

Greater Cleveland Council of Teachers of Mathematics
2011 Mathematics Tournaments

Grade 7 (Each problem is worth ten points.)

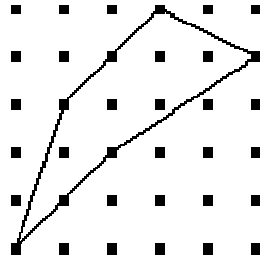
THE PILE: (Write answers on answer sheet AND all fractions in lowest terms)

1.

A	B	
B		C
A	B	A

What is the probability of landing in sections labeled A or C on the above dartboard if you assume all darts land on the board and that all darts land on any point with equal probability?

2. Find the area of the irregular polygon:



3. The cost for 23 students to attend a field trip is \$160.50 and \$214.50 for 35 students. The relationship between cost and number of students is linear. Find the cost for 49 students to go on the field trip.

4. Find ONE number to fill in the blanks to make the following true:

[both blanks hold the SAME number]

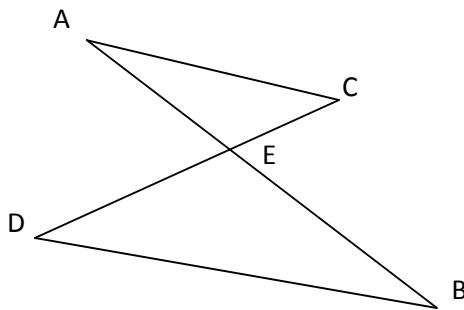
$$3 - 2(\square - 5) = -4(8 - \square) + 3$$

5. Raised garden beds are being built all the same size. The first soil delivery of 2409.75 cubic feet filled 8.5 gardens, how many cubic yards will be needed to fill 20 gardens?

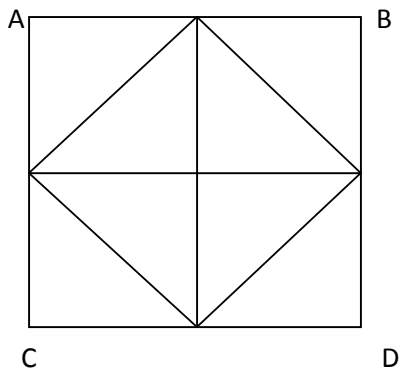
6. Use the digits 3, 4, 5, 6, 7, 8 to fill in the blanks to get the largest possible sum of two decimals. Each digit can only be used once. Provide the sum as your answer.

$$\square . \square \square + \square . \square \square$$

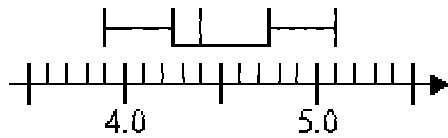
7. $AC = 420$ centimeters; $BD = 6.1$ meters; $EC = 120$ centimeters. Find the length of DC if $\angle A$ is congruent to $\angle B$. Express as a decimal rounded to the hundredths place.



8. How many rhombuses are there? [ABDC is a square]

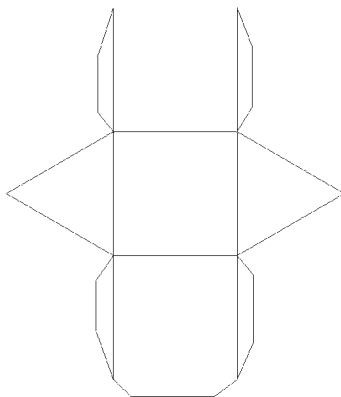


9. A set of five non-negative integers has a mean of 5, a median of 6 and a mode of 7. What is the smallest possible number of the set?
10. A washing machine sits next to a dryer. A wash cycle takes 46 minutes and a dryer cycle takes 28 minutes. An identical bell sounds at the end of each cycle. Each machine is in constant use with a cycle starting exactly when one stops. After how many minutes will the bell on both machines sound at the same time assuming both start their cycle at the same time.
11. What is the measure of the acute angle between the hour hand and the minute hand at exactly 5:20?
12. How much larger is the range of the upper 50% of the data compared to the range of the lower 50% of the data?



