KEY

5th – 6th Grade

Regional Math Meet Tests

2019

- **Individual Problems**
  - Event 1: Problem Solving (No Calculator)
  - Event 2: Problem Solving (With Calculator)
  - Event 3: Mathematical Reasoning
  - Event 4: Mental Math

- **Team Problems**
  - Event 5: Team Problems

- **Tie Breaker Question**

Name:_____   School Team: _____

Circle your final answer!

Event 1: Computations Without Calculator- 20 points total
   Part I (2 points each)
Remember to simplify all fractions if able!

1. $2\frac{2}{3} \times 1\frac{1}{4} = \frac{8}{3} \times \frac{5}{4} = \frac{2}{3} \times \frac{5}{1} = \frac{10}{3}$

   $\boxed{\frac{10}{3} \text{ or } 3\frac{1}{3}}$

2. 42 hours is what percent of one week?

   $24 \text{ hrs} \times 7 \text{ days} \rightarrow 168 \text{ hrs in } 1 \text{ wk}$

   $\boxed{25\%}$

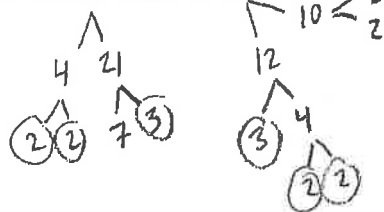 $\frac{42}{168} = \frac{x}{100} = \frac{25}{100}$

   $\downarrow$

   $\frac{6}{24} = \frac{1}{4}$

3. $1.13 \times 2.4 - 3.067 = 2.712 - 3.067$

   $= \boxed{-0.355}$

4. Find the GCF of 84 and 120

   $2 \cdot 2 \cdot 3 = 12$ $\boxed{12}$

5. If $x = 2$ and $y = 5$, find $3x - 4y$

   $3(2) - 4(5) = 6 - 20 = \boxed{-14}$

Name:_____ School Team: _____

Circle your final answer!

Event 1: Computations Without Calculator- 20 points total
    Part II (2 points each)
Remember to simplify all fractions if able!

1. $11^2 + 2^3 = 121 + 8 = \boxed{129}$

2. 114% of 29 $1.14 \times 29 = \boxed{33.06}$

3. $0.261 \div 0.03 = \boxed{8.7}$

4. $\frac{3}{4} \times 1\frac{1}{3} + 3\frac{1}{2} = \frac{3}{4} \times \frac{4}{3} + 3\frac{1}{2} = 1 + 3\frac{1}{2} = 4\frac{1}{2}$

$\boxed{4\frac{1}{2} \text{ or } \frac{7}{2}}$

5. $1\frac{2}{3} \div 3\frac{4}{9} = \frac{5}{3} \div \frac{31}{9} = \frac{5}{3} \times \frac{9}{31} = \frac{5}{1} \times \frac{3}{31} = \boxed{\frac{15}{31}}$

Name:_____   School Team: _____

Circle your final answer!

Event 2: Computations With Calculator- 25 points total
Consumer Math (5 points each)

1. 8 apples cost $2.96. Find the cost of 17 apples.

   $2.96 \div 8 = \$0.37$ $17 \times \$0.37 = \$6.29$ $\boxed{\$6.29}$
   Cost per apple

2. Alfred went to the store and paid 42 cents tax on a $7.97 purchase. Find the tax rate that he was charged to the nearest tenth of a percent.

   $\$7.97x = \$7.97 + 0.42$ $x = 1.0526$
   $\$7.97x = \$8.39$ $\boxed{5.3\%}$

3. Roberta paid $2.65 for a package of tea. This price included a 6% sales tax applied after a coupon for 45 cents off was applied. Find the price of the tea without the tax. Round to the nearest cent.

   $1.06(x - 0.45) = 2.65$ $\boxed{\$2.95}$

   $x = 2.95$

4. Carlos can pay $47.98 for a carton containing 96 boxes of crayons. Each box of crayons contains 48 individual crayons. Carlos can purchase smaller empty boxes for 3 cents each. The empty boxes can each hold 16 crayons, and Carlos believes he can sell them for 65 cents. If Carlos purchases 4 cartons along with the smaller boxes, repackages all the crayons, sells everything, and earns $1.15 when he recycles his cardboard waste, find his net profit. Round to the nearest cent.

