

Math Field Day 2015

Mad Hatter 6-8

CSU Fresno

www.fresnostate.edu/csm/math/

18 April 2015

Mad Hatter 6-8

Math Field
Day 2015

CSU Fresno

Welcome to Fresno State!

The Mad Hatter Marathon is a competition in rapid computation and problem solving. You will find that you do not have time to solve every problem. After a few minutes you may feel “mentally out of breath.” Do not let this discourage you. Your fellow contestants feel the same way. That is why this contest is called *Mad Hatter Marathon!*

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The Mad Hatter Marathon is divided into two problem solving periods, each lasting 45 minutes. Between the two periods there will be a 15 minute break.

Part I

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Part I

Part I:
Problems 1-15

Part I:
Problems
16-30

- **This part of the exam consists of 30 problems.**
- The problems will be shown one at a time.
- You will have one and a half minutes to solve the problem shown.
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As soon as you have solved the problem mark your answer in the corresponding space on the Scantron form.

Part I

Math Field
Day 2015

CSU Fresno

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Math Field
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Math Field
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Problems 1-15

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Math Field
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CSU Fresno

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Problems 1-15

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Rules and Scoring

Math Field
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Part I

Part I:
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16-30

You may use pencil and scratch paper to do calculations, but **calculators are not allowed**.

Your score is the total number of correct answers, so give the best answer that you can in the time available for each problem. There is no penalty for guessing.

Reminders

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Part I

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- Please turn off any devices that could make noise, such as cell phones, beepers, watches, etc.
- If your pencil breaks or needs sharpening, stay in your seat and raise your hand.
- Keep your eyes on your own paper. Keep your Scantron flat on your desk. Contestants caught cheating will be disqualified.

Ready... Set... Go!

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Part I

Part I:
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Prepare to begin the *Mad Hatter Marathon!*

Part I - Problem 1

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Part I

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Problem 15

Part I:
Problems
16-30

Voldemort has Neville tied down to a table while a blade on a swinging pendulum lowers towards him. Each swish lowers the blade one inch and there are 7 seconds between each swish. If the blade is now 15 inches away from Neville, how many seconds does he have left to wriggle out?

- A 100
- B 105
- C 95
- D 98
- E 110

Part I - Problem 2

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Part I

Part I:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

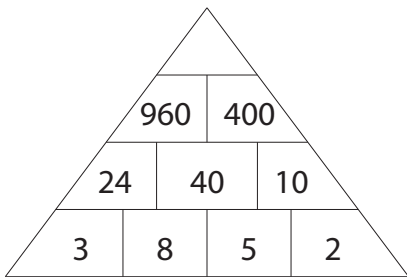
Problem 12

Problem 13

Problem 14

Problem 15

Part I:
Problems
16-30



If the pattern of numbers is consistent, what number should go in the uppermost triangle?

A 28,800

B 5,400

C 384,000

D 84,000

E 192,000

Part I - Problem 3

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Part I

Part I:
Problems 1-15

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Problem 12

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Problem 15

Part I:
Problems
16-30

It is Saturday morning at 10 AM. What day will it be 2 million seconds from now?

- A Tuesday
- B Thursday
- C Sunday
- D Monday
- E Friday

Part I - Problem 4

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Part I

Part I:
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Problem 15

Part I:
Problems
16-30

In order to launch a rope to Black Widow, who is positioned at the top of a tall tower, Hawkeye needs to know how tall the tower is. Hawkeye's longbow is five feet long and he notices that, when held upright, the bow casts a shadow that is 2.5 longbows long. He measures that the tower casts a shadow 20 longbows long. How tall is the tower?

- A 50 feet
- B 35 feet
- C 100 feet
- D 30 feet
- E 40 feet

Part I - Problem 5

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Part I

Part I:
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Problem 15

Part I:
Problems
16-30

Which of the numbers

$$-2 \quad -\frac{1}{2} \quad 1 \quad 2$$

is less than its reciprocal?

- A -2
- B $-\frac{1}{2}$
- C 1
- D 2
- E -2 and $-\frac{1}{2}$

Part I - Problem 6

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Part I

Part I:
Problems 1-15

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Problem 15

Part I:
Problems
16-30

If gas costs \$4.25 per gallon and Scooby's Mystery Machine gets 17 miles per gallon, how many miles can Scooby travel with the amount of gas that he can purchase for \$20?