13. Find the volume of the triangular prism if each edge is 6 cm. Round to the nearest whole number.

Triangular prism

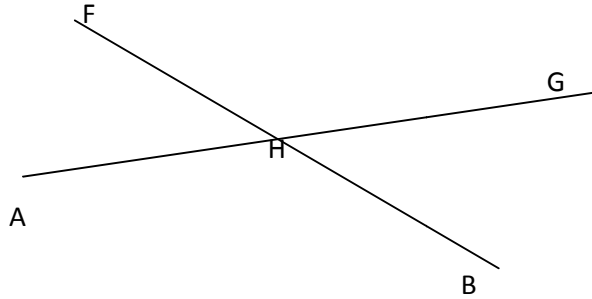


14. Sam, Steve, Sue and Stan collect animal bracelets. Sam's collection contains 200 bracelets. Steve's collection contains 50 more than $\frac{3}{5}$ of Sam's collection. Sue's collection contains 75 more than $\frac{1}{2}$ of Steve's. Stan's collection is $\frac{1}{2}$ of the sum of Steve's and Sue's collections. How many bracelets do the four students have in all?
15. There are 6 finalists in a poetry contest. How many ways can the first, second, and third prizes be awarded?
16. A triangle has vertices: A (0,6) B(-4,0) C (8,-6)
The triangle is reflected over the x-axis. What are the coordinates of the vertex that is static under this reflection (does not move)?
17. How many square inches would it take to cover the same area as one square foot?
18. The original price of a blanket is marked down 25%. A customer has a coupon for 20% off the sale price. What percent of the original price does the customer pay?
19. Find the next number in the pattern: 3, 5.5, 9, 13.5, 19, _____
20. Sam rode his bike 8 miles in the first 24 minutes, and then changed his speed to 15 mph for the next 20 minutes. What was Sam's average speed for his bike ride given in miles per hour rounded to the nearest hundredths?

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HURDLE #1

(This problem is worth 15 points)



Estimate the measure of $\angle FHG$ (within 5°)

Team Number _____

Answer: _____

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HURDLE #2 (This problem is worth 15 points)

What percent of the low temperatures fall below -2 ? (assume a temperature of -2 is put in the -2 to 0 range)

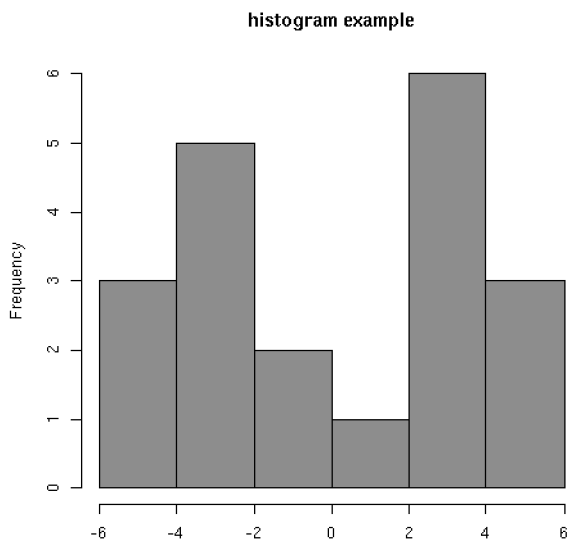


Figure 1 Low Temperatures

Team Number _____

Answer: _____

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HURDLE #3

(This problem is worth 15 points.)

There were two types of tickets for the school play: adults and students. A total of 150 tickets were sold bringing in \$720. Student tickets cost $\frac{1}{2}$ as much as adult tickets. How much money was raised by the adult ticket sales?

Team Number _____

Answer: _____

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HURDLE #4

(This problem is worth 10 points.)

Recipe for salad dressing:

$\frac{1}{3}$ cup oil

$\frac{1}{4}$ cup vinegar

2 tablespoon Italian herbs

How many cups of vinegar should be used if the amount of oil was increased to $\frac{1}{2}$ cup to keep the proportions the same?

Team Number _____

Answer: _____

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HURDLE #5 (This problem is worth 10 points)

Two circular gardens are designed with the area of the large one 340π square feet and the smaller garden area is 40% less. What is the diameter in feet of the smaller garden? (Round to the nearest tenth).