   Profit:
   $\$748.80 + \$1.15 - \$191.92 - \$34.56$

   $4 \times \$47.98 = \$191.92$ Carlos' cost for crayons
   $96 \times 48 \times 4 = 18432$ crayons
   $18432 \div 16 = 1152$ is # of smaller boxes to sell
   $\$0.03 \times 1152 = \$34.56$ cost of small boxes
   $\$0.65 \times 1152 = \$748.80$ income from selling

   $\boxed{\$523.47}$

5. A car dealer purchases a car for $18,927.98. He marks up the price by 28%. Sam purchases the car after negotiating a $500 trade-in discount and a 5.2% off deal, to be applied after the discount. If salestax is 8.1%, find the amount Sam pays for the car to the nearest cent.

   $1.28(\$18927.98) = \$24227.81$ cost of car originally
   $\$24227.81 - \$500 = \$23727.81$ after trade-in
   $0.948(\$23727.81) = \$22493.96$ after % off
   $1.081(\$22493.96) = \$24315.97$

   $\boxed{\$24,315.97}$
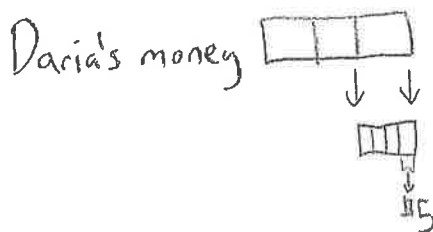
Name:_____ School Team: _____

Event 3: Mathematical Reasoning With Calculator- 35 points total

Circle your final answer!

Part I: Algebra (7 points each)

Remember to use labels when appropriate

1. Daria spent $\frac{2}{3}$ of her money and gave $\frac{3}{4}$ of the remainder to her mother. She then had $5 left. How much money did Daria have at first?
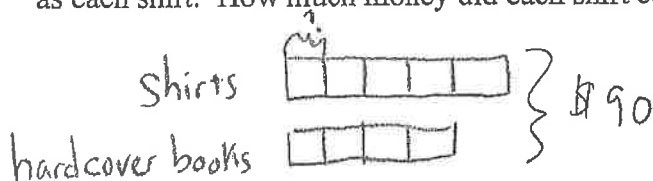
Daria's money

$4 \times \$5 = \$20$

$3 \times \$20 = \$60$

$\$60$

2. Five shirts and two hardcover books cost $90. Each hardcover book costs twice as much as each shirt. How much money did each shirt cost?

Shirts

hardcover books

$\$90$

$\$90 \div 9 = \$10$

$\$10$

3. A pack of gum and a bottle of water cost $1.87 without tax. The bottle of water costs 43 cents less than the gum. Find the cost of 3 packs of gum and 5 water bottles without tax.

Gum costs X

$X + X - 0.43 = 1.87$

$2x = 2.30$

$X = 1.15$

$3(1.15) + 5(1.15 - 0.43) =$

$3.45 + 5(.72) =$

$3.45 + 3.6 =$

7.05

$\$7.05$

Name:_____ School Team: _____

Event 3: Mathematical Reasoning With Calculator- 35 points total

Circle your final answer!

Part II: Algebra (7 points each)

4. Angelica has collected pebbles from 3 states: Colorado, Kansas, and Missouri. She collected 20 more pebbles in Kansas than she collected in Missouri. She collected 34 more pebbles in Colorado than she did in Missouri. If there are 75 total pebbles in her collection, how many are from Missouri?

Colorado $\square\boxed{}$ 34

Kansas $\square\boxed{}$ 20 $\Big\} 75$

Missouri $\boxed{}$
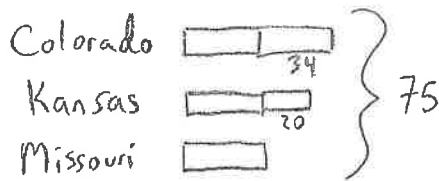
$75 - 34 - 20 = 21$

$21 \div 3 = 7$

$\boxed{7 \text{ pebbles}}$

5. Ernesto, Tara, Falisha, and Victoria ate lunch at a restaurant. Ernesto paid $\frac{1}{5}$ of the bill, Tara paid $2 less than $\frac{1}{4}$ of the bill, Falisha paid $10.50, and Victoria paid the rest with a twenty dollar bill, receiving some change. If the bill game a suggested 15% tip amount of $7.50, find the amount of change received by Victoria.

Let x be the bill

$0.15x = 7.50$
$x = 50$

Ernesto paid $10
Tara paid $(\$50 \div 4) - 2 = \$10.50$
Falisha paid $10.50

$\$50 - \$10 - \$10.50 - \$10.50 = \$19$
Victoria paid $19
$\$20 - \$19 = \$1$

$\boxed{\$1}$

Name: _____   School Team: _____

Event 4: Mental Math (no calculator)- 20 points total
(2 points each)

Example: ___23___ $(12-5) + (4 \times 4)$

1) ___269___ $24 \times 11 + 5$

2) ___37___ $28 + 15 \div 5 \times 3$

3) ___11___ $5 - 3 \times (4-6)$

4) ___35___   FIND $\frac{1}{4}$ OF 50% OF 280

5) ___-106___ $-59 - 47$

6) ___14___ $62 + 4x = 118$

7) ___4095___ $3697 + 398$

8) ___74___ $19 \times 3 + 17$

9) ___99___ $66 \div 2 \times 3$

10) ___-216___ $(7-19) \times 18$

Name:_____   School Team:_____

Circle your final answer!

