

WISCONSIN MIDDLE SCHOOL STATE MATHEMATICS MEET
WISCONSIN MATHEMATICS COUNCIL
March 3 – 7, 2014

Problem Set #1

Score: _____
(For Scorer's Use Only)

Name: _____

Team: _____

[Reduce all common fractions. Decimal approximations are **not** accepted except when specifically asked for. When allowed, round decimal approximations to **3** decimal places. **No rounding should be done except on the final answer.**]

For this first problem set, calculators are not allowed. They may be used for the remainder of the meet only, starting with Problem Set #2.

Answers

1. (1 point)

Four consecutive integers add up to 2014. What is the smallest of these integers?

2. (3 points)

Five times the sum of a number and three is eight more than four times the number increased by four. Find the number.

3. (5 points)

What value is the 2014th decimal place of the fraction $\frac{38}{135}$?

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Problem Set #2

Score: _____
 (For Scorer's Use Only)

Name: _____

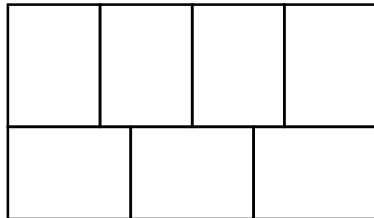
Team: _____

[Reduce all common fractions. Decimal approximations are **not** accepted except when specifically asked for. When allowed, round decimal approximations to **3** decimal places. **No rounding should be done except on the final answer.**]

Answers

1. (1 point)

Seven congruent rectangles are arranged as shown below to form a larger rectangle with area 336 in^2 . What is the perimeter of the large rectangle?



_____ in

2. (3 points)

The 4th term of a sequence is -4, and the 6th term is 4. Every term in the sequence is the sum of the two preceding terms. Find the product of the 1st and 8th terms of this sequence.

3. (5 points)

If $a \uparrow b$ means a^b , then find the value of x that satisfies this equation:

$$4 \uparrow (3 \uparrow 2) \div (4 \uparrow 3) \uparrow 2 = 4 \uparrow (3 \uparrow x)$$

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Problem Set #3

Score:
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Name: _____

Team: _____

[Reduce all common fractions. Decimal approximations are **not** accepted except when specifically asked for. When allowed, round decimal approximations to **3** decimal places. **No rounding should be done except on the final answer.**]

Answers

1. (1 point)

Joe bowled four games with scores of 125, 155, 165, and 185. If he needs to have an average score of 150, and he has one more game to bowl, what must he score in his final game?

2. (3 points)

What acute angle do the hour hand and minute hand of a clock form at 9:40 pm?

_____°

3. (5 points)

A company makes foam cubes and ships them in large cardboard boxes that are 115 cm wide, 161 cm long, and 92 cm tall on the inside. How many cubes of the largest size that will fit in the box could be used to completely fill these boxes with no extra space?

_____ cubes

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Problem Set #4

Score:
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Name: _____

Team: _____

[Reduce all common fractions. Decimal approximations are **not** accepted except when specifically asked for. When allowed, round decimal approximations to **3** decimal places. **No rounding should be done except on the final answer.**]

Answers

1. (1 point)

Let $T = 20 \times 30 \times 50 \times 70 \times 110 \times 130$. What is the smallest positive prime number that is not a factor of T ?

2. (3 points)

Jennifer has 34% of her paycheck taken out for taxes. If the amount taken out for taxes is \$265.20, what is the amount of Jennifer's paycheck before taxes are taken out?

3. (5 points)

A 4×4 square is divided into sixteen 1×1 squares as shown below. If 4 of the 16 squares are randomly selected and marked, what is the probability that every row and every column contain exactly one marked square? One such example is shown below. Express your answer as a fraction in lowest terms.

	×		
			×
		×	
×			

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Team Problem Set (Page 1)

Score:
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Team: _____

Captain: _____

[Reduce all common fractions. Decimal approximations are **not** accepted except when specifically asked for. When allowed, round decimal approximations to **3** decimal places. **No rounding should be done except on the final answer.**]

Answers

1. (10 points)

A palindrome is a number that reads the same forwards and backwards, such as 1,661 and 707. How many palindromes exist between 1 and 1,000 (including 1)? _____

2. (10 points)

Wendy's mom drove her from home to the shopping mall at 35 miles per hour and was 15 minutes late meeting her friends there. The next day, her mom drove her from home to the mall at 55 miles per hour and was 15 minutes early meeting her friends there. How far is it from Wendy's house to the mall? _____ miles

3. (10 points)

What is the area of a square in which the sum of the squares of the lengths of the four sides plus the sum of the squares of the lengths of both diagonals is 400? _____

Team Problem Set (Page 2)

4. (10 points)

If x , $2x + 2$, and $3x + 3$ are the first three terms of a geometric sequence made up of non-zero terms, find the number that is the 4th term in this sequence.

5. (10 points)

Angie, Brenda, Charles, Derek, and Eleanor are seated around a table in this order. Each person is holding two playing cards. Angie has a red card and a black card, while the other four people have two red cards.

First, Angie and Brenda each exchange one of their cards (randomly and simultaneously) with each other. Next, Brenda and Charles do the same thing, then Charles and Derek do, then Derek and Eleanor do, and finally Eleanor and Angie do.

What is the probability that Angie ends up with the black card after all five exchanges? Express your answer as a fraction in lowest terms.

6. (10 points)

Two students, Chris and Scott, are in charge of cleaning the gymnasium after basketball games. Usually, they work together, and it takes them x hours to complete the job. When Chris works alone, he needs an additional 4 hours to finish, but if Scott works alone, he needs only 1 additional hour to finish.

How long does it take both students to clean the gym when they work together? _____ hr _____ min