**BATE Quizbowl Tournament**

**Round 2**

1 **This philosopher attempted to civilize an acquaintance of a friend named Battius in *Handbook of a Christian Knight*. This philosopher also wrote an instruction on how to diversify, amplify, and embellish one’s speech and writing in *Copia: Foundations of the Abundant Style*. This philosopher wrote a dialogue between the titular character and Saint Peter in *Julius Excluded from Heaven* while his signature work was written while in the company of Thomas** More. For 10 points, name this Dutch philosopher who criticized the Roman Catholic Church in *The Praise of Folly*.

ANSWER: Desiderius **Erasmus**

2 **The Day-Stout-Warren algorithm decreases the height of one type of these structures in order to balance them. There are AVL and B types structures, while Djikstra, Prim, and Kruskal all name algorithms that find their minimum spanning variety. The radix type of this structure stores a set of strings such as IP addresses and another is the binary search variety. Zig-Zig and Zig-Zag are both steps involved in generating the self-balancing splay variety, while yet another type is the** Red-Black type, which is also a self-balancing one. For 10 points, name these data structures that start at their roots and have nodes that branch off from there until they terminate at the leaves.

ANSWER: **Tree**s

3 **Queen Margaret of Denmark urged the formation of the Kalmar Union as a response to this entity that was funding the Victual Brother’s raids on Denmark. Its main base was in Visby and it was deprived of many of its privileges in the Treaty of Vordingborg. After Ivan III expelled it from its Peterhof Kontor in Novgorod, this group went on to Great Britain to establish the sea port town of Kings Lynn. This group forced the Treaty of Straslund on Valdemar IV and controlled** cities like Bergen, Danzig, and Bremen, For 10 points, identify this German trading alliance that was centered in Lubeck.

ANSWER: **Hanseatic League** (Accept **Hansa**)

4 **One section of this work asks “gentile or Jew” to “consider Phlebas, who was once handsome and tall as you”. The line “jug jug jug jug jug” represents the calling of a bird in its third section, which also features a description of the Unreal City. That section is based on a lesson given by the Buddha and is entitled “The Fire Sermon”. Its first section features a “famous clairvoyante” named Madame Sosostris and this long poem ends with the triple repetition of the Sanskrit word** “Shantih”. Edited by its author's friend Ezra Pound, for 10 points, name this long modernist work of poetry by T.S. Eliot which begins by noting that “April is the cruelest month”.

ANSWER: *The* ***Waste Land***

5 **This concept’s namesake curve slopes downward because of the Mundell-Fleming exchange-rate effect, Pigou’ s wealth effect, and Keynes’ interest rate effect. In Das Kapital, Marx rejected the correlation between this concept and expenditure on GDP. This concept is also used to model the use of** “disposable income” in the Keynesian Cross. For 10 points, name this concept, whose name is defined as the total purchases of goods and services in the economy at a given time and price level, often contrasted with supply
Answer: **demand** curve (accept aggregate **demand**)

6 **The main villain of this film is repeatedly described as smelling like strawberries. This film was paired with a short film about two blobs who learn to respect each other titled *Day & Night.* This film opens with a scene in which the main characters save a runaway train before being attacked by a flying pig and a group of monkeys. The plot springs into action after a garbage bag intended for the attic is accidentally placed at the curb. At the end, the main characters escape the tyrannical rule of** Lots-O’-Huggin’ Bear at Sunnyside Daycare. For 10 points, name this 2010 film, the latest in a series to features characters like Mr. Potato Head, Woody, and Buzz Lightyear.

ANSWER: ***Toy Story 3*** (do not accept “Toy Story”)

7 **One of his novellas discusses the love between Mashechka and Sergey and is titled *Family Happiness*. Maryanka rejects the love of Olenin in another novella titled after a group of steppe people. In addition to *The Kreutzer Sonata* and *The Cossacks*, he wrote about a civil official whose death is sparked after he** falls while installing curtains in his apartments. More famous characters created by this author include Anatole Kuragin, Pierre Bezukhov, and a lover of Count Vronsky who commits suicide by throwing herself on train tracks. For 10 points, name this author of *The Death of Ivan Ilyich*, *War and Peace* and *Anna Karenina*.