- A 120 miles
- B 110 miles
- C 60 miles
- D 140 miles
- E 80 miles

Part I - Problem 7

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Part I

Part I:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

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Problem 10

Problem 11

Problem 12

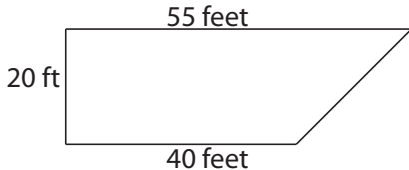
Problem 13

Problem 14

Problem 15

Part I:
Problems
16-30

If the fencing material costs \$3.50 per foot, how much will it cost to fence in the area below?



A \$490

B \$486.50

C \$493.50

D \$497

E \$483

Part I - Problem 8

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Part I

Part I:
Problems 1-15

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Problem 15

Part I:
Problems
16-30

If the numerator and denominator of a positive proper fraction are both increased by the same amount, then

new fraction _____ original fraction

A $>$

B $<$

C $=$

D Not enough info.

Part I - Problem 9

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Part I

Part I:
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Problem 15

Part I:
Problems
16-30

2		
	1	♡

The nine squares are to be filled so that every row and every column contains each of the numbers 1, 2, and 3. What number must ♡ be?

- A 1
- B 2
- C 3
- D Impossible to determine

Part I - Problem 10

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Part I

Part I:
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Part I:
Problems
16-30

To escape some hungry zombies, you and three of your friends need to cross a precarious rope bridge. At most two people can go on the bridge at once, and the pair must use a flashlight to cross the bridge. You have only one flashlight. How much time will it take to get everyone across if it takes two minutes for a person to cross the bridge?

- A 6 minutes
- B 8 minutes
- C 10 minutes

- D 12 minutes
- E 14 minutes

Part I - Problem 11

Math Field
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Part I

Part I:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

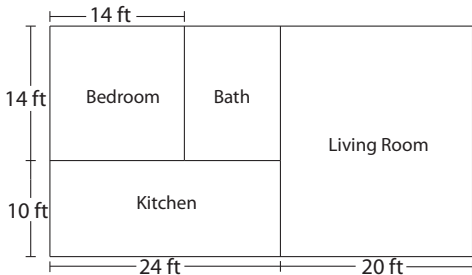
Problem 12

Problem 13

Problem 14

Problem 15

Part I:
Problems
16-30



The area of the bathroom is what fraction of the area of the living room?

A $\frac{7}{12}$

B $\frac{9}{20}$

C $\frac{5}{24}$

D $\frac{7}{24}$

E $\frac{5}{12}$

Part I - Problem 12

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Part I

Part I:
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Part I:
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You look up from your math book and see a tornado is moving toward your position. The news says the tornado is moving at 6 miles per hour. A bolt of lightning strikes near the tornado and 5 seconds later you hear the thunder. You remember that sound travels at 0.2 miles per second. How much time do you have until the tornado reaches you?

- A 8 minutes
- B 10 minutes
- C 14 minutes

- D 15 minutes
- E 16 minutes

Part I - Problem 13

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Part I

Part I:
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Problem 15

Part I:
Problems
16-30

The length of Earth's equator is 24901 miles. Imagine a 24901-mile-long belt wrapping around the equator. If you wanted to lengthen the belt so that the entire belt could be lifted one foot off the surface of the Earth, by how much would you need to lengthen the belt?

- A 2 feet
- B π feet
- C 2π feet

- D 5280π feet
- E 2640π feet

Part I - Problem 14

Math Field
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Part I

Part I:
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Problem 15

Part I:
Problems
16-30

Ultron's pulse is always a steady 72 beats per minute.
How many heartbeats will he have in 35 seconds?

A 42

B 35

C 26

D 45

E 36

Part I - Problem 15

Math Field
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Part I

Part I:
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Problem 15

Part I:
Problems
16-30

A vampire has come to town. Each month a vampire sucks blood from two humans and creates two new vampires. After 6 months how many vampires will be in town?

- A** 48
- B** 1458
- C** 96
- D** 81
- E** 729

Part I - Problem 16

Math Field
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Part I

Part I:
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Problem 30

About how many knots must a ship sail in order to travel 747 miles in one week? (1 knot is about 1.1 miles per hour.)