Team Number _____

Answer: _____

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HURDLE #6 (This problem is worth 10 points.)

There are two baskets each filled with marbles: Basket A: 2 red; 3 white

Basket B: 7 blue, 2 white

A person randomly picks a basket and takes out one marble. What is the probability the marble is white?

Team Number _____

Answer: _____

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HURDLE #7 (This problem is worth 10 points.)

Your mom is building a patio 15 feet by 20 feet. She is using 18 inches by 12 inches tiles sold at a price of \$4.50 each. She must buy whole tiles and all tiles must run in the same direction. What is the cheapest cost of tiling the patio?

Team Number _____

Answer: _____

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HURDLE #8 (This problem is worth 5 points.)

In a school with 320 students: 37 students are allergic to peanuts, 19 students to bee stings and 85% of the students have no allergies. How many are allergic to peanuts and bee stings?

Team Number _____

Answer: _____

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HURDLE #9 (This problem is worth 5 points)

Carla earns \$42 for babysitting 8 hours at one job and \$30 for 4 hours at another job. What was her mean (average) pay per hour for both jobs?

Team Number _____

Answer: _____

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HURDLE #10 (This problem is worth 5 points.)

Jane selects a positive two-digit integer. She multiplies the units digit by five and the tens digit by three and adds the results. What was the integer she selected if her total is the same as the integer she chose?

Team Number _____

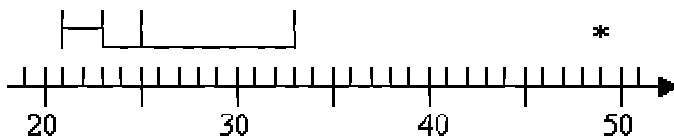
Answer: _____

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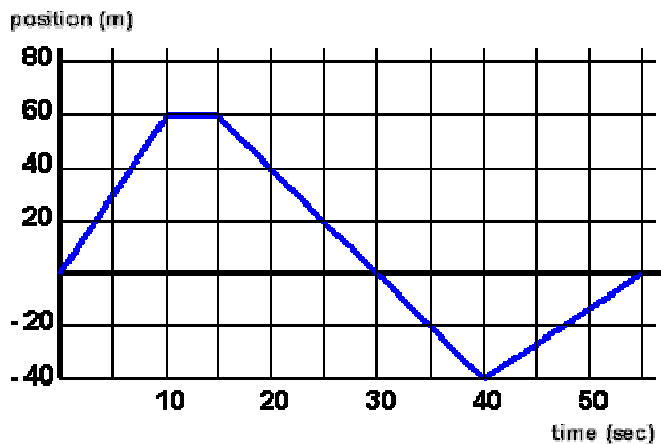
Grade 8 (Each problem is worth ten points.)

THE PILE: (Write answers on answer sheet)

1. If the outlier is not included, how much larger is the range of the upper 50% of the data compared to the lower 50% of the data?



2. The mean height of 42 students is 62 inches. If five of the students are five feet tall, what is the mean height (in inches) of the remaining students in inches? [Round answer to the nearest hundredths]
3. If the length of a rectangle were increased by 10% and the width were decreased by 10%, how does the area of the new rectangle compare to the original? Give answer as percent of original.
4. During what interval of time was this person's speed the slowest? (give starting and ending time for the interval.)



5. At a school carnival a game is played with a bag of marbles containing 2 yellow, 4 red and 3 blue. A person picks one marble (does not put it back) and then a second marble. If the marbles

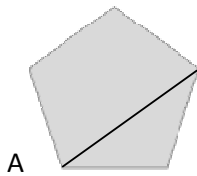
are the same color they win. What is the probability of winning? [Express your answer as a fraction in lowest terms.]