ANSWER: Leo **Tolstoy**

8**This composer’s fourth symphony includes a recurring motif of A-flats in octaves representing the power of fate and is dedicated to the financial patron he never met, Nadezha von Meck. His first piano concerto, in the key of B-flat minor, was played to tremendous acclaim by Van Cliburn at the first international piano competition named for this composer. An overture by this composer repeats a theme from “La marseillaise” to represent the** French army before the theme “God save the tsar” and uses cannon fire to represent the Russian army turning back Napoleon at the Battle of Borodino in the title year. For 10 points, name this Russian composer of the *1812 Overture*.
ANSWER: Pyotr **Tchaikovsky**

9 **One side in this battle was primarily commanded by Hugh Dowdy. Another side’s defeat at this battle led to the dismantling of the proposed Operation Sea Lion. Most of the fighting during this battle occurred after “Eagle Day”; the failure of that day led one side to declare “never in the field of human conflict was so much owed by so many to so few”. This battle saw some of the earliest uses of radar in the Chain Home defense system and it pitted such combatants as the Junkers Ju 87 and the** Messerschmitt Bf 109 against the Hurricane and the Spitfire. For 10 points, name this 1940 battle fought between the Luftwaffe and the Royal Air Force.

ANSWER: Battle of **Britain**

10 **The Planck length is equal to the square of the reduced Planck’s constant times g divided by the cube of this quantity. Vacuum permittivity is given as one over permeability times this quantity squared, and this quantity also appears squared in the denominator of the Lorentz factor. Cherenkov radiation occurs when a particle** exceeds this quantity and accounts for the blue glow of nuclear reactors. Time dilation occurs because this quantity is constant in all frames of reference. According to another equation, this quantity is equal to the square root of energy divided by mass. For 10 points, name this quantity equal to about three times ten to the eighth meters per second.

ANSWER: **speed of light** (accept reasonable equivalents, prompt on “c” before mentioned)

11 **The Barisan Mountains run along the Western portion of this island, whose largest city is Medan. One region on this island is noted for its GAM separatist movement which was formed after the intervention of foreign oil companies. At this island’s southern lies the Sunda Strait and on this island one can find a rare endangered breed of tigers. At the northern tip of this island lies the region of** Aceh and to its northeast lies the Malay Peninsula, which is separated from this island via the Strait of Malacca. For 10 points, name this large island of Indonesia that lies north of Java.

ANSWER: **Sumatra**

12 **This artist’s *Massacre in Korea* was influenced by Goya’s *The Third of May 1808.* Dora Maar served as a model for a work by this man known as the *Weeping Woman;* he also painted a 1906 portrait of Gertrude Stein in his early career.With Georges** Braque, he would go on to pioneer a major new art style. One work by this man was inspired by a trip to a Parisian museum displaying African masks; that work shows five nude prostitutes in Barcelona. For 10 points, name this artist of *Les Demoiselles d’Avignon* who depicted a German bombing raid in Spain in his work *Guernica.*

ANSWER: Pablo Ruiz **Picasso**

13 **The capital of this nation was once moved to Debre Berhan by Zara Yaqob. The provinces of Borgos, Hamasien, and parts of Tigray were ceded from this country through the Treaty of Wuchale. Rulers of this nation include Lij Yasu and Tewodros II and it was once ruled by the Zagwe dynasty. A notable ruler was preceded by Empress Zewditu and deposed by Aman Andom, the Chairman of the** Derg. That man who faced the Wolo famine gave a speech against chemical weapons at the League of Nations when his country was invaded by Italy in the 1930’s. For 10 points, identify this African nation once ruled by Haile Selassie.

ANSWER: **Ethiopia**

14 **One example of this statement is the kidney removing bicarbonate ions from the blood to generate hydrogen ions and raise the blood’s pH. In physics, Lenz’s law is an analogue of this statement, which does not apply for the addition of an** inert gas. Another example of it is lowering the temperature during the Haber process since the Haber process gives off about 90 kilojoules per mole and is therefore exothermic. For 10 points, name this principle which states that a system in chemical equilibrium will shift to counteract an imposed stress.

