

5<sup>th</sup> & 6<sup>th</sup> Grade  
Regional Math Meet Tests  
2015

Individual Student Problems

- Event #1: Problem Solving (No Calculators)
- Event #2: Problem Solving (With Calculators)
- Event #3: Mathematical Reasoning
- Event #4: Mental Math

Key

5<sup>th</sup> and 6<sup>th</sup> Grade Math Meet 2015

Name: Key

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Event 1: Problem Solving (No Calculators)

Write answers as whole or mixed numbers only.

2 points for the right answer

Part 1: Computations (2 points each)

Answers

1.)  $9.2 \times 5 =$

46

2.)  $2\frac{3}{4} \div \frac{1}{4} =$

11

$\frac{11}{4} \cdot \frac{4}{1} = \frac{44}{4} = 11$

3.)  $6 + 4(2) - (1 + 5) =$

8

$6 + 8 - 6$   
 $14 - 6$

4.)

~~$\frac{1}{2} = \frac{4}{?}$~~

? is equal to 28

$28 = ?$

5.)  $\frac{4(? - 2)}{4} = \frac{20}{4}$

? is equal to 7

$? - 2 = 5$

$? = 7$

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**Event 1: Problem Solving (No Calculators)**  
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Answers

Part 2: Consumer Math (5 points each)

- 1.) A department store marked up the cost of a pair of sunglasses by 20%. After several weeks, the department store reduced the selling price by 25%. If the department store originally paid \$20 for the pair of sunglasses, how much did the department store lose after the 25% off sale?

5 - Right Answer  
4 - Right Answer w/ no label (EX: 2)  
3 - Answer of 18  
2 - Answer of 6  
1 - Answer of 24 or 4

$$20 \times 0.2 = 4 \rightarrow 20 + 4 = 24$$
$$24 \times 0.25 = 6 \rightarrow 24 - 6 = 18$$
$$20 - 18 = \$2 \text{ Loss}$$

\$2.00

- 2.) A health and fitness club charges a \$50 initial fee for membership, and then \$3.00 for every time a member uses the facilities. How many times did a member use the facility in the first month of membership if their monthly charge was \$107?

5 - Right Answer  
4 -  $3x = 57$  without answer  
3 -  $50 + 3x = 107$  without solving  
0 - other response

$$50 + 3x = 107$$
$$3x = 57$$
$$x = 19$$

19 times

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### Event 2: Problem Solving (With Calculators)

Part 1: Probability (4 points per question; 2 points an answer)

Answers

For each question, write your answer as a fraction and as a percent. Write fractions in simplest form.

Marcus put ten marbles in a bag. There are four blue marbles, three red marbles, one yellow marble, and two white marbles in the bag.

1) What is the probability Marcus picks a blue marble out of the bag?

2 points for  $\frac{2}{5}$   
1 point for  $\frac{4}{10}$

$$\frac{4}{10} = \frac{2}{5}$$

$\frac{2}{5}$  or 40 %

2 pts. for correct %

2) Marcus picked a white marble, and then put it back in the bag. Afterwards, he picked a red marble. What are the chances of Marcus picking a white followed by a red marble (with replacement)?

2 points for  $\frac{3}{50}$   
1 point for  $\frac{6}{100}$

$$\frac{2}{10} \cdot \frac{3}{10} = \frac{6}{100} = \frac{3}{50}$$

$\frac{3}{50}$  or 6 %

2 pts for correct %

3) Marcus picked a red marble, didn't replace the red marble, and then picked a yellow marble out of the bag. What is the probability of this happening?

2 points for  $\frac{1}{30}$   
1 point for  $\frac{3}{90}$

$$\frac{3}{10} \cdot \frac{1}{9} = \frac{3}{90} = \frac{1}{30}$$

$\frac{1}{30}$  or  $\frac{3.33}{3}$  %  
or  $3\frac{1}{3}$

2 pts for  $3.33\%$

1 pt for  $\frac{1}{3}$

4) What is the probability of Marcus picking an orange marble?

