Practice Round

1. An eccentric millionaire offers you a summer job for the month of June. She will pay you one cent on June 1 for your first day of work and will double your daily wage each day thereafter. Find the date of the first day on which you will be paid more than one million dollars for that day's work.
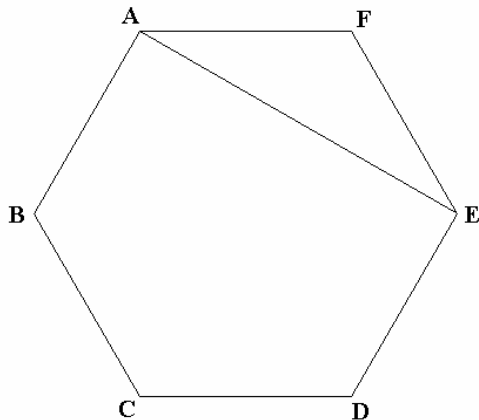
    Answer __June_____.

2. How many of the following statements are true?

    a. The sum of two irrational numbers is always irrational.
    b. The product of two irrational numbers is always irrational.
    c. The quotient of two irrational numbers is always irrational.

    Answer _____

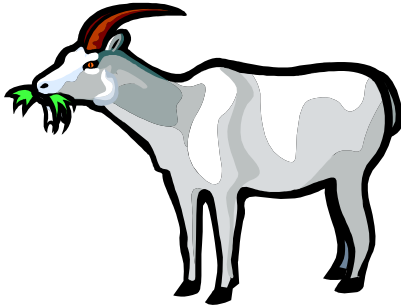3. Given that ABCDEF is a regular (equilateral) hexagon, find the ratio AE / AF.

    Answer _____

Round One

1. James has a rectangular house that has dimensions 60 feet by 40 feet. He stakes his goat to one corner of the house with a rope that is 50 feet long. How much area outside of the house can the goat cover?

Answer _____ sq. feet.

2. Find a point on the x-axis that is equidistant from the points (-2, 2) and (1, 1).

Answer (___ , ___).

3. If $x + y = 1$ and $x^2 + y^2 = 4$, what is the value of $x^3 + y^3$?

Answer _____ .

Round Two

1. Suppose $f(x+1) = 2x$. Find x such that $f(x+2) = 14$.

Answer   x =   .

2. The Beta Rho Alpha Nu Society for the Intellectually Superior has decided that they need to expand their membership since it has been declining in recent years. Previously they have required that for individuals to join they must be a college student and document a Stafford-Binhay IQ score of 150. If they desire to allow admittance for applicants from the top 2.5% of college student scorers on the Stafford-Binhay test what should be their new score for entry? Note: they know that for college students the results of the Stafford-Binhay IQ test is normally distributed with a mean score of 110 and a standard deviation of 15.
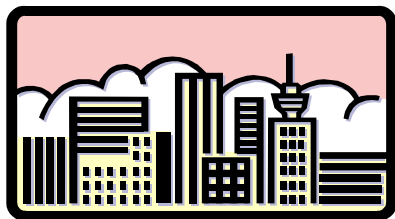
Answer _____

3. In the sequence 1, 3, 2, -1, -3, ... where each term after the first two is found by subtracting the term before the preceding term from the preceding term. What is the sum of the first 100 terms of the sequence?

Answer _____

Round Three

1. The population of Townsville begins with 50,000 people and doubles every 20 years. The population of Cityton begins with 250,000 and increases at a constant 1.6% per year. Assuming that these growth rates are held constant, how long, to the nearest year, will it be before the population of Townsville catches up with Cityton (if ever)?

Answer _____ years

2. The following four statements, and only these statements, are found on a card.

   On this card exactly one statement is false.
   On this card exactly two statements are false.
   On this card exactly three statements are false.
   On this card exactly four statements are false.

   How many false statements are on the card?

Answer _____

3. An urn contains 33 numbered balls, of which 20 are red and 13 are blue. A sample of 7 balls is to be selected. To the nearest percent, what is the probability that the sample will contain 4 red balls and 3 blue balls?

Answer _____ %

Round Four

1. Tim is out cycling on a country road. In the distance he sees a church with the spire one degree above the horizon. As he pedals directly toward the church the angle of elevation increases to five degrees after he has traveled 2000 feet. To the nearest foot, how high is the top of the spire on the church?

    Answer _____

2. If you reverse the digits in Hakeem's age, divide by three, and then add three, the result is his age again. How old is Hakeem?