ANSWER: **LeChatelier’s** principle

15 **One object in this poem is compared to “the folds of a bright girdle furl’d” in a section that describes a “melancholy, long, withdrawing roar.” In discussing the central location of this poem, the author notes that “the light gleams and is gone” and that “you hear the grating roar/** of pebbles which the waves draw back.” Its final section urges, “Ah, love, let us be true/ to one another!” long after noting that Sophocles felt similarly on the Aegean about “the turbid ebb and flow of human misery.” For 10 points, name this work set on a “darkling plain” on which “ignorant armies clash by night,” a poem by Matthew Arnold.
ANSWER: “**Dover Beach**”

16 **In one election, this man ran with former New Jersey Senator Theodore Frelinghuysen while in another election he ran with New Yorker Nathan Sanford. Along with John C. Calhoun, he developed a system of high tariffs and internal development projects known as the “American Plan”. Along with Jackson, John Quincy Adams and William Crawford, this man ran in the heavily disputed election of** 1824and was accused of getting Adams elected through a “corrupt bargain”. For ten points, identify this American politician who gained his nickname by negotiating the Missouri Compromise and Compromise of 1850.

ANSWER: Henry **Clay**, Sr.

17 **This director collaborated with Kirk Douglas in *Paths of Glory* and *Spartacus.* He also cast Peter Sellers as Clare Quilty in another of his films. This man directed a 1962 adaption of Nabakov’s *Lolita,* while another film directed by this man focuses on efforts to prevent General Jack D. Ripper from launching a nuclear strike against the Soviet Union. He directed a film that focuses on two American soldiers named Joker and Gomer Pyle, while an earlier film directed by this man sees the** *Discovery One* travel to Jupiter and opens with a piece written by Richard Strauss. For 10 points, name this American director of *Dr. Strangelove, Full Metal Jacket,* and *2001: A Space Odyssey.*

Answer: Stanley **Kubrick**

18 **One character in this novel ascends to heaven when she goes outside to hang sheets. Another character is affected by *pica* and enters her new family carrying her parents’ bones in a bag. In addition to Rebeca and Remedios, another character has an affair with his aunt Amaranta and is shot by a conservative captain. A massacre in this novel kills all striking workers except a man who studies Melquiades named José** Arcadio Segundo. The central family in this novel is led by Úrsula Iguarán and its third generation sees seventeen men named Aureliano Buendía. For ten points, name this novel by Gabriel García Márquez.

ANSWER: ***One Hundred Years of Solitude*** (accept ***Cien años de soledad***)

19 **This structure contains a layer composed of collagen known as Bowman’s layer that lies between the epithelium and the stroma; below the stroma is Descement’s membrane. The prefix “kerat” describes this structure, such as a disease affecting it called keratitis. This structure lies in front of a chamber containing aqueous humor and is surrounded by the conjunctiva, which is responsible for protecting the** sclera. This structure, responsible for refracting the majority of the light that enters the eye, malfunctions in sufferers of astigmatism and is in front of the pupil and the iris. For 10 points, name this outermost layer of the eye.

ANSWER: **cornea**

20 **In Mesopotamian mythology, Zu is a lesser deity that is half-man and half one of these animals, while on his travels, Sinbad encounters a giant race of them called Rocs. In Hindu mythology, Vishnu rides one named Garuda and it is one of these animals that carries Ganymede off to Zeus. According to the *Hesiod,* one perpetually feeds on the liver of the titan** Prometheus. Tenochtitlan was supposedly founded after the Aztecs spied one on a cactus eating a snake. For 10 points, what is this bird, the “bald” variety of which is the national animal of the United States?

ANSWER: **eagles** (be generous in accepting equivalents, prompt on “birds”)

**Extra Tossups**

21 **Casualties in this battle include Edward of Norwich and the Duke of Brabant. The Siege of Harfleur occurred before this battle, which saw Thomas Epringham lead a group of archers. This battle occurred while one side was on a march to Calais, and it resulted in the Treaty of Troyes. Occurring on St. Crispin’s day, this battle saw Charles D’Albert of France lose to** Henry V of England. For 10 points, name this battle in which French knights bogged down on a muddy field became easy prey for English archers, fought during the Hundred Years War.

ANSWER: Battle of **Agincourt**

22 **This author attacked the artist who paints “not what he dreams but what he sees” in his review of the salon of 1859. This author described a certain subject as one half of art with the “eternal and immovable” in “The Painter of Modern Life. This author’s most famous work contains “The Seven Old Men” and a poem in which the speaker is bound to the subject “like the stubborn gambler to his game” but “poison and the knife” accuse him of not deserving freedom, titled “The Vampire”.  That work contains sections like** “Revolt”, “Wine” and “Spleen and Ideal”. For 10 points, name this author of *Les Fleurs De Mal.*

ANSWER: Charles **Baudulaire**

23 **Modern industrial syntheses of vitamin C involve a fermentation process using this molecule as a starting material. This molecule’s less common L isomer cannot react with hexokinase; its D isomer reacts with the enzyme to form a compound containing a phosphate on carbon number 6. The Cori cycle involves the conversion of pyruvate into this molecule. It can also be used to form two equivalents of pyruvate, the starting material of the citric acid cycle. A dimer containing two of these molecules is called** mannose while it also forms a long linear chain called glucagon. For 10 points, name this monosaccharide with formula C6H12O6, often referred to as blood sugar.

