Tucson International Academy

Academia Internacional de Tucson

Homework Packet for Twelveth Grade

Week 20

Name_____

Week Starts on/ Due on _____

Each week you are to complete your homework packet and turn it on the day the teacher assigns. Part of the homework is reading 45 minutes a day. This can be done in after school care and they can read to a younger sibling or an adult as well. Weekend reading is encouraged, each week students can get credit for reading on Saturday and/or Sunday. Reading each day is very important to help each student get better at this skill.

© ***Reading is Fun!!*** ©

Weekly Home Reading Record

Day	Reading Material	Amount of Time	How many pages
Weekend			
Monday			
Tuesday			
Wednesday			
Thursday			

Total Time Reading: Hours_____ Minutes_____

Student Signature_____ Date_____

Parent Signature_____ Date_____

Questions 22-31 are based on the following passage.

This passage is adapted from Emily Anthes, *Frankenstein's Cat*. ©2013 by Emily Anthes.

When scientists first learned how to edit the genomes of animals, they began to imagine all the ways they could use this new power. Creating brightly colored novelty pets was not a high priority. Instead, most researchers envisioned far more consequential applications, hoping to create genetically engineered animals that saved human lives. One enterprise is now delivering on this dream. Welcome to the world of "pharming," in which simple genetic tweaks turn animals into living pharmaceutical factories.

Many of the proteins that our cells crank out naturally make for good medicine. Our bodies' own enzymes, hormones, clotting factors, and antibodies are commonly used to treat cancer, diabetes, autoimmune diseases, and more. The trouble is that it's difficult and expensive to make these compounds on an industrial scale, and as a result, patients can face shortages of the medicines they need. Dairy animals, on the other hand, are expert protein producers, their udders swollen with milk. So the creation of the first transgenic animals—first mice, then other species—in the 1980s gave scientists an idea: What if they put the gene for a human antibody or enzyme into a cow, goat, or sheep? If they put the gene in just the right place, under the control of the right molecular switch, maybe they could engineer animals that produced healing human proteins in their milk. Then doctors could collect medicine by the bucketful.

Throughout the 1980s and '90s, studies provided proof of principle, as scientists created transgenic mice, sheep, goats, pigs, cattle, and rabbits that did in fact make therapeutic compounds in their milk. At first, this work was merely gee-whiz, scientific geekery, lab-bound thought experiments come true. That all changed with ATryn, a drug produced by the Massachusetts firm GTC Biotherapeutics. ATryn is antithrombin, an anticoagulant that can be used to prevent life-threatening blood clots. The compound, made by our liver cells, plays a key role in keeping our bodies clot-free. It acts as a molecular bouncer, sidling up to clot-forming compounds and escorting them out of the bloodstream. But as many as 1 in 2,000 Americans are born with a genetic mutation that prevents them from making antithrombin. These patients are prone to clots, especially in their legs and lungs, and they are at elevated risk of suffering from fatal complications during surgery and childbirth. Supplemental antithrombin can reduce this risk, and GTC decided to try to manufacture the compound using genetically engineered goats.

To create its special herd of goats, GTC used microinjection, the same technique that produced GloFish and AquAdvantage salmon. The company's scientists took the gene for human antithrombin and injected it directly into fertilized goat eggs. Then they implanted the eggs in the wombs of female goats. When the kids were born, some of them proved to be transgenic, the human gene nestled safely in their cells. The researchers paired the antithrombin gene with a promoter (which is a sequence of DNA that controls gene activity) that is normally active in the goat's mammary glands during milk production. When the transgenic females lactated, the promoter turned the transgene on and the goats' udders filled with milk containing antithrombin. All that was left to do was to collect the milk, and extract and purify the protein. *Et voilà*—human medicine! And, for GTC, liquid gold. ATryn hit the market in 2006, becoming the world's first transgenic animal drug. Over the course of a year, the "milking parlors" on GTC's 300-acre farm in Massachusetts can collect more than a kilogram of medicine from a single animal.