- A** 5
- B** 3
- C** 6
- D** 4
- E** 7

Part I - Problem 17

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Part I

Part I:
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What fraction of 67 is $50 + \frac{1}{4}$?

A $\frac{11}{16}$

B $\frac{9}{16}$

C $\frac{7}{9}$

D $\frac{5}{8}$

E $\frac{3}{4}$

Part I - Problem 18

Math Field
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Part I

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Problem 30

Together an Xbox and a PlayStation weigh 7 pounds. An Xbox and a Wii weigh 6 pounds. A PlayStation and a Wii weigh 5 pounds. How much does a PlayStation weigh by itself?

- A 2 pounds
- B 3 pounds
- C 4 pounds
- D 5 pounds
- E 5.5 pounds

Part I - Problem 19

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Part I

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Problem 30

$7\square 7$

is a three digit number which is divisible by 11.
What digit is \square equal to?

- (A) 1
- (B) 3
- (C) 5
- (D) 7
- (E) 9

Part I - Problem 20

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Part I

Part I:
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Problem 30

You are riding on a high-speed train that is traveling at a constant speed of 90 miles per hour. The train is approaching a tunnel passage during which there will be no cell phone or internet service. If the tunnel is 4.5 miles long, how long will you be without phone service?

- A 2 minutes
- B 2 minutes and 30 seconds
- C 3 minutes
- D 3 minutes and 30 seconds
- E 4 minutes and 30 seconds

Part I - Problem 21

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Problem 30

A bag contains chocolate frogs and jelly beans. The ratio of frogs to beans is 4 to 11. How many pieces of candy are in the bag if there are 44 frogs?

- A** 16
- B** 121
- C** 137
- D** 165
- E** 177

Part I - Problem 22

Math Field
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Problem 30

This weekend, $\frac{1}{2}$ of the students from Room Ten went to Vintage Days, $\frac{1}{3}$ of the remaining students competed in the Mad Hatter Marathon, and the remaining 8 students stayed home. How many students are in the class?

A 30

B 28

C 24

D 20

E 18

Part I - Problem 23

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Problem 30

EXERCISE	DISTANCE	POINTS EARNED
Swimming	1/2 mile	4
Walking	4 miles	5
Biking	15 miles	6

Using the chart, how many points did Kay earn for 45 miles of biking, 3.5 miles of swimming, and 20 miles of walking?

A 225

B 50

C 225

D 127

E 71

Part I - Problem 24

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Part I

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Problem 30

A six-foot tall man casts a shadow 8 ft. long. He is standing next to a cell tower that casts a shadow 30 ft. long. What is the distance from the top of the tower to the end of the tower's shadow?

- A 22.5 ft.
- B 47.5 ft.
- C 27.5 ft.
- D 42.5 ft.
- E 37.5 ft.

Part I - Problem 25

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Part I

Part I:
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Problem 30

The symbol \clubsuit represents an unknown whole number.
Which of the the following must be an odd number?

- A $2 \times \clubsuit$
- B $2 \times \clubsuit + 1$
- C $3 \times \clubsuit + 2$
- D $(\clubsuit + 1)^3$
- E $3 \times (\clubsuit - 1)$

Part I - Problem 26

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Problem 30

You and five others are stranded on a lifeboat in the ocean. You have one 21 gallon barrel of drinking water and a measuring cup. Your captain knows that a 21 gallon barrel of water can last 6 people exactly 16 days if distributed correctly. In order to maximize your survival time, how much should each person be allowed to drink each day?
(1 gallon = 16 cups)

- A 3.5 cups
- B 4 cups
- C 4.5 cups
- D 5 cups
- E 5.5 cups

Part I - Problem 27

Math Field
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Part I

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Problem 30

Salmonella rode her bike to school at a speed of 12 mi./hr. After a perfectly lovely day at school (she got to be the lunch helper!) she was disappointed to see that her bike had a flat tire. Thus she walked her bike home at a speed of 4 mi./hr. If the round trip took her a total of one hour, how many miles does she live from her school?

A 3

B 4

C 6

D 8

E 10

Part I - Problem 28

Math Field
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Part I

Part I:
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Part I:
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Problem 29

Problem 30

Imagine a right triangle in which the two legs are 10 units and 24 units long. How many units is the perimeter of the triangle?

