KEY

5th – 6th Grade

Regional Math Meet Tests

2018

- **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. Find the LCM of 18 and 27

$LCM: 3 \cdot 3 \cdot 3 \cdot 2 = 27 \cdot 2 = \boxed{54}$

18: 9 2
      3 3

27: 9 3
      3 3

2. $-52 + 6 \times 5 - 8 = -52 + 30 - 8 = -22 - 8 = \boxed{-30}$

3. $\frac{3}{4}\left(\frac{1}{2} + 6\right) - \frac{2}{3} = \frac{3}{4}\left(\frac{13}{2}\right) - \frac{2}{3} = \frac{39}{8} - \frac{2}{3} = \frac{117}{24} - \frac{16}{24} = \frac{101}{24} = \boxed{\frac{101}{24} \text{ or } 4\frac{5}{24}}$

$\frac{12}{2}$

4. Find 412% of 80

$4.12 \times 80 = \boxed{329.6} \text{ or } \boxed{329\frac{3}{5}}$

5. $6\frac{3}{4} \div \frac{7}{8} = \frac{27}{4} \div \frac{7}{8} = \frac{27}{4} \cdot \frac{8}{7} = \boxed{\frac{54}{7} \text{ or } 7\frac{5}{7}}$

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. $5.2 \div 0.04$ = $\boxed{130}$

2. $1.32 - 2.1 \times 5.4$ = $1.32 - 11.34 = \boxed{-10.02}$

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

$$3(4) - 2(-3) + (-3)(4) = 12 + 6 - 12$$
$$= \boxed{6}$$

4. $5^2 - 3^3$ = $25 - 27 = \boxed{-2}$

5. Write 3.34% as a simplified fraction

$$3.34\% = 0.0334 = \frac{334}{10000} = \boxed{\frac{167}{5000}}$$

Name:_____   School Team: _____

Circle your final answer!

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

1. An employment contract promises a part-time worker wages for working 6 days a week for a 52 weeks a year. For the first 26 weeks he was paid \$15.70 per day. He then received a 45 cent raise for the rest of the year. Find the total amount earned in a year, assuming he worked each scheduled day.

$$26 \times 6 \times \$15.70 + 26 \times 6 \times \$16.15 = \boxed{\$ 4,968.60}$$

2. The usual price for a couch was \$479.97. It was on sale for 15% off. Find the sale price. Round your answer to the nearest cent.

$$\$479.97 - 0.15(\$479.97) = \boxed{\$407.97}$$

3. A store made a 20% profit after selling a dress for \$24.48. How much did the store pay for the dress?

$$120\% \rightarrow \$24.48$$
$$20\% \rightarrow \$4.08$$
$$100\% \rightarrow \$20.40$$

$$\boxed{\$20.40}$$

4. A man bought 15 boxes of oranges at \$20.50 per box. It cost him \$16.57 to transport the oranges. Find his net profit if he sold all his oranges for \$385.

$$15 \times \$20.50 = \$307.50$$
$$\$307.50 + \$16.57 = \$324.07$$
$$\$385 - \$324.07 \quad \$60.93$$

$$\boxed{\$60.93}$$

5. A store is selling a computer for \$799.98. Since it doesn't sell quickly, the store offers a 10% discount. Bill purchased the computer, also paying 5% sales tax. Find the amount of money Bill paid for the computer. Round to the nearest cent.

$$\$799.98 - 0.10(\$799.98) = \$719.98$$
$$\$719.98 + 0.05(\$719.98) = \$755.98$$

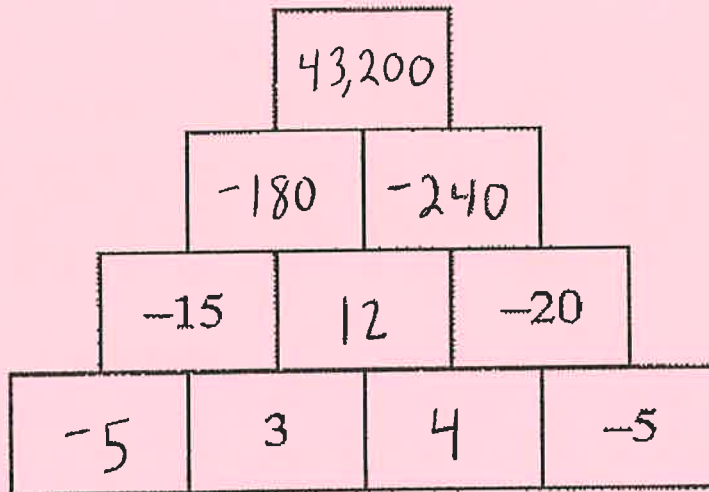$$\boxed{\$755.98}$$

Name: _____ School Team: _____

Event 3: Mathematical Reasoning With Calculator- 35 points total

Circle your final answer!