22

The primary purpose of the passage is to

A) present the background of a medical breakthrough.

B) evaluate the research that led to a scientific discovery.

C) summarize the findings of a long-term research project.

D) explain the development of a branch of scientific study.

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CONTINUE

23

The author's attitude toward pharming is best described as one of

A) apprehension.
B) ambivalence.
C) appreciation.
D) astonishment.

24

As used in line 20, "expert" most nearly means

A) knowledgeable.
B) professional.
C) capable.
D) trained.

25

What does the author suggest about the transgenic studies done in the 1980s and 1990s?

A) They were limited by the expensive nature of animal research.
B) They were not expected to yield products ready for human use.
C) They were completed when an anticoagulant compound was identified.
D) They focused only on the molecular properties of cows, goats, and sheep.

26

Which choice provides the best evidence for the answer to the previous question?

A) Lines 16-19 ("The trouble . . . need")
B) Lines 25-29 ("If they . . . milk")
C) Lines 35-36 ("At first . . . true")
D) Lines 37-40 ("That all . . . clots")

27

According to the passage, which of the following is true of antithrombin?

A) It reduces compounds that lead to blood clots.
B) It stems from a genetic mutation that is rare in humans.
C) It is a sequence of DNA known as a promoter.
D) It occurs naturally in goats' mammary glands.

28

Which choice provides the best evidence for the answer to the previous question?

A) Lines 12-16 ("Many . . . more")
B) Lines 42-44 ("It acts . . . bloodstream")
C) Lines 44-46 ("But as . . . antithrombin")
D) Lines 62-65 ("The researchers . . . production")

29

Which of the following does the author suggest about the "female goats" mentioned in line 59?

A) They secreted antithrombin in their milk after giving birth.
B) Some of their kids were not born with the antithrombin gene.
C) They were the first animals to receive microinjections.
D) Their cells already contained genes usually found in humans.

30

The most likely purpose of the parenthetical information in lines 63-64 is to

A) illustrate an abstract concept.
B) describe a new hypothesis.
C) clarify a claim.
D) define a term.

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CONTINUE

31

The phrase "liquid gold" (line 71) most directly suggests that

A) GTC has invested a great deal of money in the microinjection technique.

B) GTC's milking parlors have significantly increased milk production.

C) transgenic goats will soon be a valuable asset for dairy farmers.

D) ATryn has proved to be a financially beneficial product for GTC.

Questions 32-41 are based on the following passages.

Passage 1 is adapted from Edmund Burke, *Reflections on the Revolution in France*. Originally published in 1790. Passage 2 is adapted from Thomas Paine, *Rights of Man*. Originally published in 1791.

Passage 1

To avoid . . . the evils of inconstancy and versatility, ten thousand times worse than those of obstinacy and the blindest prejudice, we have consecrated the state, that no man should approach to look into its defects or corruptions but with due caution; that he should never dream of beginning its reformation by its subversion; that he should approach to the faults of the state as to the wounds of a father, with pious awe and trembling solicitude. By this wise prejudice we are taught to look with horror on those children of their country who are prompt rashly to hack that aged parent in pieces, and put him into the kettle of magicians, in hopes that by their poisonous weeds, and wild incantations, they may regenerate the paternal constitution, and renovate their father's life.

Society is indeed a contract. Subordinate contracts for objects of mere occasional interest may be dissolved at pleasure—but the state ought not to be considered as nothing better than a partnership agreement in a trade of pepper and coffee, calico or tobacco, or some other such low concern, to be taken up for a little temporary interest, and to be dissolved by the fancy of the parties. It is to be looked on with other reverence; because it is not a partnership in things subservient only to the gross animal existence of a temporary and perishable nature. It is a partnership in all science; a partnership in all art; a partnership in every virtue, and in all perfection. As the ends of such a partnership cannot be obtained in many generations, it becomes a partnership not only between those who are living, but between those who are living, those who are dead, and those who are to be born. . . . The municipal corporations of that universal kingdom are not morally at liberty at their pleasure, and on their speculations of a contingent improvement, wholly to separate and tear asunder the bands of their subordinate community, and to dissolve it into an unsocial, uncivil, unconnected chaos of elementary principles.