A 26

B 52

C 34

D 60

E 36

Part I - Problem 29

Math Field
Day 2015

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Part I

Part I:
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Part I:
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Problem 29

Problem 30

Hermione can produce one polyjuice potion in 20 minutes. Ron takes 45 minutes to make the same potion. After three hours, how many more potions does Hermione have than Ron?

A 3

B 8

C 9

D 5

E 4

Part I - Problem 30

Math Field
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Part I

Part I:
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Part I:
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Problem 29

Problem 30

A pack of forty-eight dingos are taking eleven speedboats to the annual butterfly festival. If each boat is carrying either four or five dingos, then how many of the boats have five dingos?

A None

B 2

C 4

D 5

E 6

Mad Hatter - 15 minute break

Math Field
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Part I

Part I:
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Problem 27

Problem 28

Problem 29

Problem 30

Whew! You've reached the end of Part I.

- Please make sure your full name and school name are on your Scantron form.
- Pass your Scantron to the closest end of your row.
- You may leave your belongings here during the break.
- Part II will begin promptly in **15 minutes**.

Mad Hatter - Part II

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Solutions

The rules for this part of the competition are the same as the previous part.

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Mad Hatter - Part II

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

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Mad Hatter - Part II

Math Field
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CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

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Mad Hatter - Part II

Math Field
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CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Solutions

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Mad Hatter - Part II

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Solutions

The rules for this part of the competition are the same as the previous part.

- This part of the exam consists of 30 problems.
- The problems will be shown one at a time.
- You will have one and a half minutes to solve the problem shown.
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Mad Hatter - Part II

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Solutions

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Mad Hatter - Part II

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Solutions

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Ready... Set... Go!

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Solutions

Prepare to restart the *Mad Hatter Marathon!*

Part II - Problem 1

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

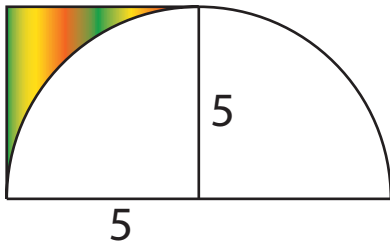
Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Pictured is a semi-circle and a square. Which of the following is the best approximation for the area of the shaded region?



- A 4 units²
- B 7 units²
- C 6 units²

- D 2 units²
- E 8 units²

Part II - Problem 2

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

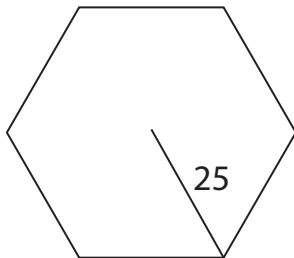
Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Pictured is a regular hexagon. The distance from the center of the hexagon to one of its corners is 25 units. How many units is the perimeter of the hexagon?



- A 150 B $25\sqrt{3}$ C 125 D $25\sqrt{2}$ E $25\sqrt{6}$

Part II - Problem 3

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

There are 29 people in a room. Eleven of the people speak Spanish, 24 speak English, and three speak neither Spanish nor English. How many people in the room speak both Spanish and English?

A 3

B 4

C 6

D 8

E 9

Part II - Problem 4

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Yoda has seven coins worth a total of \$0.49. How many nickels does he have?

A 0

B 1

C 2

D 4

E 6

Part II - Problem 5

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Col. Campbell gives Solid Snake 20 pills to take. Snake is to take one pill exactly every 8 hours. If Snake takes the first pill at 8 AM, then at what time will he take the last pill?

- A 8:00 AM
- B 12:00 noon
- C 4:00 PM
- D 8:00 PM
- E 12:00 midnight

Part II - Problem 6

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

$$\frac{3}{4} \times \frac{5}{6} + \frac{1}{2} \times \frac{5}{6} - \frac{3}{4} =$$

A $\frac{5}{24}$

B $\frac{7}{24}$

C $\frac{7}{12}$

D $\frac{19}{48}$

E $\frac{11}{48}$

Part II - Problem 7

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Space Ghost finds a PS-Vita and a 3DS at a garage sale. Together they cost \$250. The 3DS costs \$20 more than the PS-Vita. How much does the PS-Vita cost?

- A \$70
- B \$85
- C \$100
- D \$105
- E \$115

Part II - Problem 8

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Which of the following sets of numbers could NOT be the lengths of the sides of a triangle?