6. A person invests \$4500 in an account paying 4.5% interest compounded each year. What is the value of the account at the end of 4 years rounded to the nearest penny?
7. The bottom of a small popcorn bag (open on top) is 15 centimeters by 8 centimeters. The bag is 20 centimeters tall. The bottom dimensions in the large popcorn bag are twice those of the small bag, but the height is the same. Find the ratio of the surface area of the small bag to the large bag expressed as a fraction in lowest terms.
8. A car averages 50 miles per hour for the first 200 miles of a trip and 60 miles per hour for the last 90 miles the trip. How much longer would the trip have taken if they traveled a constant speed of 40 miles per hour? Express your answers in minutes.
9. If a regular hexagon and a regular triangle are used to tessellate the plane, how many polygons will meet at a vertex?
10. Find the missing value:

0	1
3	10
5	26
8	

11. If $\bullet\bullet\bullet\bullet\bullet\bullet\bullet\bullet$ is $\frac{4}{3}$ of a unit, how many dots would be in $\frac{1}{2}$?
 $\bullet\bullet\bullet\bullet\bullet\bullet\bullet\bullet$

12. The polygon is regular. Express the ratio of the measures of the two acute angles at vertex A in lowest terms.



13. What is the smallest 4-digit perfect square number?

14. A square piece of paper, 12 inches on each side, is folded in half. Both layers are then cut in half parallel to the fold, resulting in three new rectangles: one large and two identical small ones. Find the perimeter of one of the small rectangles.
15. A book is purchased with a 20% discount and then 7.5% tax added. The final bill was \$30.96. What was the price of the book before the discount and tax?
16. A 6 foot 3 inch man casts a 4-foot shadow. At the same time a tree casts a 10-foot shadow. Assume the tree and man are standing perpendicular to the ground. How tall is the tree in feet? [No rounding]
17. What is the first capital letter of the alphabet that has rotational symmetry but not a line of symmetry?
18. Three vertices of a rhombus are at $(0, -3)$, $(1, 4)$ and $(4, 0)$. What are the coordinates of the fourth vertex?
19. The point $(-3, -2)$ is rotated clockwise about the origin 90° . What is its image under this transformation?
20. A scatterplot is drawn to show the relationship between the two variables listed. Which would have a line of best fit with a negative slope? [Put letter of selection as your answer]
- A. Number of cars washed at a car wash in one day and the amount of water used.
 - B. The price of a donut and number of donuts sold.
 - C. The weight of an elevator and the number of people on the elevator.
 - D. Age of a baby in months and the baby's weight.

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MENTAL MATH

ROUND #1

1. What is $\frac{2}{3}$ of 33?
2. Find the sum of 109 and 56.
3. What is the mean of 14 and 22?
4. Sally had \$20 and bought a \$7.50 movie ticket and a \$1.50 popcorn. How much does she have left?
5. Find the product of 3 squared and 4.
6. What is the cost of 7 notebooks that each cost 63 cents?
7. What is 20% of 17?
8. What is the area of a triangle in square inches with base 2.5 inches and a height of 10 inches?
9. What is 470 minus 600?
10. Each piece of wallpaper needs to be $3\frac{1}{2}$ yards long. How many pieces can you get from a roll of wallpaper with 20 yards?
11. A theatre has 35 rows with 12 seats in each row. How many total seats are there?
12. Find $\frac{3}{8}$ plus $\frac{1}{4}$.
13. A movie starts at 6:15 and ends at 8:00. How many minutes long is the movie?
14. How many inches are in 6 feet?
15. What is 3.4 divided by 100?

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MENTAL MATH

ROUND #2

1. What would you divide $\frac{3}{4}$ by to get 3?
2. How much is 8% tax on a \$20,000 car?
3. What is the least common multiple of 12 and 9?
4. If a dog eats 22 ounces of food in 2 days, how many ounces would it eat in 5 days?
5. What is the sum of negative 42 and positive 37?
6. A piece of rope 2 yards long has 2 feet cut off. What is the length of the rope in feet now?
7. What is 6 times 45?
8. Each bow needs $\frac{1}{3}$ yard of ribbon. How many bows can be made from $4\frac{1}{2}$ yards?
9. What is the perimeter in feet of a rectangle 4 feet by 9 feet?
10. Subtract 593 from 700.
11. Bill's test scores were 80, 82 and 78. What was his mean score?
12. A checking account has \$400. Three withdrawals of \$150 each are made and the account is overdrawn. What is the account balance?
13. What number must you add to -7 to get 21?
14. What is the sum of 2.4 and 0.15?
15. What is the greatest common factor of 20 and 15?