Part I: Number Theory (7 points each)
   Remember to use labels when appropriate

1. Fill in each box of the pyramid below. Each brick is the product of the two bricks below it.

```
            ┌──────────┐
            │  43,200  │
        ┌───────┬──────────┐
        │ -180  │  -240    │
    ┌────────┬───────┬──────────┐
    │  -15   │  12   │   -20    │
┌───────┬───────┬───────┬──────────┐
│  -5   │   3   │   4   │    -5    │
└───────┴───────┴───────┴──────────┘
```

2. Three teachers go to the library on a regular schedule. Mr. Xiong goes every 15 days, Ms. Washington every 8 days, and Mrs. Rodriguez every 25 days. If all three teachers are at the library today, how many days from now will they all be back again?

$$LCm\ 15, 8, 25 = 5 \cdot 5 \cdot 2 \cdot 2 \cdot 2 \cdot 3 = 600$$

600 days
(or 1 year, 235 days)

Name:_____ School Team: _____

Event 3: Mathematical Reasoning With Calculator- 35 points total

Circle your final answer!

Part II: Number Theory (7 points each)

3. By selling cookies for 24 cents each, Josie made enough money to buy several cans of soda for 45 cents each. If she had no money left over, find the least possible number of cookies that she might have sold.

$$LCM(45, 24) = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 = 360$$

9 5   3 8
     K 2
^   2 2
3 3
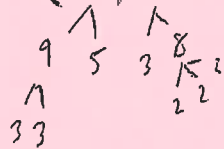
$$360 \div 24 = 15$$

15 cookies

4. In a chocolate box, the number of chocolates is such that if they are divided among 7 children equally, there are 2 left over. If they are divided equally among 5 children, there are 3 left over. What is the least number of chocolates that the box could contain?

• 2 more than a multiple of 7 and 3 more than a multiple of 5

9 ✗
16 ✗
23 ✓

23

5. A number is called *cute* if it has exactly four factors. What percent of the first 25 positive whole numbers are cute?

1 ✗
2 ✗
3 ✗
4 1 2 4
5 ✗
✓6) 1 2 3 6
7 ✗
✓8) 1 2 4 8

9 1 3 9
10) 1 2 5 10
11 ✗
12 1 2 3 4 6 12
13 ✗
14) 1 2 7 14
15) 1 3 5 15
16 1 2 4 8 16
17 ✗

18 1 2 3 6 9 18
19 ✗
20 1 2 4 5 10 20
21) 1 3 7 21
22) 1 2 11 22
23 ✗
24 1 2 3 4 6 8 12 24
25 1 5 25

$$\frac{7}{25} = 28\%$$

Name:_____   School Team: _____

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

Example: _____23_____

1) _____-60_____

2) _____82_____

3) _____15_____

4) _____1094_____

5) _____135_____

6) _____93 feet_____

7) _____15_____

8) _____2045_____

9) _____$\frac{3}{4}$_____

10) _____-111_____

Name:_____   School Team: _____

Circle your final
answer!

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

1. A bakery offers three types of cookies: Chocolate Chip, Peanut Butter, and Molasses.
   One Saturday the bakery starts the day with 250 Chocolate Chip cookies, 350 Peanut
   Butter cookies, and 200 Molasses cookies.

   a) What percent of the cookies are Chocolate Chip?

   $\frac{250}{800} = \frac{x}{100}$ $\boxed{31.25\%}$

   b) How many percent fewer Molasses cookies are there than Chocolate Chip cookies?

   $250 - 200 = 50$
   There are 50 fewer $\frac{50}{250} = 20\%$ $\boxed{20\%}$

   c) If a customer purchases five dozen Peanut Butter cookies, what percent of the
      bakery's cookies remain? $5 \times 12 = 60$

   $\frac{740}{800} = \frac{x}{100}$ $\boxed{92.5\%}$

   d) If a baker decided to make 350 more Chocolate Chip cookies, by what percent would
      the total amount of cookies made increase?

   $\frac{350}{800} = \frac{x}{100}$ $\boxed{43.75\%}$

   e) After 70% of the bakery's original cookies have been sold, a customer purchases $2\frac{1}{2}$
      dozen cookies. What percent of the remaining cookies does that customer purchase?

