presented a theory similar to the "big bang theory." This challenged the established doctrines of the church relating to cosmology. (2, pg. 57-58)
- Following Bishop Grosseteste's theory, William of Ockham (the man for whom "Ockham's Razor' is named) created a philosophy that science should look for the simplest solution that fits the facts. This was a huge challenge to accepted theology. To counteract this, the church led a religious revival and rebellion against science. Therefore, the mathematical and scientific fields were given less credence. (2, pg. 58)
- In Contrast, the mathematics of geometry, specifically perspective drawings, were used widely during the Renaissance. Artists like Michelangelo, Davinci, and others created paintings, murals, and even painted church walls and ceilings using the techniques of perspective drawings. (2, pg 64)
- Statistics were also used as a way to promote religion. During the Age of Enlightenment, statistics were seen as a way of conducting public policy and ensuring moral and social equity. (2, pg, 154)

THE HELIOCENTRIC HYPOTHESIS AND CHRISTIANITY
- Ptolemy believed that the sun revolved around the earth and that this phenomenon of heavenly bodies (planets) being turned was the direct result of angels moving them. The church did not object to these ideas (2, pg. 86).
- Copernicus, a Catholic, proposed the heliocentric universe theory in the 16th Century. His theory said that the sun was stationary and that all the planets moved around it. (2, pg. 87)
- At first the church authorities and the Vatican council supported his theory. Martin Luther, the one who began the Counter Reformation and consequently the Protestant religion, objected to Copernicus's ideas at first. (2, pg. 87)
- The Jesuits, a branch of Catholic priests, were prepared to accept Copernicus' ideas if proof was provided. (2, pg. 93-94)
- It was not until 80 years after Copernicus published his thoughts that the Catholic Church deemed his ideas heretical. But by that time, many other religious mathematicians and scientists, including Kepler and Galileo, had already come to consider Copernicus's ideas. (2, pg. 87)
- These Copernican ideas seemed to replace Ptolemy's angels with the geometry. (2, pg. 92)
- Kepler, a devout Lutheran, thought that the Holy Spirit was responsible for gravity and charted the day of creation to April 27, 4977 B.C. (2, pg. 90-91)
- He also believed that math was a religious undertaking. In fact, he thought that geometry equaled God himself. (1, pg. 5)

- Ultimately, the Catholic Church did dismiss Copernicus' ideas as false and contradictory to Christian views and Holy Scripture. (1, pg. 4)
- Those who supported the Copernican view were either sentenced to house arrest (as is the case of Galileo) or sentenced to death under the Inquisition in the 1600s (1, pg. 5)
- Others attempted to reconcile the viewpoints using careful wording. Tycho Brahe, a Catholic astronomer, combined the ideas of Copernicus and Aristotle to prevent the theories from contradicting the Bible.
- Galileo, probably the most famous mathematician to suffer the wrath of the inquisition, was placed under house arrest for believing in the Copernican viewpoint. He thought, though, that he was a devout Christian doing the best to "save Christianity from an error." (1, pg. 6)
- In addition, despite being imprisoned due to a mix-up with some documents, the switching of Popes, and a strange trial, Galileo remained committed to Christianity throughout his life. (1, pg. 8)
- He was forced to recant his beliefs in Copernicus' ideas if he wanted to be released from his imprisonment. (2, pg. 98)

Citations:
1 – "Christianity and the Mathematical Sciences" – web article
2 – The Story of Mathematics – by Mankiewicz
3 – The Story of Civilization – by Durant

Pre-Test Answers:

True / False
1. TRUE – scholars were mostly religious priests and would ignore any mathematics that seemed to contradict the religious ideals.

2. TRUE - Pythagoras created his own type of religion based on math and mysticism

3. FALSE – although Magic Squares eventually became simply a hobby, they were originally designed and used because they were thought to lead to some magical / religious power.

4. FALSE – most famous mathematicians were not atheists. Aristotle, Plato, Kepler, Galileo, Copernicus, Newton, and others were devout to their religions.

5. Mostly FALSE – although several proofs have been offered over the years to disprove God's existence, many more have been found showing why God's existence is guaranteed using statistics or logical reasoning.

6. FALSE – Copernican ideas were not declared heretical until 80 years after he published his book. In fact, they were first looked favorably upon by the Catholic Church.

7. TRUE – throughout history, the most noticeable uses of mathematics within a religious context have been through astronomy or astrology. Statistics and Geometry (specifically perspective drawing) were also used often.

8. FALSE - During the Holy Roman Empire, the scientific capital of the world was in Baghdad and was based on Islam. Because of the feeling of inferiority, Charlemagne opened Catholic "Cathedral" schools throughout the Roman Empire in an attempt to "catch-up."

9. FALSE - Ptolemy believed that Angels pushed the planets around the earth. Kepler believed that the Holy Spirit was the source of the force that caused the planets to revolve around the sun.

10. FALSE - Ockham's Razor (in science one should look for the simplest solution that fits the facts) created such a controversy among the religious… that it ultimately led to a decline in science and mathematics during the Medieval times.

Math and Religion -Common Misconceptions

Many people today believe that math and religion are on opposing sides. It is also a common belief that the average mathematician of today is an atheist. While these statements are true in several cases, they are generalizations or misconceptions. Let's see how many of the following statements you can correctly identify as true or false.

PRE-TEST

True / False

1. In ancient times math and religion always went hand in hand....civilizations used math to explain the world around them.

2. Pythagoras created his own type of religion.

3. Magic Squares and Magic Crosses were considered by the ancient Chinese as games to pass the time with.

4. Most famous mathematicians were atheists.

5. Throughout the years, mathematics has often been used to disprove God's existence.

6. Copernicus was declared a heretic when his heliocentric theory was published.

7. The main use of mathematics in religion has been to aide in astronomical tables or astrology.

8. During the Holy Roman Empire, the scientific capital of the world was based on Christianity.

9. Ptolemy and Kepler's concepts of the solar system were purely mathematical.

10. Ockham's Razor (in science one should look for the simplest solution that fits the facts) contributed to the decline of religious fervor during Medieval Europe and led to a heightened scientific awareness.