2020 Castro Valley Junior Math Tournament
Mental Math Solutions – 3rd-5th Grades

1. **Diego had 95 cookies, but then he gave 87 of them to Daniel. How many cookies does Diego have now?**

$95 - 87 = 8$

2. **What number is 6 times the positive difference between 9 and 70?**

$6(70 - 9) = 6 \cdot 61 = 366$

3. **How many vertices does a cube have?**

A cube has four vertices "on top" and four more "on the bottom", for an answer of $4 + 4 = 8$.

4. **Evaluate as a decimal: 14.1 + 1.298**

$14.1 + 1.298 = 15.398$

5. **What is the perimeter, in centimeters, of a square with sides measuring 2 cm?**

$P = 4s = 4 \cdot 2 = 8$

6. **Round 2508.4186 to the nearest tenth.**

The tenths digit is the 4, and the next digit is a 1, so we'll round down to 2508.4.

7. **When my favorite number is increased by 72 and this result is multiplied by 5, the final result is 700. What is my favorite number?**

The intermediate result must have been $700 \div 5 = 140$, so that my favorite number must have been $140 - 72 = 68$.

8. **What is the missing term of the arithmetic (adding or subtracting) sequence 6, 22, 38, 54, ___, ...?**

The common difference is $22 - 6 = 16 = 38 - 22 = \cdots$, so that the missing term is $54 + 16 = 70$.

9. **How many days are in 7 weeks?**

A week has 7 days, for an answer of $7 \cdot 7 = 49$.

10. **What is the name for a polygon with 5 sides?**

You just need to memorize that this is a "pentagon".

11. **What digit is in the thousands place of 9957.0566?**

The thousands place is the first digit of this number, for an answer of 9. The thousandTHs digit is something different, so you have to read carefully.

12. **What is the volume, in cubic centimeters, of a cube with edges measuring 6 cm?**

$V = l \cdot w \cdot h = 6 \cdot 6 \cdot 6 = 36 \cdot 6 = 216$

13. **What is the perimeter, in meters, of a parallelogram with sides measuring 7 m and 2 m?**

Parallelograms have two pairs of congruent sides, for a perimeter of $7 + 2 + 7 + 2 = 9 + 9 = 18$.

14. **How many seconds are in 9 minutes?**

There are 60 seconds in a minute, for an answer of $9 \cdot 60 = 540$.

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15. **Evaluate: 6 + 6 x 9**

Order of operation (PEMDAS) says that multiplication must take place before addition, so that $6 + 6 \cdot 9 = 6 + 54 = 60$.

16. **Evaluate as a fraction:** $\frac{3}{6} - \frac{1}{8}$

$\frac{3}{6} - \frac{1}{8} = \frac{1}{2} - \frac{1}{8} = \frac{4}{8} - \frac{1}{8} = \frac{3}{8}$

17. **The Department of Motor Vehicles assigns license plates that are 4 digits (0-9) followed by 2 letters (A-Z). How many different license plates are possible?**

The counting principle says there are $10 \cdot 10 \cdot 10 \cdot 10 \cdot 26 \cdot 26 = 10{,}000 \cdot 676 = 6{,}760{,}000$.

18. **What is the smallest palindrome greater than 3950? A palindrome is a number that reads the same forwards or backwards, such as 121 or 3443.**

The first palindrome to consider is 3993, which is indeed larger than 3950, so is the answer.

19. **When one card is drawn from a standard 52-card deck, what is the probability that it is a red face card or the 2 of spades? Jacks, Queens, and Kings are considered face cards.**

The red face cards are the Jack, Queen, and King of Hearts and the Jack, Queen, and King of Diamonds, which is six cards. The 2 of Spades make a 7th card, for a probability of $\frac{7}{52}$.

20. **How many two-digit numbers have the property that their tens digit is less than their ones digit?**

In the teens, 12 to 19 all work, which is 8 numbers. In the twenties, 23 to 29 work, which is 7 numbers. In the thirties, 34 to 39 work, which is 6 numbers. Aha; a pattern! The answer will be the sum of the number from 1 to 8, which is $4 \cdot 9 = 36$.