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CONTINUE

Passage 2

Every age and generation must be as free to act for itself, *in all cases*, as the ages and generations which preceded it. The vanity and presumption of governing beyond the grave, is the most ridiculous and insolent of all tyrannies.

Man has no property in man; neither has any generation a property in the generations which are to follow. The Parliament or the people of 1688, or of any other period, had no more right to dispose of the people of the present day, or to bind or to control them in any shape whatever, than the parliament or the people of the present day have to dispose of, bind, or control those who are to live a hundred or a thousand years hence.

Every generation is, and must be, competent to all the purposes which its occasions require. It is the living, and not the dead, that are to be accommodated. When man ceases to be, his power and his wants cease with him; and having no longer any participation in the concerns of this world, he has no longer any authority in directing who shall be its governors, or how its government shall be organized, or how administered. . . .

Those who have quitted the world, and those who are not yet arrived at it, are as remote from each other, as the utmost stretch of mortal imagination can conceive. What possible obligation, then, can exist between them; what rule or principle can be laid down, that two nonentities, the one out of existence, and the other not in, and who never can meet in this world, that the one should control the other to the end of time? . . .

The circumstances of the world are continually changing, and the opinions of men change also; and as government is for the living, and not for the dead, it is the living only that has any right in it. That which may be thought right and found convenient in one age, may be thought wrong and found inconvenient in another. In such cases, who is to decide, the living, or the dead?

32

In Passage 1, Burke indicates that a contract between a person and society differs from other contracts mainly in its

A) brevity and prominence.
B) complexity and rigidity.
C) precision and usefulness.
D) seriousness and permanence.

33

As used in line 4, "state" most nearly refers to a

A) style of living.
B) position in life.
C) temporary condition.
D) political entity.

34

As used in line 22, "low" most nearly means

A) petty.
B) weak.
C) inadequate.
D) depleted.

35

It can most reasonably be inferred from Passage 2 that Paine views historical precedents as

A) generally helpful to those who want to change society.
B) surprisingly difficult for many people to comprehend.
C) frequently responsible for human progress.
D) largely irrelevant to current political decisions.

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CONTINUE

Pre-Calculus (12) Week 20

Name: Gary Young

#1 Points possible: 1. Total attempts: 1

Convert the Cartesian coordinate (-6,1) to polar coordinates, $0 \leq \theta < 2\pi$

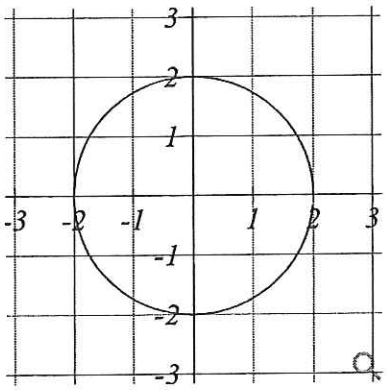
$r =$ _____

Enter exact value.

$\theta =$ _____

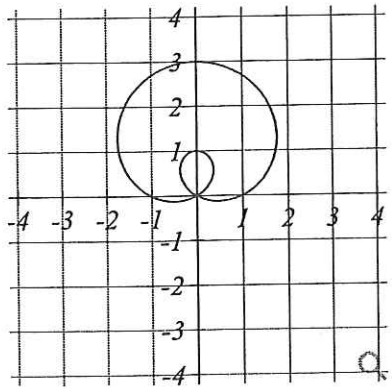
#2 Points possible: 1. Total attempts: 1

Write a polar equation for the graph below. Enter **theta** for θ if needed.



