

Name _____ Score _____ School _____

TEAM QUESTION

March 2018

(10 pts)

Twelve balls with the numbers 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 25 and 30 are in a bucket. Patrick will pick two different balls and compute the greatest common factor (GCF) and the least common multiple (LCM) of the two selected numbers. In order to win a prize, the product of the GCF and the LCM must be divisible by 24, 54, or 75. How many winning combinations are there?

ANSWER: _____

Name _____ Score _____ School _____

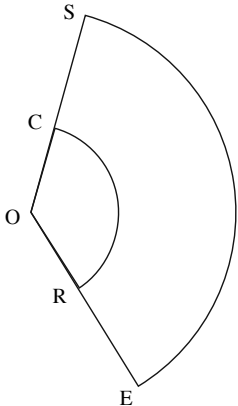
TEAM QUESTION

March 2017

(10 pts)

Using the problems below to find the values of A, B, and C, find the roots of $Ax^3 + Bx^2 + Cx = -24$.

Problem A: In the figure \widehat{CR} and \widehat{SE} are arcs of concentric circles with center O. The area of region CRES is 55. If $RE = 5$ and $m\angle O = 2$ radians. Find A = the length of \overline{OR} .



Problem B: $B = n - m$

- Seven students worked together on a project. Let m = the number of ways their teacher can choose four to present their project.
- When Jack bought his new truck, there were 192 different ways his truck could be equipped. He had four choices of engines, and two choices of transmissions. The only other choice was color. Let n = the number of colors available.

Problem C: One endpoint of a line segment is $(8, -7)$ and the midpoint is $\left(-2, -\frac{9}{2}\right)$. Let C be the y-coordinate of the other endpoint.

ANSWER: _____ $x =$ _____

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TEAM QUESTION

March 2016

(10 pts)

Use the Sudoku puzzle to find $\left(\frac{AE}{D}\right)^{\%D}$

3			D					
6			1	7	9	A		
	5							4
1				6	B	5		
				5		2	9	3
	C	2			3			7
		6		8				
	9							
			5				6	E

ANSWER: _____

Name _____ Score _____ School _____

TEAM QUESTION

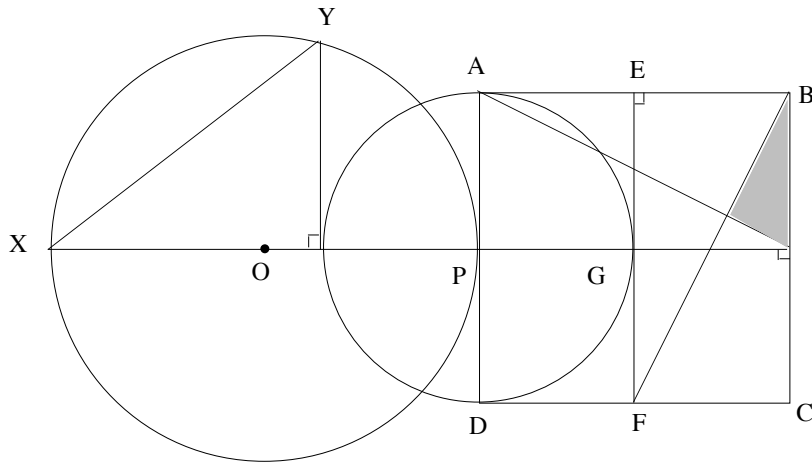
March 2015

(10 pts)

Given: $XY = 8$, $XP = 10$, and \overline{XP} is a diameter of circle O.

\overline{AD} is tangent to circle O at P and \overline{EF} is tangent to circle P at G.

Find the area of the shaded region inside square ABCD.



ANSWER: _____

Name _____ Score _____ School _____

TEAM QUESTION

March 2014

(10 pts)

Ann has 10 counters numbered 20 – 29. She invites four of her friends (Brian, Charlie, David, and Edwin) to pick two counters each. She notices that the sum of the numbers on her counters is 47, that Brian's total is 51, Charlie's total is 44, David's total is 57, and Edwin's total is 46. List who has which counters in each possible grouping.

ANSWER: _____

Name _____ Score _____ School _____

TEAM QUESTION

2013

(10 pts)

Bella's entire stamp collection fits into three books. One-fifth of the stamps are in the first book, 303 stamps are in the second book, and several sevenths are in the third book (the numerator got smudged). How many stamps does Bella have?

ANSWER: _____

Name _____ Score _____ School _____

TEAM QUESTION

2012

(10 pts)

A is the exact value of $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}$

B is the exact value of $\sqrt{7 + \sqrt{48}} + \sqrt{7 - \sqrt{48}}$

C is the perfect square from the following: 568518 725902 458327 571536 522723

D is $\frac{C}{AB}$

E is the different number of ways to put 4 keys on a circular ring

Find $\frac{D}{E}$

ANSWER: _____

Name _____ Score _____ School _____

TEAM QUESTION

2011

(10 pts)

Let A = the remainder when $x^4 - 7x^3 + 9x^2 + 13x - 4$ is divided by $x + 1$

B = the value of $x^4 - 7x^3 + 9x^2 + 13x - 4$ when $x = 4$

C = the sum of the irrational roots of $x^4 - 7x^3 + 9x^2 + 13x - 4 = 0$

D = the average of the roots of $x^4 - 7x^3 + 9x^2 + 13x - 4 = 0$

Find $\frac{A+B+C}{D}$

ANSWER: _____

Name _____ Score _____ School _____

TEAM QUESTION

2010

(10 pts) A is the GCF of 483483 and 90610.

