

Whatcom County Math Championship – 2017

Algebra – 4th Grade

1. What is the greatest common factor of 144 and 108?
2. What is the sum of the 2-digit square numbers?
3. What is the units digit of 5^{2017} ?

4. Simplify $\frac{2 + \frac{1}{1 - \frac{1}{2}}}{1 - \frac{\frac{1}{2}}{1 - \frac{1}{3}}}$.

5. Let $\otimes m = 2(m - 3)$. What is $\otimes \otimes \otimes 4$?
6. If $3a + 2b + 4c = 23$, and $2a + 3b + c = 32$, what is $a + b + c$?
7. How many 3 digit numbers are divisible by 3, 4 and 5?
8. Write 2017 (base 10) in base 8.
9. The product of the digits in 38, $3 \cdot 8 = 24$, is even and the product of the digits in 57, $5 \cdot 7 = 35$, is odd. How many 2-digit numbers have an odd product?
10. Each of the symbols \diamond , \heartsuit , and \spadesuit represents a different digit. The three digit number $\diamond\heartsuit\spadesuit$ is odd and is divisible by 5. The three digit number $\diamond\spadesuit\heartsuit$ is even and is not divisible by 5. The two digit number $\diamond\spadesuit$ is divisible by 7. The two digit number $\heartsuit\diamond$ is not prime. What digit is \heartsuit ?

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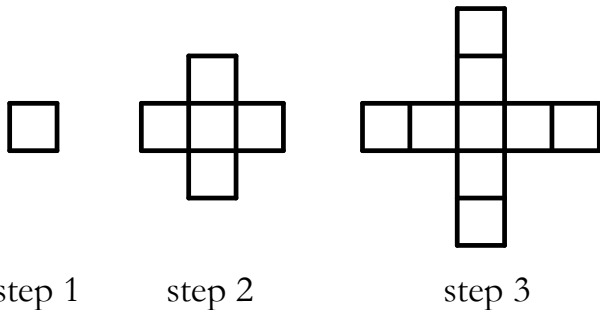
Algebra – 5th Grade

1. Simplify $\frac{2 + \frac{1}{1 - \frac{1}{2}}}{1 - \frac{\frac{1}{2}}{1 - \frac{1}{3}}}$.
2. Let $\otimes m = 2(m - 3)$. What is $\otimes \otimes \otimes 4$?
3. If $3a + 2b + 4c = 23$, and $2a + 3b + c = 32$, what is $a + b + c$?
4. How many 3 digit numbers are divisible by 3, 4 and 5?
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7. Each of the symbols \diamond , \heartsuit , and \spadesuit represents a different digit. The three digit number $\diamond\heartsuit\spadesuit$ is odd and is divisible by 5. The three digit number $\diamond\spadesuit\heartsuit$ is even and is not divisible by 5. The two digit number $\diamond\spadesuit$ is divisible by 7. The two digit number $\heartsuit\diamond$ is not prime. What digit is \heartsuit ?
8. Mary has \$15.00 in nickels and quarters, and has six more nickels than quarters. How many nickels does she have?
9. If $(\mathbf{a}, 0)$ and $(0, \mathbf{b})$ are the x – and y – intercepts of the line that goes through the point $(-2, -3)$ and $(1, 6)$, what is $\mathbf{a} + \mathbf{b}$?
10. What is the sum $1 + 2 + 3 + \dots + 98 + 99 + 100 + 99 + 98 + \dots + 3 + 2 + 1$?

Whatcom County Math Championship – 2017

Algebra – 6th Grade

1. How many 3 digit numbers are divisible by 3, 4 and 5?
2. Write 2017 (base 10) in base 8.
3. The product of the digits in 38, $3 \cdot 8 = 24$, is even and the product of the digits in 57, $5 \cdot 7 = 35$, is odd. How many 2-digit numbers have an odd product?
4. Each of the symbols \blacklozenge , \heartsuit , and \spadesuit represents a different digit. The three digit number $\blacklozenge\heartsuit\spadesuit$ is odd and is divisible by 5. The three digit number $\blacklozenge\spadesuit\heartsuit$ is even and is not divisible by 5. The two digit number $\blacklozenge\spadesuit$ is divisible by 7. The two digit number $\heartsuit\blacklozenge$ is not prime. What digit is \heartsuit ?
5. Mary has \$15.00 in nickels and quarters, and has six more nickels than quarters. How many nickels does she have?
6. If $(\mathbf{a}, 0)$ and $(0, \mathbf{b})$ are the x – and y – intercepts of the line that goes through the point $(-2, -3)$ and $(1, 6)$, what is $\mathbf{a} + \mathbf{b}$?
7. What is the sum $1 + 2 + 3 + \dots + 98 + 99 + 100 + 99 + 98 + \dots + 3 + 2 + 1$?
8. If the pattern below continues, at what step will the perimeter be 500?

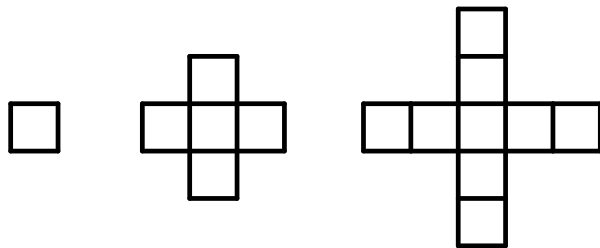


9. A sequence begins $1 - 2 + 3 - 4 + 5 - 6 + \dots$. If the first term is 1, at what term will the sum of the sequence first be greater than 100?
10. The first and last terms of an arithmetic sequence are 213 and 133, and the sum of the sequence is 2941. How many terms are there in the sequence?

Whatcom County Math Championship – 2017

Algebra – 7th + 8th Grade

1. Each of the symbols \diamond , \heartsuit , and \spadesuit represents a different digit. The three digit number $\diamond\heartsuit\spadesuit$ is odd and is divisible by 5. The three digit number $\diamond\spadesuit\heartsuit$ is even and is not divisible by 5. The two digit number $\diamond\spadesuit$ is divisible by 7. The two digit number $\heartsuit\diamond$ is not prime. What digit is \heartsuit ?
2. Mary has \$15.00 in nickels and quarters, and has six more nickels than quarters. How many nickels does she have?
3. If $(a, 0)$ and $(0, b)$ are the x – and y – intercepts of the line that goes through the point $(-2, -3)$ and $(1, 6)$, what is $a + b$?
4. What is the sum $1 + 2 + 3 + \dots + 98 + 99 + 100 + 99 + 98 + \dots + 3 + 2 + 1$?
5. If the pattern below continues, at what step will the perimeter be 500?



step 1

step 2

step 3

6. A sequence begins $1 - 2 + 3 - 4 + 5 - 6 + \dots$. If the first term is 1, at what term will the sum of the sequence first be greater than 100?
7. The first and last terms of an arithmetic sequence are 213 and 133, and the sum of the sequence is 2941. How many terms are there in the sequence?
8. How many 4 digit numbers are divisible by 15, 20 and 25?
9. What is the hundreds digit of 5^{2017} ?
10. Using the digits 1 to 9, at most one time each, fill in the letters of this equation to make a result that that has the greatest value possible: $A^B = CDE$. Then figure out $A + B + C + D + E$.