Potpourri – 5$^{\text{th}}$ Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of "7" does not need to be answered as "007". If your answer is a fraction like $\dfrac{3}{16}$, bubble in 316.

1. **2 points:** How many positive factors do the numbers 16, 24, and 48 all have in common?

2. **2 points:** Find the next number in the following sequence:

$$4, 6, 10, 18, 34, 66, \underline{\hphantom{00}}.$$

3. **2 points:** How many fractions are equivalent to $\dfrac{2}{3}$ and have positive two-digit integers as both the numerator and denominator?

4. **3 points:** What is the sum of the terms in the following sequence: $3, 6, -9, 12, 15, -18, \ldots, -63$?

5. **3 points:** In Mr. Pavlov's classroom, a buzzer sounds every 12 minutes. Every 26 minutes, a bell chimes. How many minutes will pass between each occurrence where both the buzzer and bell make a sound at the same time?

6. **3 points:** If $f(x, y) = x^2 - 3xy + 9y$, what is the value of $f(2, 4)$?

7. **3 points:** Aaron is trying to send a letter out to his grandma to tell her all about his time at Math Camp. The letter needs a 45-cent stamp attached to it, but for the strangest reason, the camp only has 2-cent, 5-cent, and 8-cent stamps. How many different combinations of stamps could he use to send his letter?

8. **4 points:** What is the ones digit of the sum of 3^{141} and 5^{926}?

9. **4 points:** How many three-digit numbers have either two or three identical digits?

10. **4 points:** Suppose that the five-digit number $89xyz$ is divisible by 2, 4, 5, and 9. If x, y, and z are unique digits, what is the sum of the three missing digits?

Potpourri – 6$^{\text{th}}$ Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of "7" does not need to be answered as "007". If your answer is a fraction like $\dfrac{3}{16}$, bubble in 316.

1. **2 points:** What is the sum of the terms in the following sequence: $3, 6, -9, 12, 15, -18, \ldots, -63$?

2. **2 points:** In Mr. Pavlov's classroom, a buzzer sounds every 12 minutes. Every 26 minutes, a bell chimes. How many minutes will pass between each occurrence where both the buzzer and bell make a sound at the same time?

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5. **3 points:** What is the ones digit of the sum of 3^{141} and 5^{926}?

6. **3 points:** How many three-digit numbers have either two or three identical digits?

7. **3 points:** Suppose that the five-digit number $89xyz$ is divisible by 2, 4, 5, and 9. If x, y, and z are unique digits, what is the sum of the three missing digits?

8. **4 points:** What is $0.\overline{24}$ represented as a reduced fraction?

9. **4 points:** Suppose that your friend Claire believes she can tell the future, and so she knows what five of the lottery numbers are for tomorrow. However, Claire will only tell you a few clues about the set of numbers:

   - All of the numbers are unique prime numbers.
   - The range is 27.
   - The median is 11.

   What is the greatest possible sum of the five lottery numbers?

10. **4 points:** How many digits are in the product of 31,415,926,535 and 2,718,281,828?

Potpourri – 7th Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of "7" does not need to be answered as "007". If your answer is a fraction like $\dfrac{3}{16}$, bubble in 316.

1. **2 points:** Aaron is trying to send a letter out to his grandma to tell her all about his time at Math Camp. The letter needs a 45-cent stamp attached to it, but for the strangest reason, the camp only has 2-cent, 5-cent, and 8-cent stamps. How many different combinations of stamps could he use to send his letter?

2. **2 points:** What is the ones digit of the sum of 3^{141} and 5^{926}?

3. **2 points:** How many three-digit numbers have either two or three identical digits?

4. **3 points:** Suppose that the five-digit number $89xyz$ is divisible by 2, 4, 5, and 9. If x, y, and z are unique digits, what is the sum of the three missing digits?

5. **3 points:** What is $0.\overline{24}$ represented as a reduced fraction?

6. **3 points:** Suppose that your friend Claire believes she can tell the future, and so she knows what five of the lottery numbers are for tomorrow. However, Claire will only tell you a few clues about the set of numbers:

   - All of the numbers are unique prime numbers.
   - The range is 27.
   - The median is 11.

   What is the greatest possible sum of the five lottery numbers?

7. **3 points:** How many digits are in the product of 31,415,926,535 and 2,718,281,828?

8. **4 points:** In some base b, $6_b \times 7_b = 46_b$. What is value of b?

9. **4 points:** Two students took an identical 8-question true-or-false test. Using "T" for "true" and "F" for "false", student 1 answered "TTFFFFTF" and student 2 answered "TFTFTTTF". Both students got 6 out of their 8 questions correct. What is the greatest number of questions that could have had the correct answer of "true"?

10. **4 points:** Suppose that the WSMC were to change the scoring rules for the last 20 questions of the individual test. Instead of receiving 1 point per correct answer, you would now receive 5 points for each correct answer, 1 point for each problem left without an answer, and 0 points for an incorrect answer. How many scores between 1 and 100 among the last 20 questions are impossible to achieve based on this new scoring system?

Potpourri – 8th Grade

1. **2 points:** Suppose that the five-digit number $89xyz$ is divisible by 2, 4, 5, and 9. If x, y, and z are unique digits, what is the sum of the three missing digits?

2. **2 points:** What is $0.\overline{24}$ represented as a reduced fraction?

3. **2 points:** Suppose that your friend Claire believes she can tell the future, and so she knows what five of the lottery numbers are for tomorrow. However, Claire will only tell you a few clues about the set of numbers:

   - All of the numbers are unique prime numbers.
   - The range is 27.
   - The median is 11.

   What is the greatest possible sum of the five lottery numbers?

4. **3 points:** How many digits are in the product of 31,415,926,535 and 2,718,281,828?

5. **3 points:** In some base b, $6_b \times 7_b = 46_b$. What is value of b?

6. **3 points:** Two students took an identical 8-question true-or-false test. Using "T" for "true" and "F" for "false", student 1 answered "TTFFFFTF" and student 2 answered "TFTFTTTF". Both students got 6 out of their 8 questions correct. What is the greatest number of questions that could have had the correct answer of "true"?

7. **3 points:** Suppose that the WSMC were to change the scoring rules for the last 20 questions of the individual test. Instead of receiving 1 point per correct answer, you would now receive 5 points for each correct answer, 1 point for each problem left without an answer, and 0 points for an incorrect answer. How many scores between 1 and 100 among the last 20 questions are impossible to achieve based on this new scoring system?

8. **4 points:** You are given the ten digits: $0, 0, 1, 2, 4, 6, 6, 7, 7$, and 9, and are asked to form 5 two-digit numbers such that they sum to 222. What is the smallest possible two-digit number that could be a part of that sum?

9. **4 points:** How many integral values of x satisfy the inequality: $10^{10} < 2^x < 10^{15}$?

10. **4 points:** Compute the number of perfect squares that are factors of $10!$.