0 or 0 %

2 pts. for correct answer

2 pts for correct %

5) Marcus emptied the original bag of marbles and only put the blue and yellow marbles back in the bag. What are the chances Marcus does not pick a blue marble?

$\frac{1}{5}$  or 20 %

2 pts. for correct answer

2 pts for correct %

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Event 2: Problem Solving (With Calculators)

Part 2: Consumer Math (5 points)

Answers

Mary, Jessica, Sandra, and Judy are going on a road trip to Washington, D.C. They decided to split the expenses evenly for the trip. Sandra made the hotel reservations for two nights. Each night cost \$153, and then she applied a coupon for 15% off the stay. Judy spent \$116 for gasoline each way, and Mary spent \$156 on food expenses. Jessica purchases miscellaneous expenses, and she spent \$73. After they totaled the expenses, they split the total four ways. How much did each friend pay? Round to the nearest penny if necessary.

Hotels

$153 \times 2 \text{ nights} = \$306$

$\$306 \times 0.15 = 45.90$

$306 - 45.90 = \text{\$260.10}$

Gas

$116 \times 2 \text{ ways} = \text{\$232}$

Food

$\text{\$156}$

Miscellaneous

$\text{\$73}$

\\$180.28

5 - Correct answer

- ~~4~~
- ~~3~~ +1 for hotel price
- ~~2~~ +1 for gas
- ~~1~~ +1 for food
- +1 for miscellaneous
- +1 for correct sum, average, and rounding

Sum:

$$\begin{array}{r}
 260.10 \\
 232.00 \\
 156.00 \\
 + 73.00 \\
 \hline
 721.10
 \end{array}$$

$\div 4 \text{ girls}$

$\$180.275$

Rounded =

$\$180.28$

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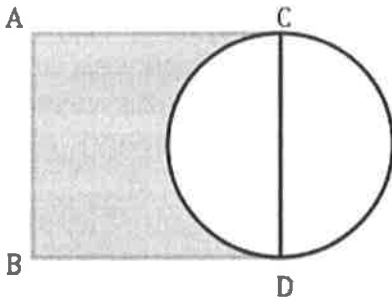
School: \_\_\_\_\_

Event 3: Mathematical Reasoning (10 points each)

Answers

- 1) In the square ABCD below, side length AC is 4 inches. The circle overlays the square and has a diameter of CD. What is the approximate area of the shaded region? Round to the nearest hundredth.

10 pts for correct answer (approx. or exact)  
 9 pts for correct answer w/o label  
 8 pts for area of just circle or square



Area of  $\square = 4^2 = 16$

Area of  $\bigcirc = \pi r^2$   
 $= \pi \cdot 2^2 = 4\pi$

$\approx \frac{12.56}{2} = 6.28$

area of  $\frac{1}{2}$  circle  $\uparrow$   
 $16 - 6.28 = 9.72$

$\frac{9.72 \text{ in}^2}{\text{or } 16 - 2\pi \text{ in}^2}$

Area of Semi-Circle Exactly

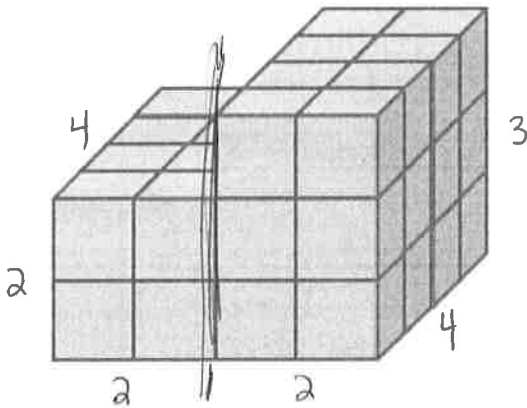
$4\pi \div 2 = 2\pi$

Area of Shaded Exactly

$16 - 2\pi$

- 2) Find the volume of the following figure.