Event 5: Team Problems (with calculator)- 100 points total
### Part 1: Problem Solving (5 points each)

1.

a) How many ways can I make 50 cents using just dimes, nickels, and quarters?

5 dimes
4 dimes 2 nickels
3 dimes 4 nickels
2 dimes 6 nickels
1 dime 8 nickels
10 nickels

2 quarters
1 quarter 5 nickels
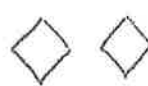1 quarter 3 nickels 1 dime
1 quarter 1 nickel 2 dimes

10 ways

b) In the grid below, all dots are evenly spaced. How many rectangles can I make if all four vertices must use a dot from the grid?
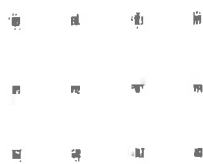
6 one by ones
4 two by ones
3 one by twos
2 two by twos
1 two by three
2 one by three
2 made from using diagonals ◇ ◇

20

c) When a number is increased by 6, the result is a perfect square. When the original number is decreased by 6, the result is the square root of the perfect square. Find the original number.

Find perfect square: separated from its square root by 12

x^2	x
1	1
4	2
9	3
16	4 ✓

16-6 and 4+6 are 10

10

d) Consider the sequence: *a, b, c, d, 0, 1, 1, 2, 3, 5, 8, 13...* Find the values of a, b, c, and d.

2 -1 1

Each term is sum of previous 2 terms

$a = -3$
$b = 2$
$c = -1$
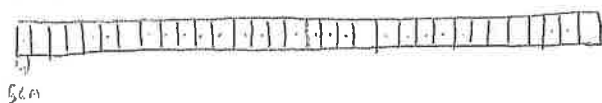$d = 1$

Name:_____ School Team: _____

Circle your final answer!

Event 5: Team Problems (with calculator)
   Part 2: Measurement (6 points each)
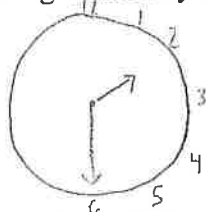2. Solve each of the following problems.

a) A ribbon is folded in half 5 times lengthwise, then measuring 5cm long. How long is the ribbon when it is unfolded?

$32 \times 5 = 160$

5cm

(160cm)

b) Find the angle made by the hands of an analog clock at 2:30.

$360° \div 12 = 30°$ between each number

$30° \div 2 = 15°$ hr hand moved

$3 \times 30° + 15° = 105°$

(105°)

c) The circles shown below have the same center and have radii of 8in, 9in, and 10in. What percent of the largest circle is shaded?

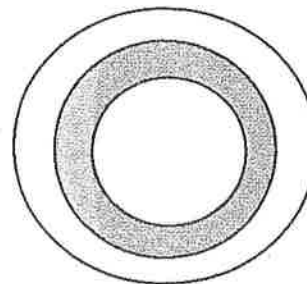Area lg $\bigcirc$: $\pi(10)^2 = 100\pi$

Area middle $\bigcirc$: $\pi(9)^2 = 81\pi$

Area small $\bigcirc$: $\pi(8)^2 = 64\pi$

$81\pi - 64\pi = 17\pi$ is shaded area

$\frac{17\pi}{100\pi} = \frac{17}{100}$

(17%)

d) 100 nickels are stacked up, making a tower that is 6.25in tall. To the nearest cent, find the value of a stack of nickels that is 8ft tall.

$8ft = 8 \times 12 in = 96 in$

$96 \div 6.25 = 15.36$ stacks of 100 nickels

$15.36 \times 100 = 1536$ nickels

$\$ 0.05 \times 1536 = \$ 76.80$

($76.80)

e) Gemma is drawing a triangle. She makes one side 6cm long and another side 10cm long. Fill in the blanks below.

   i. The third side must be longer than ⟨4⟩ cm.

   ii. The third side must be shorter than ⟨16⟩ cm.

Name:_____ School Team: _____

Circle your final answer!

Event 5: Team Problems (with calculator)
    Part 3: Ratios (6 points each)
3. Solve each of the following problems.

a) Horatio, Igor, and Jack share $1800 in the ratio 1:2:6. How much more money would Horatio receive if the ratio was 2:3:5?