A $\{1, 2, 3\}$

B $\{4, 5, 6\}$

C $\{7, 8, 9\}$

D $\{10, 11, 12\}$

E $\{13, 14, 15\}$

Part II - Problem 9

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

The sum of the even numbers between 31 and 101 is less than the sum of the odd numbers between 32 and 102. How much less?

A 35

B 69

C 36

D 75

E 34

Part II - Problem 10

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

If I buy one cup of coffee and three doughnuts it costs me \$1.45. If I buy two cups of coffee and two doughnuts it costs me \$1.90. How many cents does one doughnut cost?

- A 12
- B 20
- C 15
- D 18
- E 25

Part II - Problem 11

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Suppose that ♣, ♥ and ♠ are numbers such that

$$\clubsuit + \heartsuit = 13$$

$$\heartsuit + \spadesuit = 15$$

$$\spadesuit + \clubsuit = 18$$

Which is the largest number?

A ♣

B ♥

C ♠

D Impossible to decide

Part II - Problem 12

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

If $1\frac{1}{2}$ gremlins can eat $1\frac{1}{2}$ small pizzas in $1\frac{1}{2}$ hours, how many small pizzas can 10 gremlins eat in 9 hours?

A 18

B 9

C 36

D 60

E 54

Part II - Problem 13

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

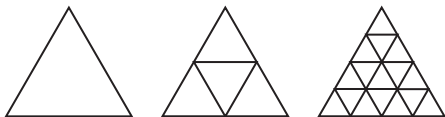
Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions



If this pattern continues, how many small triangles will be in the eighth figure?

A $4^8 - 1$

B 4^7

C $2^8 + 1$

D $2^7 + 1$

E $4^7 - 1$

Part II - Problem 14

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

Problem 8

Problem 9

Problem 10

Problem 11

Problem 12

Problem 13

Problem 14

Part II:
Problems
16-30

Solutions

Superman wants to treat the Justice League to pizza. The orders are as follows:

Superman	1 slice
Spider-Man	2 slices
Hulk	2 pizzas
Wolverine	1/2 pizza
Thor	1 pizza
Rocket	3 slices
Groot	1 pizza

Each pizza costs \$18 and is cut into exactly 12 slices. How much money does Superman need?

A \$85.50

C \$88.50

E \$91.50

B \$87

D \$90

Part II - Problem 15

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

Nico has three books overdue from the library. The fine is 10 cents per book per day. He remembers that he checked out an astronomy book exactly one week earlier than the other two books. If the total fine is \$1.90, how long overdue is the astronomy book?

- A 4 days
- B 9 days
- C 11 days
- D 14 days
- E 17 days

Part II - Problem 16

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

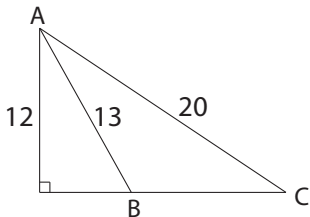
Problem 27

Problem 28

Problem 29

Problem 30

Solutions



What is the area of triangle ABC ?

- A 48
- B 59.5
- C 64
- D 72.5
- E 66

Part II - Problem 17

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

A frog repeats the five noises

“ribbit” - “rabbit” - “rubbit” - “robot” - “BURP”

in this exact sequence, with one sound each second. The first sound you hear is “rabbit”. What sound will you hear 2015 seconds later?

- A ribbit
- B rabbit
- C rubbit
- D robot
- E BURP

Part II - Problem 18

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

$20152015201520152015 \div 2015$ is equal to:

- A 11111
- B 1001001001001001
- C 1001001001001
- D 10001000100010001
- E 1000100010001

Part II - Problem 19

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

A banquet hall has capacity of 400 persons — including both diners and servers. Each server can attend to at most 12 diners. (For example, 24 people would require two servers, but 25 people would need three servers.) What is the maximum number of diners that can be served in the banquet hall?

A 366

B 367

C 368

D 369

E 370

Part II - Problem 20

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

Stimpy walks 18 inches with each step. Ren walks 15 inches with each step. If Stimpy walks one mile and Ren takes the same number of steps as Stimpy, how far will Ren have walked when Stimpy completes the mile?

- A 1760 feet
- B 4400 feet
- C 870 feet
- D 3620 feet
- E 6330 feet

Part II - Problem 21

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

Which of the following is between $\frac{7}{18}$ and $\frac{1}{2}$?