10 pts for correct answer  
 9 pts for correct answer w/o label  
 8 pts for either 16 or 24



$2 \times 2 \times 4 = 16$

$2 \times 4 \times 3 = 24$

$24 + 16 = 40$

$\frac{40 \text{ units cubed}}{40 \text{ u}^3}$

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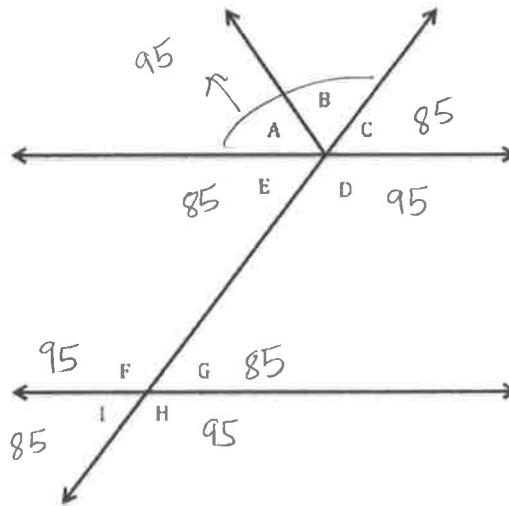
**Event 3: Mathematical Reasoning** (5 points each)

Answers

For questions 3, 4, and 5, please refer to the following figure.

**Hint:** Angle E is equal to Angle G.

\* 5 pts for correct answer



- 3) The measurement of angle F is 95 degrees. What is the measurement of angle E?

85°

- 4) Angle C is the same measurement as angle G. What is the sum of angles A and B?

95°

- 5) (Angle C + Angle G) – Angle H = ....

$$(85 + 85) - 95$$

$$170 - 95 = 75^\circ$$

75°

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**Event 4: Mental Math (2 points each)**

<b>Question Number</b>	<b>Answer</b>
Example	11
1	47
2	30
3	16
4	70
5	0
6	126
7	48
8	-17
9	-5
10	3

\* 2pts each \*

1 point if w/o negative



Dane County Regional Math Meet  
2015

Team Problems

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Name: Key

School: \_\_\_\_\_

Team Problems: Question 1 (5 points each; 25 total)

Answers

$$A \diamond B = (A + B) \div B$$

$$C \heartsuit = C + 5$$

For example:  $3 \diamond 1 = (3+1) \div 1 = 4 \div 1 = 4$

\*5pts.  
for each  
correct  
answer\*

1)  $4 \diamond 2 =$

$$(4+2) \div 2$$

$$6 \div 2 = \textcircled{3}$$

3

2)  $(24 \diamond 3) + 8 \heartsuit =$

$$((24+3) \div 3) + 13$$

$$(27 \div 3) + 13$$

$$9 + 13 = \textcircled{22}$$

22

3)  $2 \heartsuit - (8 \diamond 1) =$

$$7 - (8 \diamond 1)$$

$$7 - ((8+1) \div 1)$$

$$7 - (9 \div 1)$$

$$7 - 9 = \textcircled{-2}$$

-2

4)  $(9 \heartsuit) \diamond 2 =$

$$14 \diamond 2$$

$$(14+2) \div 2$$

$$16 \div 2 = \textcircled{8}$$

8

5)  $(7 \heartsuit) \diamond (1 \heartsuit) =$

$$12 \diamond 6$$

$$(12+6) \div 6$$

$$18 \div 6 = \textcircled{3}$$

3

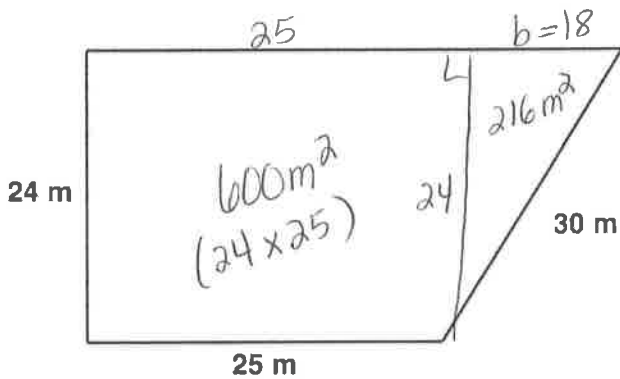
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**Team Problems: Question 2** (24 points; 8 points per question) Answers