B is the sum $4 + 8 + 12 + 16 + \dots + 100$

C is the sum $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8}$

D is $\frac{BC}{A}$

E is the y-intercept of the line containing (2, 2) that is perpendicular to the line containing (-2, 1) and (6, 5)

Find $\frac{D}{E}$

ANSWER: _____

Name _____ Score _____ School _____

TEAM QUESTION

2009

(10 pts)

Two statisticians at a certain university agree that there is a high correlation between height and weight, but differ about the likelihood of finding exceptions. One said that if four men are taken at random, their rankings in order of height and weight would be the same, the other doubted this. They agree to test the hypothesis by picking four students. From the following clues find each student's full name (one first name is Jeff, another one has surname Stone), major, height, and weight.

1. There is a difference of exactly two inches between each height and a difference of exactly twenty pounds between each weight.
2. The first statistician was wrong in at least one instance; the student who weighs 170 pounds is shorter than the one who weighs 150 pounds.
3. The French major is heavier than Eric and lighter than the English major.
4. Peck is the heaviest; the chemistry major is the lightest.
5. Gary is taller than at least one of the others, but shorter than the English major.
6. The math major is taller than Harry and shorter than Finn.
7. Eric, who is not Vogel, is not the lightest.
8. The number of pounds of the lightest is twice the number of inches of the shortest, who is between five and six feet tall.

ANSWER:	first name	surname	major	weight	height
	Gary	_____	_____	_____	_____
	Jeff	_____	_____	_____	_____
	Eric	_____	_____	_____	_____
	Harry	_____	_____	_____	_____

Names _____ Score _____ School _____

TEAM QUESTION

2008

(10 pts) A radio station has a contest. The radio listeners are given clues about the number to call. The first person to call ABC-DEF-GHIJ wins four tickets to a football game.

Each digit of the telephone number is unique.

A, C, D, H, and I are odd numbers.

F and I are cubic numbers.

A, B, G, and H are multiples of 3.

$E + H = C + F$

$A \cdot J = G$

What telephone number should the listeners call?

ANSWER _____

Names _____ Score _____ School _____

TEAM QUESTION

2007

(10 pts)

Newton, Pascal, and Einstein play the following game. There are three cards each with a different positive integer. In each round the cards are randomly dealt to the players. The number on their card represents the number of M&Ms they will receive that round. After two or more rounds, Newton has received 20 M&Ms, Pascal 10 M&Ms, and Einstein 9. In the last of these rounds, Pascal received the largest number of M&Ms. Who received the middle number on the first round?

ANSWER _____

Names _____ Score _____ School _____

TEAM QUESTION

2006

(10 pts)

Given points $A(1, -7)$, $B(3, 1)$, and $C(11, -3)$. The centroid (intersection of the medians) of triangle ABC has coordinates (u, v) .

The largest prime number less than 500 is w .

s is the integer which makes $8x^3 - 84x^2 + 294x + s$ a perfect cube.

Find $u + v + w + s$.

ANSWER: _____

TEAM QUESTION

2005

(10 pts)

Answer questions 1 through 4, fill in the answer boxes with the corresponding numbers, and then evaluate the expression in question 5 to find the final answer.

1. Find the determinant of $\begin{bmatrix} 2 & 3 \\ 8 & 9 \end{bmatrix}$ $A =$

2. Using each of the ten digits only once, place them in the boxes below to form two five-digit numbers whose difference is as large as possible.

$$\begin{array}{r} \square \square \square \square \square \\ - \square \square \square \square \square \\ \hline \end{array}$$

$B =$ thousand's digit of the difference =

$C =$ hundred's digit of the difference =

3. Find the probability of 7 as a sum when rolling two six-sided dice.

$D =$

4. Find the number of diagonals in a regular octagon.

$E =$

5. $A^2 - \frac{B}{D} - CE$

ANSWER: _____

Names _____ Score _____ School _____

TEAM QUESTION

2004

(10 pts)

In response to questions about their ages, Kristen, Jana, and Amy made the following statements:

Kristen: Jana is 25 years old.
I am two years younger than Jana.
I am one year older than Amy.

Jana: I am not the youngest.
Amy and I are three years apart.
Amy is 28 years old.

Amy: I am not older than Kristen.
Kristen is 25 years old.
Jana is three years older than Kristen.

Exactly two of the three statements made by each woman are true. How old is each woman?