- A $\frac{1}{4}$
- B $\frac{4}{9}$
- C $\frac{2}{3}$
- D $\frac{5}{16}$
- E $\frac{7}{13}$

Part II - Problem 22

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

At night your math teacher likes to wear a basket of fruit on her/his head. The basket contains only bananas, apples and oranges. The basket contains 8 bananas, 3 red apples and 6 green apples. If the total number of pieces of fruit is three times the number of apples in the basket, how many oranges are in the basket?

- A 14
- B 4
- C 7
- D 26
- E 10

Part II - Problem 23

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

500 nickels have the same value as how many quarters?

- A 100
- B 250
- C 50
- D 75
- E 200

Part II - Problem 24

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

Zelda has 22 red M&M's, 26 yellow M&M's, and 60 green M&M's. She would like to share her candy with three of her friends. If Zelda's share is equal to that of each of her friends, how many M&M's will each person receive?

- A 54
- B 27
- C 30
- D 51
- E 24

Part II - Problem 25

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

A sewing project requires $6\frac{1}{8}$ yards of material that costs \$0.62 per yard and $3\frac{1}{4}$ yards of material that costs \$0.81 per yard. Which of the following is the best estimate for the cost of the project?

- A between \$1 and \$3
- B between \$3 and \$5
- C between \$5 and \$7
- D between \$7 and \$9
- E more than \$9

Part II - Problem 26

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

Robin has been poisoned by the Riddler. Batman has the antidote but needs to mix it with water to get the correct concentration. Batman has a 1 mL dropper and several 100 mL mixing cylinders. Suppose Batman places one drop of the antidote in a cylinder and then fills the cylinder with water. He then takes one drop of the new mixture and puts it in another cylinder which he fills with water. What will be the concentration of this second mixture?

- A $1/10000$
- B $1/9000$
- C $1/10500$
- D $2/21111$
- E $3/30694$

Part II - Problem 27

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

Which number is the largest?

- A .19
- B .036
- C .195
- D .2
- E .145

Part II - Problem 28

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

$1 + 2 + 3 + 4 + \dots + 199$ is equal to what number?

- A** 20199
- B** 22799
- C** 20000
- D** 19900
- E** 21100

Part II - Problem 29

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

Problem 19

Problem 20

Problem 21

Problem 22

Problem 23

Problem 24

Problem 25

Problem 26

Problem 27

Problem 28

Problem 29

Problem 30

Solutions

$$\frac{4}{7}, \frac{7}{8}, \frac{4}{10}, \frac{11}{10}, \frac{1}{10}, \frac{8}{18}$$

How many of the six fractions listed above are closer to 1 than they are to zero?

- A 1
- B 2
- C 3
- D 4
- E 5

Part II - Problem 30

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Problem 15

Problem 16

Problem 17

Problem 18

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Problem 25

Problem 26

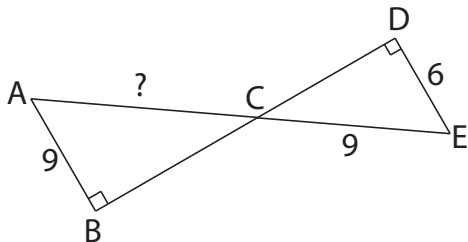
Problem 27

Problem 28

Problem 29

Problem 30

Solutions



In the figure above, what is the length of segment AC ?

A 12

B 14.5

C 6

D 18

E 13.5

Mad Hatter - Done!

Math Field
Day 2015

CSU Fresno

Part II

Part II:
Problems 1-15

Part II:
Problems
16-30

Solutions

You made it!

- Please make sure your full name and school name are on your Scantron form.
- Pass your Scantron to the closest end of your row.
- Please take your belongings with you.
- The awards ceremony will begin at **2:45pm**. If there are any ties, you have to be present to win the tiebreaker. See you there!

Part I

1	b	6	e	11	d	16	d	21	d	26	a
2	c	7	a	12	b	17	e	22	c	27	a
3	d	8	a	13	c	18	b	23	e	28	d
4	e	9	b	14	a	19	b	24	e	29	d
5	a	10	c	15	e	20	c	25	b	30	c

Part II

1	c	6	b	11	c	16	e	21	b	26	a
2	a	7	e	12	d	17	b	22	e	27	d
3	e	8	a	13	b	18	d	23	a	28	d
4	a	9	a	14	d	19	d	24	b	29	c
5	c	10	e	15	c	20	b	25	c	30	e