1.) The Pike family has plans to purchase land to build a new house. Below is a diagram of the lot. What is the square area of the lot?



$$600 + 216 = 816 \text{ m}^2$$

$$\begin{aligned} 24^2 + b^2 &= 30^2 \\ 576 + b^2 &= 900 \\ -576 &\quad -576 \\ \hline b^2 &= 324 \\ b &= 18 \end{aligned}$$

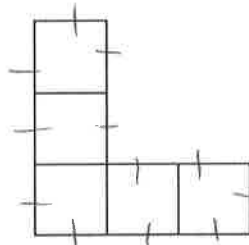
Area of  $\Delta = \frac{1}{2}bh$  or  $(bh) \div 2$

$$\frac{(18)(24)}{2} = 216 \text{ m}^2 \quad \underline{816 \text{ m}^2}$$

8 pt. for correct answer  
7 pt. for correct answer w/o label  
6 pt. for either rect. area or  $\Delta$  area

2.) The figure below is composed of five squares. If the perimeter of the figure is 60 units, what is the area in square units?

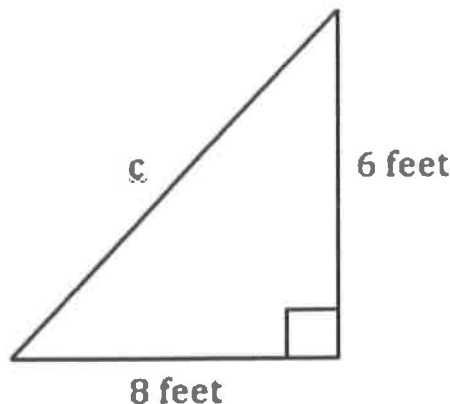
$$\begin{aligned} P &= 60 \text{ u} \\ 12 \text{ sides} &\rightarrow 60 \div 12 = 5 \text{ units per side} \\ \text{Area of } 1 \square &= 5 \times 5 = 25 \\ 25 \times 5 \text{ squares} &= 125 \end{aligned}$$



125 units<sup>2</sup>  
or 125 sq. units  
8 pts. for correct answer  
7 pts. for correct answer w/o label

3.) What is the length of side c?

$$\begin{aligned} 6^2 + 8^2 &= c^2 \\ 36 + 64 &= c^2 \\ \sqrt{100} &= \sqrt{c^2} \\ c &= 10 \end{aligned}$$



8 pt. for correct answer  
7 pt. for correct answer w/o label

10 feet

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**Team Problems: Question 3 (25 points)**

Answers

What is the average (arithmetic mean) of  $2x + 1$ ,  $3x - 4$ ,  $5x + 3$ , and  $2x + 8$ ?

$$\begin{array}{r} 2x + 1 \\ 3x - 4 \\ 5x + 3 \\ + 2x + 8 \\ \hline (12x + 8) \\ \div 4 = 3x + 2 \end{array}$$

$3x + 2$

25 points for correct answer

10 points for just  
 $2$  or  $3x$

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Team Problems: Question 4 (26 points)

Answers

Conversions	
1 foot	12 inches
1 gallon	4 quarts
1 pint	2 cups
1 minute	60 seconds
1 quart	2 pints

13 pts for correct answer  
 12 pt for correct w/o label  
 11 pt. for correct w/o rounding right  
 10 pts. for getting to  $\frac{160 \text{ cups}}{60 \text{ sec.}}$

A water hose is leaking at a rate of 10 gallons every minute. How many cups is the hose leaking every second? Round to the nearest tenth.