ANSWER: **glucose** (prompt on “C6H12O6” since a couple of things have the same chemical formula)

1 Answer these questions about spectroscopy, for 10 points each:
[10] One popular form of spectroscopy uses this form of radiation, sometimes alternatively named for their discover Wilhem Rontgen.

ANSWER: **X-ray**s or **X**-radiation

[10] When performing spectroscopy, it is often useful to use this law which relates absorbance to concentration using the path length and the molar absorptivity as constants.

ANSWER: **Beer**-Lambert-Bouguer law

[10] When performing infrared spectroscopy, one often uses a salt plate composed of this halogen’s potassium salt. Along with mercury, this is the only element that is a liquid at standard state.

ANSWER: **bromine**

2 She commits suicide by drowning into the Gulf of Mexico. For 10 points each:

[10] Identify this character that falls in love with Alcée Arobin and Robert Lebrun after her husband Léonce goes to New York.

ANSWER: **Edna** **Pontellier** (prompt on Pontellier)

[10] Edna Pontellier is the female protagonist of this work by Kate Chopin.

ANSWER: *The* ***Awakening***

[10] *The Awakening* begins and ends in Grand Isle, a resort in this state that is the setting of most of Chopin’s work. Her other novel, *At Fault*, is set in its largest city and *A Confederacy of Dunces* also occurs in this state.

ANSWER: **Louisiana**

3 Answer these questions about the Minotaur, for 10 points each:

[10] The Minotaur was constructed after King Minos prayed to this god to present him with a bull as a sign of approval. This deity was the god of earthquakes.

ANSWER: **Poseidon**

[10] The Minotaur was eventually killed by this man and one time lover of Ariadne.

ANSWER: **Theseus**

[10] Theseus accidentally caused the death of his father when he forgot to change the color of these objects from black to white.

ANSWER: his **sails** (accept anything reasonable like “the **sails** of his ships)

4 A March 2011 earthquake of magnitude 8.9 struck the coast of an Asian nation. For 10 points each:

[10] Name that Asian nation whose parliament is known as the Diet.

ANSWER: **Japan** (accept **Nippon**)

[10] The earthquake prompted this Japanese Prime Minster to request international aid to help disaster areas.

ANSWER: Naoto **Kan**

[10] Observers compared the earthquake to a magnitude 6.8 earthquake that devastated this Japanese city located in the backdrop of Mount Maya.

ANSWER: **Kobe**

5 This empire lost to forces seeking Greek independence at Navarino Bay. For ten points each:

[10] Name this Middle Eastern empire that captured Constantinople in 1453 and collapsed at the end of World War One.

ANSWER: **Ottoman** Empire

[10] The ottoman emperor Selim I established this military group, the sultan’s personal guard which were originally made up of prisoners of war.

ANSWER: **Janissaries** or **Yeniceri**

[10]The Janissaries were disbanded by Sultan Mehemed II in this 1826 event.

ANSWER: **Auspicious Incident** or **Unfortunate Inicident** or **Vaka-i Hayriye**or**Vaka-i Şerriyye**

6 The two main characters are drawn to each other during a piece titled “Dance At the Gym”. For 10 points each:

[10] Name this modern day adaption of *Romeo and Juliet* that features Tony and Maria.

ANSWER: ***West Side Story***

[10] The music to *West Side Story* was composed by this long time director of the New York Philharmonic who also composed the music to *Candide*.

ANSWER: Leonard **Bernstein**

[10] The lyrics to *West Side Story* were written by this American who did the music for *Sunday in the Park with George*.

ANSWER: Stephen **Sondheim**

7 One character in this work, Vershinin, is a colonel whose affair with one of the title characters abruptly ends after his regiment moves away. For 10 points each:

 [10] Name this work centering on Masha, Irina, and Olga.

ANSWER: *The* ***Three Sisters***

[10] *The Three Sisters* was a work by this Russian author who wrote about Konstantin Treplyov shooting the title creature in *The Seagull*.