   30% of 800 → 240 cookies remain
   $2\frac{1}{2}$ dozen →30 $\frac{30}{240} = \frac{x}{100}$ $\boxed{12.5\%}$

   f) The store sold 85% of its cookies for a profit of 60 cents each. (Assume only the
      original cookies are made.) Half of the remaining cookies are sold at a discount,
      cutting the profit in half. The rest of the cookies are not sold, resulting in a loss of 20
      cents per cookie. Find the daily net profit.

   $0.85(800)(0.60) = \$408$ profit

   $0.85(800) = 680$ $60(0.30) = \$18$ profit $\boxed{\$414 \text{ profit}}$
   $800 - 680 = 120$ $60(0.20) = \$12$ loss
   $120 \div 2 = 60$
   $\$408 + \$18 - \$12 = \$414$

5th-6th grades 2018

Name: _____   School Team: _____

Circle your final answer!

Event 5: Team Problems (with calculator)
    Part 2: Logic (6 points each)

Remember to simplify all fractions if able!
2. Mathematicians have created two new operations, defined below. Use the information to solve the following problems.

$$X @ Y = 3X - 2Y$$
$$X * Y = \frac{-2Y}{3X}$$

a) Find 3 @ (4 @ 5)

$$3@\left[3(4)-2(5)\right] = 3@\left[12-10\right] = 3@2 = 3(3)-2(2)$$
$$= 9-4$$
$$= \boxed{5}$$

b) Find (3 @ 4) * 2

$$3@4 = 3(3)-2(4) = 9-8 = 1$$
$$1*2 = \frac{-2(2)}{3(1)} = \boxed{\frac{-4}{3} \text{ or } -1\tfrac{1}{3}}$$

c) Find (4 @ 3) * 2

$$4@3 = 3(4)-2(3) = 12-6 = 6$$
$$6*2 = \frac{-2(2)}{3(6)} = \frac{-4}{18} = \boxed{\frac{-2}{9}}$$

d) Find $(2 @ -4)^2$

$$2@-4 = 3(2)-2(-4) = 6+8 = 14$$
$$(2@-4)^2 \overset{50}{=} (14)^2 = \boxed{196}$$

e) Find $\frac{5 @ -1}{2 @ 5}$

$$5@-1 = 3(5)-2(-1) = 15+2 = 17$$
$$2@5 = 3(2)-2(5) = 6-10 = -4$$
$$\boxed{\frac{-17}{4} \text{ or } -4\tfrac{1}{4}}$$
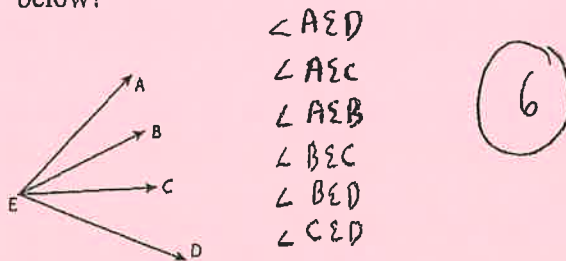
Name:_____ School Team:_____

Circle your final answer!

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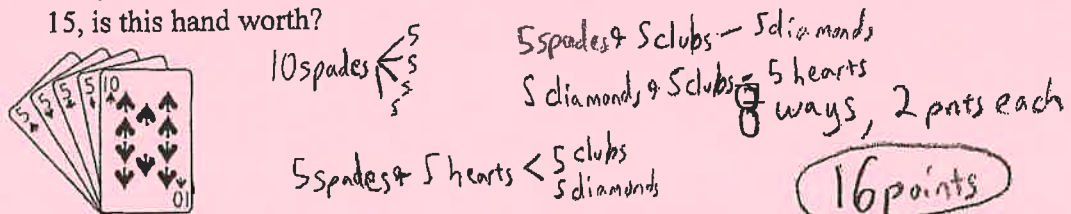
3. Solve each of the following problems.

   a) Angle AED is an acute angle. How many total acute angles are there in the diagram below?

∠ AED
∠ AEC
∠ AEB
∠ BEC
∠ BED
∠ CED

(6)

   b) An ice cream store offers two drinks (soda or milk shake) in four sizes (small, medium, large, and jumbo) and five flavors (vanilla, strawberry, chocolate, coffee, or mint). In how many different ways can a customer order a drink?

(40)

   c) One of the rules in the card game cribbage directs players to "score two points for every different combination of cards that totals 15." How many points, for totals of 15, is this hand worth?

10 spades < 5 5 5 5

5 spades & 5 clubs — 5 diamonds
5 diamonds & 5 clubs — 5 hearts
8 ways, 2 pnts each

5 spades & 5 hearts < 5 clubs 5 diamonds

(16 points)

   d) A girl decides she wants to wear a hat, a shirt, a skirt, and a pair of shoes. If she has 3 hats, 2 shirts, 4 skirts, and 1 pair of shoes how many different possible outfits can she create?