$$\frac{10 \text{ gallon}}{1 \text{ minute}} \cdot \frac{4 \text{ quarts}}{1 \text{ gal}} \cdot \frac{2 \text{ pints}}{1 \text{ quart}} \cdot \frac{2 \text{ cups}}{1 \text{ pint}} \cdot \frac{1 \text{ minute}}{60 \text{ seconds}} = \frac{160 \text{ cups}}{60 \text{ sec.}}$$

$$= \frac{2.677... \text{ cups per}}{1 \text{ second}}$$

2.7 cups/sec

A swimming pool is being filled at the rate of one pint every second. If the swimming pool holds 700 gallons, how long will it take to fill the pool in minutes? Round to the nearest minute if necessary. Round up to the nearest minute.

$$\frac{1 \text{ pint}}{1 \text{ sec}} = \left[ \frac{60 \text{ pints}}{1 \text{ min.}} \cdot \frac{1 \text{ qt}}{2 \text{ pints}} \cdot \frac{1 \text{ gal}}{4 \text{ qt}} \right] = \frac{60 \text{ gal}}{8 \text{ min}} = \frac{7.5 \text{ gal}}{1 \text{ minute}}$$

94 minutes

$$700 \text{ gallon} \div 7.5 = 93.\bar{3} \text{ minutes}$$

Round up to 94 minutes.

13 pts for correct answer  
 12 pts. for correct answer w/o label  
 11 pts. for stating, "1 hour and 34 minutes"  
 10 pts for answering 7.5 gal / 1 min

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Tie Breaker Question

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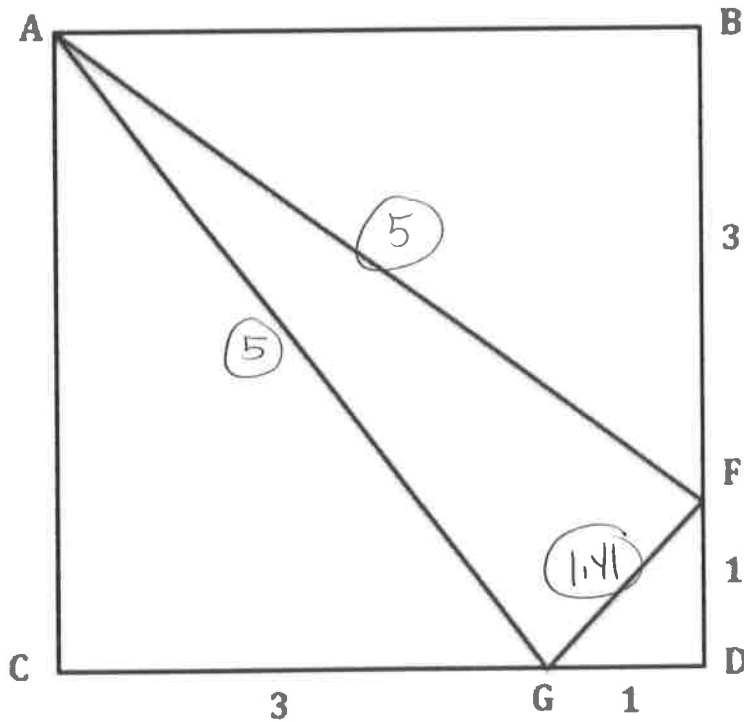
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**Tie Breaker**

Answers

Square ABCD is divided into three right triangles. What is the approximate perimeter of triangle AGF? Round to the nearest hundredth.

11.41 units



25 pts. for correct answer

24 pts. for correct answer w/o label

23 pts. for getting 5 or 1.41 only

$$\begin{aligned} \overline{AG} \\ 3^2 + 4^2 &= c^2 \\ 9 + 16 &= c^2 \\ \sqrt{25} &= \sqrt{c^2} \\ c &= 5 \end{aligned}$$

$$\begin{aligned} \overline{AB} &= 4 \\ \overline{AF} &= 5 \end{aligned}$$

$$\begin{aligned} \overline{GF} \\ 1^2 + 1^2 &= c^2 \\ \sqrt{2} &= \sqrt{c^2} \\ c &= 1.41 \end{aligned}$$

$$5 + 5 + 1.41 = 11.41$$