ANSWER: Anton **Chekhov**[10] Among the friends of Chekhov was this other Russian author who wrote *Children of the Sun* and described members of a homeless shelter in *The Lower Depths*.

ANSWER: Maxim **Gorky**

8 This property is measured in units of force divided by length and gives rise to the Young-Laplace equation. For 10 points each:

[10] Name this property that describes the cohesive forces between liquid molecules which allows water striders to walk on water.

ANSWER: **surface tension**

[10] Detergents are an example of these substances with hydrophobic and hydrophilic regions that lower surface tension.

ANSWER: **surfactant**

[10] Surface tension is also responsible for this effect when a liquid is pulled up a sufficiently thin enough tube.

ANSWER: **capillary action** or **capillary effect**

9 This daughter of Ferdinand and Isabella was the subject of an annulment controversy leading to England’s break with the Roman Catholic Church. For 10 points each:

[10] Name this first wife of Henry VIII.

ANSWER: **Catherine of Aragon** (prompt on “Catherine”)

[10] The annulment controversy led to the downfall of this Roman Catholic official and close advisor to Henry VIII who resided in Hampton Court Palace.

ANSWER: Thomas **Wolsey**

[10] Wolsey engineered a meeting at the Field of the Cloth of Gold where Henry VIII met with this French king. This king was captured during his Italian campaign following his 1525 defeat at the Battle of Pavia.

ANSWER: **Francis I**

10 This work shows a condottieri named Erasmo of Narni. For 10 points each:

[10] Name this statue that literally translates as “The Honeyed-Cat”.

ANSWER: **Gattamelata**

[10] Gattamelata was a work by this sculptor, whose depiction of David was the first free standing bronze sculptor during the Renaissance.

ANSWER: **Donatello** or **Donato** di Niccolo Betto Bardi

[10] Donatello did sculptures of St. George and St. Mark at this Florentine church built at the site of a kitchen garden. The guilds of Florence were eventually commissioned to place statues of their patron saints at this building’s façade.

ANSWER: **Orsanmichele** or **Kitchen Garden of St. Michael**

11 This man is sent to a mental asylum after falsely confessing to the murder of Sister Dorothea. For 10 points each:

[10] Name this man who stops growing at the age of three, the protagonist of *The Tin Drum*.

ANSWER: **Oskar** **Matzerath** (accept either)

[10] *The Tin Drum* was the first work of *The Danzig Trilogy*, a series of works by this German author.

ANSWER: Gunter **Grass**

[10] This other author of post World War Two Germany wrote a work narrated by Hans Schneir, a man of the title profession who is left by Marie in *The Clown.*

ANSWER: Heinrich **Boll**

12 For 10 points each, answer these questions about photosynthesis.

[10] Since plants perform photosynthesis, they fall under this classification of organisms that are able to produce their own food.

ANSWER: **autotroph**

[10] In the chloroplasts, light dependent reactions of photosynthesis occur in these disk-like structures that form stacks called grana.

ANSWER: **thylakoid**

[10] The light independent Calvin cycle uses this enzyme, the most abundant protein on Earth, to facilitate the initial reaction that forms 3-phosphoglycerate.

ANSWER: **RuBisCO** or **ribulose-1,5-biphophosphate carboxylase oxygenase**

13 *U.S. v. E.C. Knight* was the first case concerning this piece of legislation. For 10 points each:

[10] Name this 1890 act that gave the federal government the right to oppose the formation of trusts.

ANSWER: **Sherman** Antitrust Act

[10] The Celler-Kefauver Act strengthened this 1914 extension of the Sherman Antitrust Act which helped specify particular activities considered to be illegal.

ANSWER: **Clayton** Antitrust Act

[10] The Sherman Antitrust Act was used in a 1911 case involving the New Jersey branch of this company, also the subject of a 1904 work by Ida Tarbell.

ANSWER: **Standard Oil**

14 An advertisement for five cent Phillies cigars can be seen on the top of this painting. For 10 points each:

[10] Name this Edward Hopper painting that shows four people at a late night diner.

ANSWER: ***Nighthawks***

[10] This other Hopper painting shows a woman in a green dress conversing with another woman at a restaurant; many people believe that the second woman is in fact a doppelganger.

ANSWER: ***Chop Suey***

[10] In his early career, Hopper studied under Robert Henri, a leading figure of this art movement that included Everett Shinn and George Luks and was known for its realistic depiction of gritty New York neighborhoods.

