

Round 1, Question 1

Find x for which

$$\frac{\frac{52}{11x - 4}}{13} - 5 = 13.$$

ANSWER: _____

Round 1, Question 2

The digits 1, 3, 4 and 8 are each used once to form the smallest possible odd four-digit number. What is the digit in the hundreds place?

ANSWER: _____

Round 1, Question 3

What is the remainder of 2^{2002} divided by 5?

ANSWER: _____

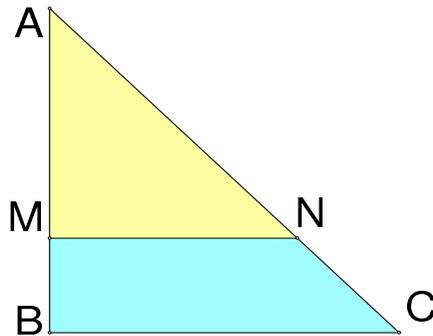
Round 1, Question 4

What is the area (in square feet) of a triangle whose sides are 5 ft , 5 ft and 8 ft long?

ANSWER: _____

Round 1, Question 5

The line segment \overline{MN} in the figure below is parallel to the side \overline{BC} of an isosceles right triangle ($AB = BC = 2 \text{ ft}$). Find MN (in feet) knowing that \overline{MN} divides the triangle ABC into regions of equal area.



ANSWER: _____

Round 1, Question 6

Find x from the equation

$$2^x = 2\sqrt{2\sqrt{2\sqrt{2}}}.$$

ANSWER: _____

Round 1, Question 7

Three numbers, when added two at a time, give the sums 10, 14 and 18. Find the largest of these three numbers.

ANSWER: _____

Round 1, Question 8

Let $y = mx + n$ be the equation of the image when the line $2x + 3y = 8$ is reflected across the x-axis. Calculate $m + n$.

ANSWER: _____

Round 2, Question 1

What is the least common (positive integer) multiple of 72 and 120?

ANSWER: _____

Round 2, Question 2

Find the area (in square feet) of a rhombus whose diagonals are 10 *ft* and 13 *ft* long.

ANSWER: _____

Round 2, Question 3

What is the sum (in degrees) of the angles of a regular pentagon?

ANSWER: _____

Round 2, Question 4

The line having equation

$$y = mx + n$$

passes through the point of coordinates $(1, 1)$ and is perpendicular to the line of equation

$$x + 3y = 1.$$

Find the value of n .

ANSWER: _____

Round 2, Question 5

The number

$$\frac{1 + \sqrt{2}}{\sqrt{3 + 2\sqrt{2}}}$$

is an integer. Find it!

ANSWER: _____

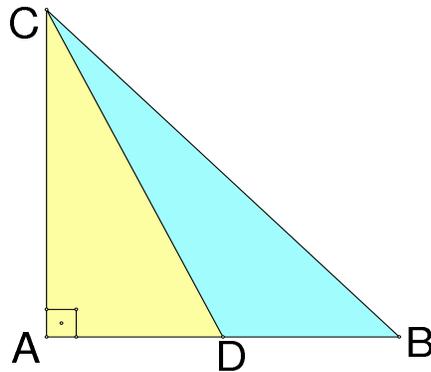
Round 2, Question 6

John drove 120 kilometers to the beach averaging 60 kilometers per hour. On the return trip he averaged 40 kilometers per hour. What was John's average speed (km/h) for the entire trip?

ANSWER: _____

Round 2, Question 7

In the figure below we have an isosceles right triangle ABC with $AB = AC = 2$ ft. The point D on \overline{AB} is chosen so that \overline{CD} divides the triangle ABC into regions of equal area. Find CD (in feet).



ANSWER: _____

Round 2, Question 8

Letters A , B , C and D represent four different digits selected from 1, 2, 3, ..., and 9. If

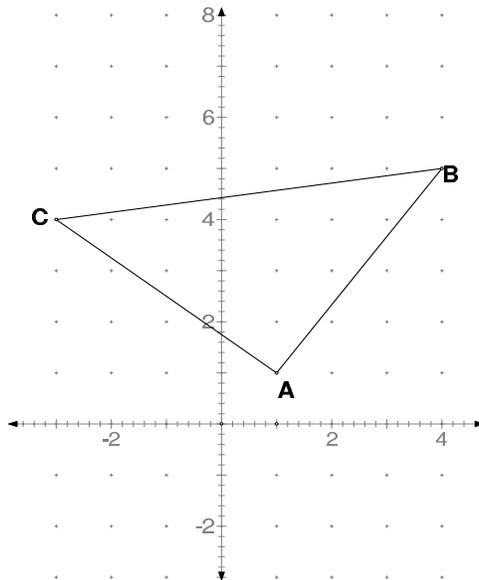
$$n = \frac{A + 3B}{C + 3D}$$

is as large as possible, what is this value of n ?

ANSWER: _____

Backup Problem 1

Consider the points in the xy -plane $A(1, 1)$, $B(4, 5)$ and $C(-3, 4)$. Find the coordinates of the point D such that $ABDC$ is a rectangle.



ANSWER: _____

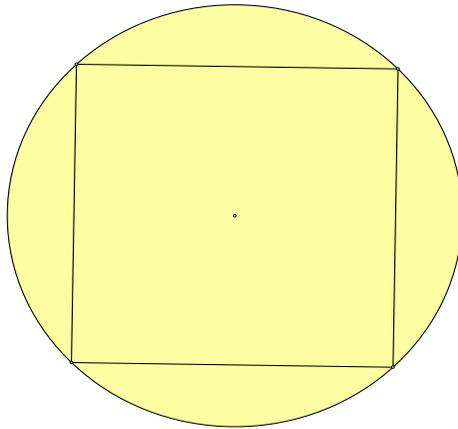
Backup Problem 2

A parabola $y = ax^2 + bx + c$ has vertex $(4, 3)$. If $(3, 0)$ is on the parabola find a .

ANSWER: _____

Backup Problem 3

A square of perimeter 20 inches is inscribed a disk as in the figure below. Find the area of the disk (in square inches).



ANSWER: _____