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Grade 7 [Problems A – F: 15 points each. Problem G: 20 points]

SIX PLACES TO START

A. Find the median of the following set (express as fraction):

$-\frac{1}{12}$ -0.43 -0.409 $-\frac{1}{9}$ -0.1 $-\frac{2}{9}$

B. A person walks 6 miles north, 5 miles east, then 6 more miles north. How far are they from where they started?

C. Mr. Miller has a monthly income of \$4950. He budgets \$1500 for housing, \$950 for food, \$600 for utilities, \$900 for transportation and the rest for miscellaneous. He is going to make a pie chart to represent his budget. How many degrees are in the central angle of the sector representing miscellaneous rounded to the nearest whole degree.

D. How many integers from 1 to 1000, inclusive, are divisible by neither 2 or 5?

E. How many $3 \times 3 \times 3$ cubes will fit into a $6 \times 6 \times 6$ box?

F. What is the probability of rolling two standard dice and getting a double?
(dice match; express as fraction)

G. Replace the letters in the following expression with the answers to the problems above and find the value of the expression: $F + C(\text{---}) + A$

Answer to A _____

Answer to B _____

Answer to C _____

Answer to D _____

Answer to E _____

Answer to F _____

Team Number _____

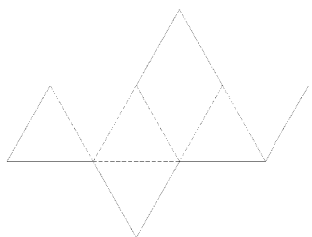
Answer to G _____

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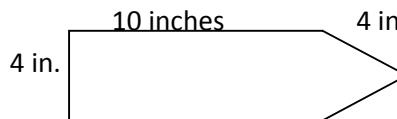
Grade 8 [Problems A – F: 15 points each. Problem G: 20 points]

SIX PLACES TO START

- A. At a school $\frac{1}{4}$ of the freshman are from homes where both parents are college graduates. Of these freshman, $\frac{3}{5}$ are interested in the same college as one or both of their parents. If this group of students interested in their parents' college there are 18 students, how many freshman are there?
- B. How many edges are there in the 3-d solid formed from this net:



- C. What is the probability of tossing 3 coins and getting at least two heads?
- D. A set of 5 numbers has a mode of 17, a median of 21, a range of 13 and a mean of 22. What is the fourth highest number in the set?
- E. Find the area of the arrow to the nearest square inch.
- F. What is the least common multiple of 12, 30 and 75?
- G. Replace the letters in the following expression with the answers to the problems above:
Find the value of the expression: $C(-) - E(B + A)$



Answer to A _____

Answer to B _____

Answer to C _____

Answer to D _____

Answer to E _____

Answer to F _____

Team Number _____

Answer to G _____

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Grade 7
THE PILE:

(Each problem is worth ten points.)

Answer to #1 _____

Answer to #2 _____

Answer to #3 _____

Answer to #4 _____

Answer to #5 _____

Answer to #6 _____

Answer to #7 _____

Answer to #8 _____

Answer to #9 _____

Answer to #10 _____

Answer to #11 _____

Answer to #12 _____

Answer to #13 _____

Answer to #14 _____

Answer to #15 _____

Answer to #16 _____

Answer to #17 _____

Answer to #18 _____

Answer to #19 _____

Team Number _____

Answer to #20 _____

Greater Cleveland Council of Teachers of Mathematics
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Grade 8
THE PILE:

(Each problem is worth ten points.)

Answer to #1 _____

Answer to #2 _____

Answer to #3 _____

Answer to #4 _____

Answer to #5 _____

Answer to #6 _____

Answer to #7 _____

Answer to #8 _____

Answer to #9 _____

Answer to #10 _____

Answer to #11 _____

Answer to #12 _____

Answer to #13 _____

Answer to #14 _____

Answer to #15 _____

Answer to #16 _____

Answer to #17 _____

Answer to #18 _____

Answer to #19 _____

Answer to #20 _____

Team Number _____

Greater Cleveland Council of Teachers of Mathematics
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(Each problem is worth one point)