$3 \cdot 2 \cdot 4 \cdot 1 = 24$

(24 outfits)

Name:_____ School Team:_____

Circle your final answer!

Event 5: Team Problems (with calculator)
Part 4: Fractions (5 points each)
Remember to Simplify!

4.

a) Adam put half of a cake in the freezer. Of the remaining half of the cake, Adam ate one fifth and his dog ate the rest. What fraction of a cake did Adam's dog eat?

$$\frac{4}{5}\left(\frac{1}{2}\right) = \frac{4}{10} = \frac{2}{5}$$

$$\boxed{\frac{2}{5}}$$

b) Rebekah is making bookmarks. She has a roll of 6 feet of ribbon. Each bookmark requires $4\frac{3}{4}$ inches of ribbon. After making all the bookmarks that she can, how much ribbon will remain? *Remember to label!* $6 \times 12 = 72$

$$72 \div 4\frac{3}{4} = \frac{72}{1} \div \frac{19}{4} = \frac{72}{1} \cdot \frac{4}{19} = \frac{288}{19} = 15\frac{3}{19} \quad \boxed{\frac{3}{4} \text{ in or } 0.75 \text{ in}}$$

15 whole book marks → $15 \times 4\frac{3}{4} = 71.25$ in $72 - 71.25 = 0.75$

c) Below you see two piles of cards, Pile A and Pile B. How many X cards would have to be taken from Pile A and put into Pile B to make the fraction of X cards the same in both piles?
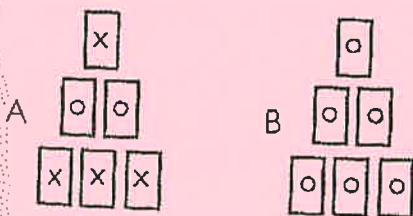
Pile A: 2 circles ⎫ Doesn't change,
Pile B: 6 circles ⎭ ratio 1:3

4 "x" cards, put in ratio 1:3

Move ③ "x" cards (Both piles have $\frac{1}{3}$ fraction)

d) Find the reciprocal of each of the fractions below. Then write them as mixed numbers, and for your answer identify the largest value.

$$\frac{7}{8} \qquad \frac{8}{9} \qquad \frac{5}{6} \qquad \frac{2}{3}$$
$$\downarrow \qquad \downarrow \qquad \downarrow \qquad \downarrow$$
$$\frac{8}{7} \qquad \frac{9}{8} \qquad \frac{6}{5} \qquad \frac{3}{2}$$
$$\searrow 1\frac{1}{7} \quad \searrow 1\frac{1}{8} \quad \searrow 1\frac{1}{5} \quad \searrow 1\frac{1}{2}$$

$$\boxed{1\frac{1}{2}}$$

Name:_____ School Team: _____

Circle your final
answer!

TIE BREAKER

Remember to simplify!

1. Use the clues below to identify the correct number suspect from the choices provided.

   clue 1   clue 2   clue 1   clue 3

   Suspects: $\frac{1}{2}$ $\frac{3}{4}$ $\frac{2}{3}$ $\left(\frac{3}{5}\right)$ $\frac{5}{8}$ $\frac{7}{10}$ $\frac{12}{21}$

   clue 4   clue 4

   - The correct suspect is greater than 0.5
   - The correct suspect is not equal to $3 \div 4$
   - If you take the correct suspect and multiply by 2 you will get a number that's less than 2
   - The denominator is prime.

2. Use the clues below to identify the correct number suspect from the choices provided.

   Suspects: 3.5 -2.7 $\left(1.4\right)$ -5 9 17 -4 7

   clue 3   clue 4   clue 7   clue 1   clue 2   clue 2   clue 2

   - The correct number suspect is not a perfect square
   - The correct number suspect is not an integer
   - If you multiply the correct number suspect by 2, you will not get an integer
   - The correct number suspect does not have any prime digits

3. Use the clues below to identify the correct number suspect.

   - The correct number suspect is a whole number between 1 and 100
   - The correct number suspect is less than a third of 50% of 576 less than 96
   - The correct number suspect has a larger digit in the tens place →10   40   54   70   80   90
   - The correct number suspect is even   20   44   66   71   81   91
   - The sum of the digits of the correct number suspect is 12   21   42   61   77   82   92
   30   43   62   73   83   93
   31   50   63   74   84   94
   32   51   64   75   85   95
   52   65   76   86 87
   53

   $\left(84\right)$