ANSWER: Kristen: _____ years old

Jana: _____ years old

Amy: _____ years old

Names _____ Score _____ School _____

TEAM QUESTION

2003

(10 pts)

Find the area of the triangle formed by:

$$y = x + 5$$

$$3y = 23 - x$$

$$y = 15 - x$$

ANSWER: _____

Names _____ Score _____ School _____

TEAM QUESTION

2002

(10 pts)

Given points A (1, -7), B (3, 1), and C (11, -3). The centroid of triangle ABC has coordinates (u, v) .

The largest prime number less than 500 is w .

s is the integer which makes $8x^3 - 84x^2 + 294x + s$ a perfect cube.

Find $u + v + w + s$.

ANSWER: _____

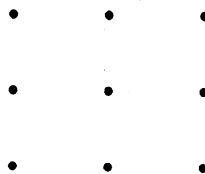
Name _____ Score _____ School _____

TEAM PROBLEM

2001

(10 pts) What is the probability that three points, randomly selected from nine equally-spaced points shown, when connected form an isosceles triangle?

Express your answer as a common fraction.



ANSWER: _____

Name _____ Score _____ School _____

TEAM PROBLEM

2000

(10 pts) On June 1, 1999, the 38th Mersenne prime was discovered. To date, $2^{6972593} - 1$ is the largest verified prime. Let A = the number of digits in $2^{6972593} - 1$.

A triangle has sides of length 51 cm, 52 cm and 53 cm. Let B = the area of this triangle in square cm.

The function $\pi(x)$ gives the number of prime numbers that are less than x . Let $C = \pi(100)$.

If $D = A + B + C$, find the sum of the digits of D .

ANSWER _____

Names _____ Score _____ School _____

TEAM QUESTION

1999

(10 pts)

Mr. Jamison had just finished putting his new five-digit license plate on his car. When he stepped back to examine the number with five distinct digits, he realized that he had put the plate on upside down. "Now I'll have to start all over again," said Mr. Jamison. The upside down plate number was 76,203 more than the correct plate number. What was Mr. Jamison's correct license plate number?

ANSWER: _____

Name _____ Score _____ School _____

TEAM PROBLEM

1998

(10 pts)

In September, the number of students at Plumeria High School was a perfect square. At the end of the first semester, with 100 new students, the number of students became 1 more than a perfect square. At the end of the year, with an additional 100 new students, the number of students is a perfect square. How many students were there in September?

ANSWER _____

Names _____ Score _____ School _____

Event: TEAM

1996

How many distinct solutions (a, b, c) are there to the equation $a^2 + bc = b^2 + ac$ if $a, b,$ and c are integers between 1 and 5 inclusive?

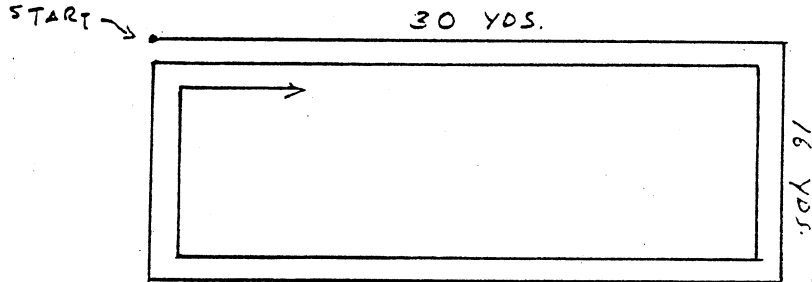
ANSWER _____

Name _____ Score _____ School _____

TEAM PROBLEM

1994

(10 pts) Mrs. S. Piral wants to plant flowers on her rectangular plot of land (30 yards by 16 yards) in a rectangular spiral. To achieve her design she needs to lay out string to guide where to plant the flowers. If she starts on the upper left hand corner of her plot and lays out the string in a clockwise spiral such that any adjacent string is 1 yard (vertically and horizontally) away, how long must the string be?



ANSWER _____ yd.

Meet 6, TEAM EVENT

2018

- 29

2017

- $-4/3$, 2, 3

2016

- 1296

2015

- 324/125

2014

- Ann: 22, 25 20, 27
- Brian: 24, 27 25, 26
- Charlie: 21, 23 **OR** 21, 23
- David: 28, 29 28, 29
- Edwin: 20, 26 22, 24

2013

- 3535

2012

- 15,876

2011

- 16/7

2010

- 2405/84

2009

- Gary Finn, Chemistry, 130 lbs, 5'9" (or 69")
- Jeff Peck, English, 190 lbs, 5'11" (or 71")
- Eric Stone, Mathematics, 150 lbs, 5'7" (or 67")
- Harry Vogel, French, 170 lbs, 5'5" (or 65")

2008

- 305-748-6912

2007

- Einstein

2006

- 158

2005

- -112

2004

- Kristen: 25 years old
- Jana: 27 years old
- Amy: 24 years old

2003

- 18

2002

- 158

2001

- 3/7

2000

- 14

1999

- 10698

1998

- 2401

1996

- 33

1994

- 526 yd.

Note: Answers are shown as they appear on the original answer keys. There may be inconsistencies with the formatting of these answers. In all cases, consult the Guidelines for Forms of Answers to determine the correct formatting.