    Answer _____

3. A bug moves North, then East, then South, then West, then North, then East, then South, then West and so on indefinitely. The first move North is 190 cm and each following move is half as long as the previous move. If the bug starts at the coordinates (0, 0), what point will it approach? Assume that the positive y-axis is North and the positive x-axis is East and the axis scale is in cm's.

    Answer (_____, _____) .

Round Five

1. In his rookie season last year Willie McGreen had a batting average of 0.289 in 114 attempts. This year, after 236 more attempts, he brought his career average of base hits per attempt up to 0.294. What was his batting average for this, his second, season? Note: batting averages are rounded to three decimal places.

Answer _____ .

2. For acute angles x and y, cos x = tan y and cos y = tan x, find the value of $\sin^2 x + \sin x$.

Answer _____

3. A parabolic arch is 30 feet wide at its base and 15 feet high. Exactly how many feet wide is it 10 feet above its base?
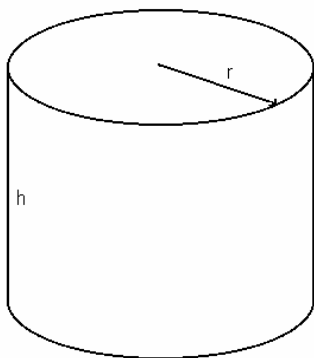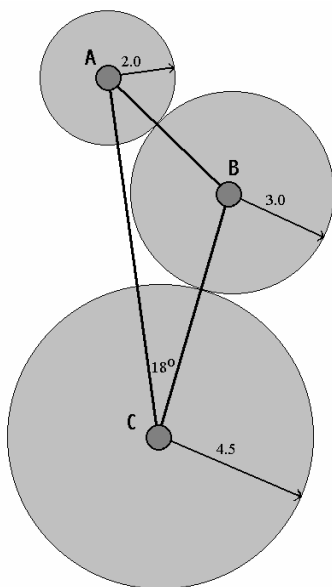
Answer _____ feet

Round Six

1. The square of the volume of a right circular cylinder is equal to the cube of its lateral surface area. Find the ratio of the radius of the cylinder to its height.

Answer_____.

2. A list of 19 consecutive integers has a sum of 95. What is the smallest integer in the list?

Answer _____.

3. Three atoms with atomic radii of 2.0, 3.0 and 4.5 are arranged as in the figure. Find the distance between the centers of atoms A and C to the nearest tenth of an atomic unit.

Answer_____ atomic units

Group Round – The Oliveville Murder

For this group round in addition to two points awarded for each correct answer, teams with all answers correct receive a bonus of two points. Additionally, the first team to get all parts correct will receive an additional bonus of two points and the second team to get all parts correct will receive a bonus one point.

On a night when a town meeting was to be held in Oliveville, OK, the call went out for the town crier to begin the meeting. However, the town crier was nowhere to be found. After an all night search, the following was found:

I Did IT!

The Crier is DEAD, but you fools will never guess:

A. Who I am _____

B. How I did it _____

C. Where I did it _____

D. Why I did it _____

Here are the choices:

Suspect	Weapon	Location	Motive
Prof. Purple	Knife	Pantry	Jealousy
Dr. Red	Cat-o-nine tails	Bathroom	Money
Mayor Cheese	Flame thrower	Bunker	Extortion
Mrs. Towel	Cross Bow	Bedroom	Humiliation
Mr. Mellon	Poison	Audio-Visual Room	Power
Captain Krunch	Piano Wire	Library	Insanity

Here are the facts:

The murder was not done for jealousy nor was it committed in the bunker.
The murder was done for jealousy and poison was used, or the motive was not humiliation.
The flame-thrower could have only been used in the bunker.
A man did not commit the murder.
Prof. Purple was the murderer if and only if the knife was used.
Only Captain Krunch could have used the cat-o-nine tails.
It was not the library, or it was not poison, or it was Mayor Cheese.
It was not Mayor Cheese but may have been done with knife.
It was not Dr. Red or it was not Captain Krunch.
It was Mrs. Towel or the cross bow was not used.
Prof. Purple was in the audio-visual room when the murder was committed elsewhere.
It is not the case that: it was done for power or due to insanity.
It is false that: Mrs. Towel did it or the knife was used.
If the piano wire was used, it was in the library and done for power.
If the murderer was not Mrs. Towel then it was not committed in the bedroom.
If the murder was not done due to insanity and not for jealousy then Captain Krunch is innocent.
If Mr. Mellon did it, he did it for jealousy.
If it was committed in the bathroom then it was committed for power.
If Dr. Red or Mr. Mellon did the deed, then it was done in the bunker or money was not the motive.
Either the knife was used or it was not done in the bathroom.