Round 1, Question 1

School Name: _____

School Number: _____

Suppose a toy manufacturer has fixed costs of $3000 and additional costs of $2 per toy. What additional cost is incurred if the production level is raised from 2000 toys to 2200 toys?

Answer: _____

Round 1, Question 2

School Name: _____

School Number: _____

Find the least common multiple of the numbers 20, 33, 36, and 42.

Answer: _____

Round 1, Question 3

School Name: _____

School Number: _____

The equation

$$x^3+8=0$$

has three solutions, including two complex solutions. Find the sum of these solutions.

Answer: _____

Round 1, Question 4

School Name: _____

School Number: _____

Find the 458^{th} number in the sequence 21, 29, 37, 45, …..

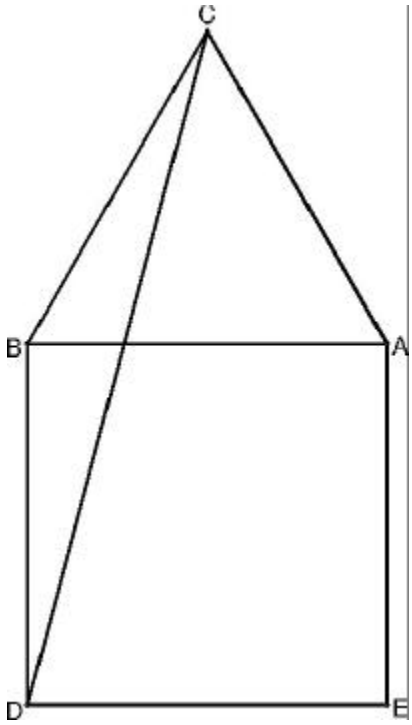
Answer: _____

Round 1, Question 5

School Name: _____

School Number: _____

If ABC is an equilateral triangle and ABDE is a 1x1 square find the length of CD.



Answer: _____

Round 1, Question 6

School Name: _____

School Number: _____

How many solutions does the equation $\tan(x) = -7$ have on the interval $0 \leq x \leq 5p$?

Answer: _____

Round 1, Question 7

School Name: _____

School Number: _____

A certain type of gutter is available in 6-foot, 8-foot, and 10-foot sections. How many different lengths can be achieved using three sections of gutter?

Answer: _____

Round 1, Question 8

School Name: _____

School Number: _____

Find all solutions of the equation

$$2\ln(x) = \ln(4) + \ln(x+3).$$

Answer: _____

Round 2, Question 1

School Name: _____

School Number: _____

A charter airline charges $300 per roundtrip ticket to London if it can sell tickets for all 95 seats on the plane. For each empty seat, the price of a ticket increases by $3.50. What is the price of a ticket if the airline sold 78 tickets?

Answer: _____

Round 2, Question 2

School Name: _____

School Number: _____

How many integers between 1 and 1000 are divisible by 30 and not by 16?

Answer: _____

Round 2, Question 3

School Name: _____

School Number: _____

If $\frac{y}{x}=3$, find the exact value of $\frac{2x+3y}{5x+7y}$.

Answer: _____

Round 2, Question 4

School Name: _____

School Number: _____

How many numbers belong to the collection 1, 4, 7, 10, 13, …, 682?

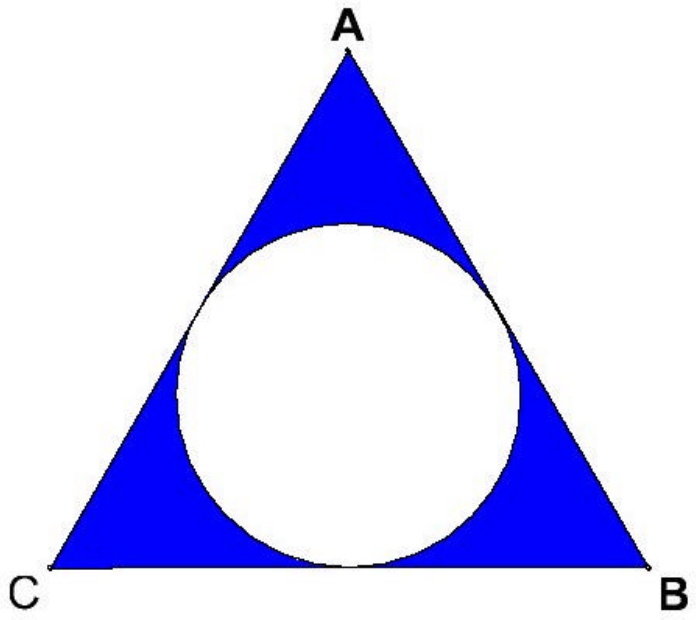
Answer: _____

Round 2, Question 5

School Name: _____

School Number: _____

A circle of radius 1 is inscribed in the equilateral triangle ABC. Find the area of the shaded region.



Answer: _____

Round 2, Question 6

School Name: _____

School Number: _____

How many solutions does the equation $\sin(3x) = 2/5$ have over $[0, 2p]$?

Answer: _____

Round 2, Question 7

School Name: _____

School Number: _____

In how many distinct ways can 16 be written as the sum of four positive odd integers (e.g. 16 = 9+5+1+1)?

Answer: _____

Round 2, Question 8

School Name: _____

School Number: _____

Given that f is a function for which $f(x+1)-f(x)=3x^2-5$ and $f(3)=14$ find $f(4)$.

Answer: _____