$r(\theta) =$ _____

#3 Points possible: 1. Total attempts: 1

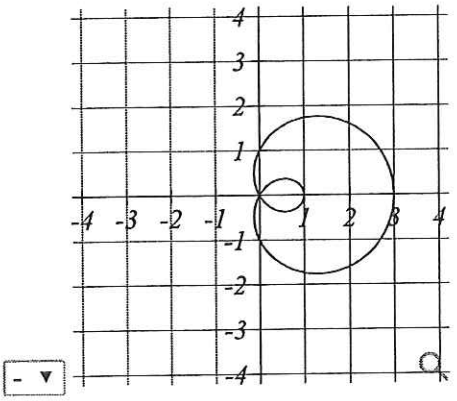


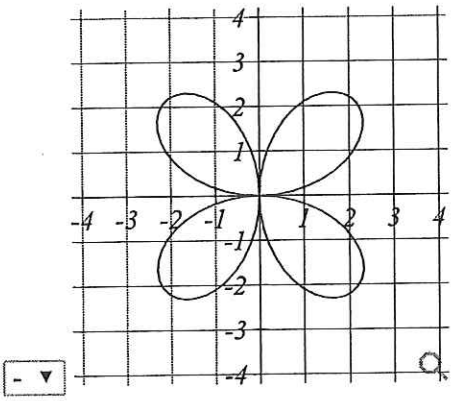
Which of the following is the equation for the graph shown above?

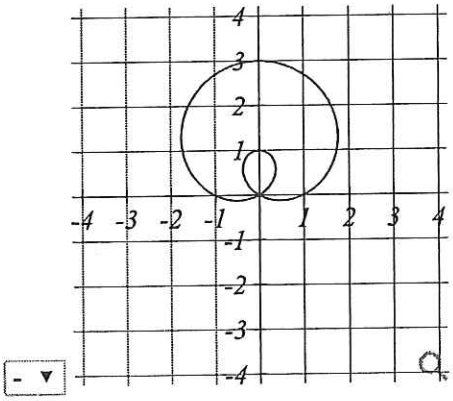
- $r = 3\cos(3\theta)$
- $r = 3\sin(2\theta)$
- $r = 1 + 2\sin(\theta)$
- $r = 3\cos(2\theta)$
- $r = 1 + 2\cos(\theta)$

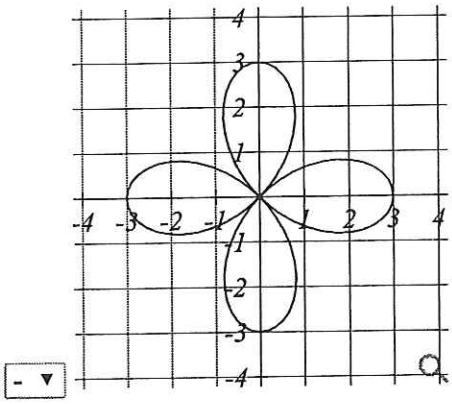
#4 Points possible: 1. Total attempts: 1

Match each graph with its equation









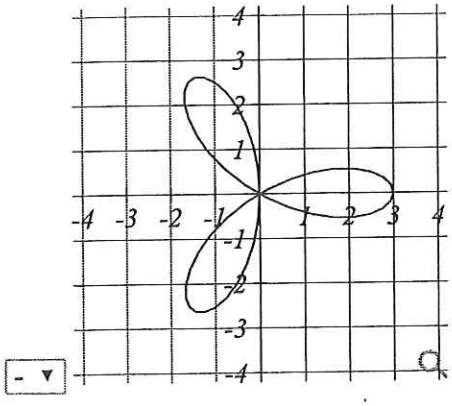
a. $r = 3\sin(2\theta)$

b. $r = 1 + 2\cos(\theta)$

c. $r = 1 + 2\sin(\theta)$

d. $r = 3\cos(3\theta)$

e. $r = 3\cos(2\theta)$


4
3
2
1
-4 -3 -2 -1 1 2 3 4
-1
-2
-3
-4
-