MENTAL MATH- Answer Sheet

Round #1

Answer to #1 _____

Answer to #2 _____

Answer to #3 _____

Answer to #4 _____

Answer to #5 _____

Answer to #6 _____

Answer to #7 _____

Answer to #8 _____

Answer to #9 _____

Answer to #10 _____

Answer to #11 _____

Answer to #12 _____

Answer to #13 _____

Answer to #14 _____

Answer to #15 _____

Team Number _____

Greater Cleveland Council of Teachers of Mathematics
2011 Mathematics Tournaments

(Each problem is worth one point)

MENTAL MATH- Answer Sheet

Round #2

Answer to #1 _____

Answer to #2 _____

Answer to #3 _____

Answer to #4 _____

Answer to #5 _____

Answer to #6 _____

Answer to #7 _____

Answer to #8 _____

Answer to #9 _____

Answer to #10 _____

Answer to #11 _____

Answer to #12 _____

Answer to #13 _____

Answer to #14 _____

Answer to #15 _____

Team Number _____

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Grade 7
THE PILE:

(Each problem is worth ten points.)

Answer to #1 $7/12$

Answer to #2 7.5 square units

Answer to #3 \$277.50

Answer to #4 7

Answer to #5 5670

Answer to #6 9.393

Answer to #7 294.29

Answer to #8 6

Answer to #9 0

Answer to #10 644 mins or 10.73 hours

Answer to #11 40°

Answer to #12 0.2

Answer to #13 94 cubic centimeters

Answer to #14 695

Answer to #15 120

Answer to #16 $(-4, 0)$

Answer to #17 144

Answer to #18 60 (%)

Answer to #19 25.5

Team Number _____

Answer to #20 17.73 (mph)

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Grade 8
THE PILE:

(Each problem is worth ten points.)

Answer to #1 4

Answer to #2 62.27 (inches)

Answer to #3 99 (%)

Answer to #4 10 – 15 seconds

Answer to #5 $5/18$

Answer to #6 \$5366.33

Answer to #7 $13/29$

Answer to #8 105 minutes

Answer to #9 4

Answer to #10 65

Answer to #11 9 (dots)

Answer to #12 $\frac{1}{2}$ or $2/1$ or $2:1$ or $1:2$

Answer to #13 1024

Answer to #14 30 inches

Answer to #15 \$36

Answer to #16 $15 \frac{5}{8}$ or 15.625

Answer to #17 N

Answer to #18 (-3,1)

Answer to #19 (-2, 3)

Answer to #20 B

Team Number _____

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Hurdle Answer Key:

1. (15 points) any value between 134° and 146°
2. (15 points) 40 (%)
3. (15 points) \$240
4. (10 points) $\frac{3}{8}$ (cup)
5. (10 points) 28.6 (feet)
6. (10 points) $\frac{37}{90}$
7. (10 points) \$900
8. (5 points) 8
9. (5 points) \$6
10. (5 points) 47

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Mental Math Round #1 Key:

1. 22

2. 165

3. 18

4. 11

5. 36

6. 4.41

7. 3.4

8. $12\frac{1}{2}$ or 12.5

9. -130

10. 5

11. 420

12. $\frac{5}{8}$

13. 105

14. 72

15. 0.034

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Mental Math Round #2 Answer Key:

1. $\frac{1}{4}$
2. 1600
3. 36
4. 55
5. -5
6. 4
7. 270
8. 13
9. 26
10. 107
11. 80
12. -50
13. 28
14. 2.55
15. 5

Greater Cleveland Council of Teachers of Mathematics
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Grade 7 [Problems A – F: 15 points each. Problem G: 20 points]
SIX PLACES TO START

Find the value of the expression.

Answer to A -1/6

Answer to B 13

Answer to C 73

Answer to D 400

Answer to E 8

Answer to F 1/6

Team Number _____

Answer to G 5840

Greater Cleveland Council of Teachers of Mathematics
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Grade 8 [Problems A – F: 15 points each. Problem G: 20 points]

SIX PLACES TO START

Replace the letters in the following expression with the answers to the problems above:

Find the value of the expression.

Answer to A 120

Answer to B 12

Answer to C 1/2

Answer to D 25

Answer to E 47

Answer to F 300

Team Number _____

Answer to G -6198