$1800 ÷ 10 = $180
2 × $180 = $360
$360 - $200 = $160

Horatio ☐
Igor ☐☐
Jack ☐☐☐☐☐☐ } $1800

$1800 ÷ 9 = $200

☐ } $1800
☐☐☐ }
☐☐☐☐☐ }

$160

b) In a coin jar, the ratio of pennies to dimes is 3:5 and the ratio of dimes to quarters is 7:8. Find the ratio of pennies to dimes to quarters.

pennies : dimes
3 : 5
21 : 35

dimes : quarters
7 : 8
35 : 40

21 : 35 : 40

c) Kelsey, Lena, and Maria share some money. Kelsey receives 25% of the money. Lena and Maria shared the rest of the money in a 2:3 ratio. If Maria received $75 more than Lena, how much did Kelsey receive?

Kelsey

Lena   Maria
$75

5 × $75 = $375
$375 ÷ 3 = $125

$125

d) Jerome, Joe, and Peter shared some stamps in the ratio 2:3:5. Peter received 60 more stamps than Jerome. Find the total number of stamps shared by the three boys.

Jerome ☐☐
Joe ☐☐☐
Peter ☐☐☐☐☐ } ?

60 ÷ 3 = 20
10 × 20 = 200

200

e) The ratio of Ian's money to Roman's money is 2:3. The ratio of Roman's money to June's money is also 2:3. Find the ratio of Ian's money to June's money after Ian gives one fourth of his money to Roman.

Ian : Roman
2 : 3
4 : 6

Roman : June
2 : 3
6 : 9

Ian : Roman : June
4 : 6 : 9   but ¼ of Ian's goes to Roman

3 : 7 : 9

Name:_____ School Team: _____

Circle your final answer!

Event 5: Team Problems (with calculator)
   Part 4: Number Theory (5 points each)
4. Solve each of the following problems.

a) A number is between 10 and 40. The number is a factor of 72 and a multiple of 8.
    Find the number.

Factors of 72: 1 2 3 4 6 8
72 36 24 18 12 9

possible → only 24 is a multiple of 8

(24)

b) How many whole numbers less than 50 are divisible by their ones digit?

1 2 3 4 5 6 7 8 9 11 12 15 21 22 24 25 31 32 33 35 36
41 42 44 45 48

(26)

c) Find three different positive numbers whose sum and product are equal.

1 × 2 × 3 = 6
1 + 2 + 3 = 6

(1, 2, 3)

d) Find the smallest three-digit number that is 1 more than a multiple of 2, 2 more than a
    multiple of 3, and 4 more than a multiple of 7.

occurs least frequently

105 is multiple of 7
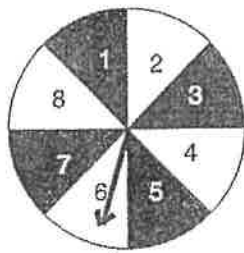
109 ✗
116 ✗
123 ✗
130 ✗
137 ✓

(137)

Name: _____ School Team: _____

Circle your final answer!

TIE BREAKER

Write all answers as a fraction. Remember to simplify!

1. The spinner below is spun twice and the resulting sum of the numbers spun is found. What is the probability that the sum is not divisible by 3?

Circled are divisible by 3

1+1	2+2	③+③	4+4	5+5	⑥+⑥	7+7	8+8
⑴+⑵	2+3	3+4	④+⑤	5+6	6+7	⑦+⑧
1+3	②+④	3+5	4+6	⑤+⑦	6+8
1+4	2+5	③+⑥	4+7	5+8
⑴+⑤	2+6	3+7	④+⑧
1+6	②+⑦	3+8
1+7	2+8
⑴+⑧

$\frac{12}{36} = \frac{1}{3}$ div by 3

$1 - \frac{1}{3} = \frac{2}{3}$ not div by 3

$\boxed{\dfrac{2}{3}}$

2. Two fair dice are rolled. Find the probability that the product of the numbers rolled is not a perfect square.

	1	2	3	4	5	6
1	X			X		
2		X				
3			X			
4	X			X		
5					X	
6						X

X indicates perfect square

$\frac{8}{36} = \frac{4}{18} = \frac{2}{9}$ are perfect squares

$1 - \frac{2}{9} = \frac{7}{9}$ are not perfect squares

$\boxed{\dfrac{7}{9}}$

3. The letters of the word "February" are placed in a bag. If a letter is chosen at random, what is the probability that it will be in the first half of the alphabet?

Fe br u a r y
✓✓ ✓   ✓

$\frac{4}{8} = \boxed{\dfrac{1}{2}}$