

Seventh Annual Upper Peninsula High School Math Challenge

Northern Michigan University (Marquette, MI, USA)
Saturday 12 March 2016

NAME: _____

TEAM: _____

SCHOOL: _____

PROBLEM 1

TIME: 4 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

The ratio of the width to the length of a rectangular rose garden is 3 to 4. If the perimeter of the garden is 168 feet, what is its area?

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PROBLEM 2

TIME: 3 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

In a sequence of consecutive integers the sum of the third and fourth terms is 47. What is the sum of the first five terms?

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PROBLEM 3

TIME: 4 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

The line $y = mx + m$ intersects the graph of $y = x^2$ at $x = m + 2$.
Find the slope of the line.

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PROBLEM 4

TIME: 4 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

The sum of two numbers is 28, and their product is 7. Find the sum of the reciprocals of the numbers. Express the answer in simplest form.

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PROBLEM 5

TIME: 5 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

A line with slope 2 intersects a line with slope 6 at the point (40, 30).
What is the distance between the x-intercepts of these lines?

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PROBLEM 6

TIME: 4 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

Calculate the distance from the center of a circle of radius 3 inches to a chord of length 5 inches.

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PROBLEM 7

TIME: 3 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

If $\frac{A}{B} + \frac{4}{3} + \frac{9}{2} = \frac{A}{B} \times \frac{4}{3} \times \frac{9}{2}$, find the value of $\frac{A}{B}$ in lowest terms.

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PROBLEM 8

TIME: 5 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

A bag contains only red and gold marbles. The probability of selecting a red marble is $\frac{2}{5}$, but if 20 red marbles are added to the bag, the probability of selecting a red marble becomes $\frac{4}{7}$. How many gold marbles are in the bag?

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PROBLEM 9

TIME: 5 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

How many distinct 3-digit numbers have a digit sum of 8?

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PROBLEM 10

TIME: 4 minutes

answer

Put no work on this side of the paper. Write the answer and only the answer in the space above. Put all work on the other side of the sheet.

If $2^4 \cdot 4^8 \cdot 8^{16} \cdot 16^{32} = 32^x$, what is x ?