ANSWER: **Aschan** School or The **Eight**

15 One section of this work describes how certain religions strictly forbid the wasteful spending of money. For 10 points each:

[10] Name that work which connected economic growth in Europe with the rise of a certain religious movement.

ANSWER: *The* ***Protestant Ethic and the Spirit of Capitalism***

[10] *The Protestant Ethic and the Spirit of Capitalism* was a written by this German sociologist who defined the state as having a monopoly on power in his *Politics as Vocation*.

ANSWER: Max **Weber**

[10] This earlier French thinker founded the field of sociology, developing the theocratic, metaphysical and positive stages in his law of three stages.

ANSWER: Auguste **Comte**

16 In one of this man’s novels, Mizoguchi befriends Kashiwagi and Tsurukawa before burning down the title Buddhist temple. For 10 points each:

[10] Name this Japanese author of *The Temple of the Golden Pavilion* who wrote about Shinji’s romance with Hatsue in *The Sound of Waves*.
ANSWER: **Mishima** Yukio (accept either order)
[10] Mishima wrote this tetralogy about Shikeguni Honda that includes *Spring Snow* and *The Decay of the Angel*. Recurring characters include Kiyoaki and Satogo.
ANSWER: *The* ***Sea of Fertility***
[10] This Japanese author wrote about a group of teenagers sent to a mountainous village in *Nip the Buds, Shoot the Kids*. His novel *The Silent Cry* ends with Mitsusaburo deciding to work as a translator in Africa.
ANSWER: **Oe** Kenzaburo (accept either order)

17 Along with Sukkot and Shavuot, this is one of the three Jewish pilgrimage holidays. For 10 points each:

[10] Name this holiday that commemorates the escape of the Israelis out of slavery from Egypt.

ANSWER: **Passover** or **Pesach**

[10] In Passover, Jews are not allowed to consume this type of food, which refers to any type of leavened product.

ANSWER: **chametz** (accept anything that sounds like “hametz”)

[10] The word Passover recalls how Israelis would rub lamb blood over their doors to avoid God’s wrath during this final of the ten plagues.

ANSWER: **killing of the firstborn son** (accept equivalent answers, prompt on anything less specific)

18 Before becoming a republic, Rome was ruled by a series of seven kings. For 10 points each:

[10] The first king was this somewhat legendary figure, the son of Rhea Silvia and brother of Remus.

ANSWER: **Romulus**

[10] During the reign of Romulus, Rome went to war against this Italian tribe. In a famous historical episode, the women of this tribe intervened to stop the fighting and were taken as wives for the men of Rome.

ANSWER: **Sabine**s (or **Sabine** women)

[10] The finally king of Rome, Tarquinius Superbus, was the victim of a revolt after his son Sextus raped this noblewoman.

ANSWER: **Lucretia**

19 Mount Kilimanjaro is found in the northeast of this country. For 10 points each:

[10] Name this African country whose largest city is the port of Dar es Salaam.

ANSWER: **Tanzania**

[10] Since 1996, Tanzania’s capital has been this central city whose name translates as “it has sunk”.

ANSWER: **Dodoma**

[10] The southwest portion of Tanzania borders this lake, the southernmost lake in the African Rift Valley.

ANSWER: Lake **Malawi** or Lake **Nyasa**

20 The 68-95-99.7 rule describes how much of the graph of the normal distribution lies within 3 times this value. For 10 points each:

[10] Name this statistical value, determined by the square root of the sum of the squares of the difference of each data point from the mean divided by the number of data points.

ANSWER: **standard deviation**

[10] Taking the square of standard deviation gives this value which describes how scattered the data is.

ANSWER: **variance**

[10] This theorem states that if you take the sum of a number of independent random variables, the resulting distribution function will approximate the normal distribution.

ANSWER: **central limit** theorem

**Tiebreaker Bonus**

21 Answer these questions about density, for 10 points each.

[10] This ratio is equal to the density of a substance divided by the density of a reference material. The reference material is typically water and thus this ratio is often used to determine if an object will float in water.

ANSWER: **specific gravity**

[10] According to this principle, a floating object displaces its own weight in fluid. That is, the buoyancy force is equal to the weight of the amount of fluid an object displaces, so objects less dense than water will float.

ANSWER: **Archimedes**’ principle

[10] Density is an example of this type of property which does not depend on the size of the system. Temperature is another example of this type of property, while mass is not.

ANSWER: **intensive** property