

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

1. **What number is 20 more than half of 56?**

$$20 + \frac{56}{2} = 20 + 28 = 48$$

2. **Wei had 40 friends, who each gave him 2 presents. How many presents did he receive?**

$$40 \cdot 2 = 80$$

3. **What is the area, in square inches, of a square with sides measuring 5 in?**

For a square,  $A_s = s^2 = 5^2 = 25$ .

4. **How many edges does a cube have?**

A cube has 4 edges around the “top”, 4 around the “bottom”, and 4 vertically at the “corners”, for a total of  $3 \cdot 4 = 12$ .

5. **Evaluate:  $920 + 587$**

$$920 + 587 = 1507$$

6. **Round 8290.5061 to the nearest thousandth.**

The thousandths place is a 6, and the next place is a 1, which is less than 5, so we round “down”, which means we truncate, for an answer of 8290.506.

7. **What is the perimeter, in feet, of a trapezoid with sides measuring 8 ft, 4 ft, 8 ft, and 3 ft?**

The perimeter of anything is just the sum of the side lengths, which in this case gives  $8 + 4 + 8 + 3 = 12 + 11 = 23$ .

8. **When the special number is decreased by 42 and this result is multiplied by 7, the final result is 28. What is the special number?**

The intermediate result must have been  $28 \div 7 = 4$ , so that the special number must have been  $4 + 42 = 46$ .

9. **How many centimeters are in 6 meters?**

There are 100 centimeters in a meter, for an answer of  $6 \cdot 100 = 600$ .

10. **What is the perimeter, in feet, of an equilateral triangle with sides measuring 4 ft?**

For an equilateral triangle,  $P = 3s = 3 \cdot 4 = 12$ .

11. **How many sides does a heptagon have?**

You just need to memorize that this is 7.

12. **What is the greatest common factor of 4 and 72?**

Consider factor pairs of the smaller number, in this case 4 can be  $4 \cdot 1$  or  $2 \cdot 2$ . Now examine the largest factor... is it also a factor of the larger number in the original problem? Yes, 4 is a factor of 72, so 4 is our answer. If it hadn't been, we'd have considered 2...

13. **How many minutes are in 9 hours?**

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

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14. **What digit is in the tens place of 857.7022?**

The 5 is in the tens place (NOT the tenTHs place).

15. **What is the perimeter, in feet, of a rhombus with sides measuring 4 ft?**

A rhombus has four congruent sides, so  $P = 4s = 4 \cdot 4 = 16$ .

16. **If today is Friday, what day of the week was it 82 days ago?**

77 days ago was Friday, and 84 days ago was Friday, so 82 days ago was two days later: Sunday.

17. **Ye rode his bike 10 miles over the course of 5 hours. What was his average speed, in miles per hour?**

His speed is 10 miles per 5 hours, so  $10 \div 5 = 2$  miles per hour.

18. **Evaluate:**  $873 \div 9$

This is  $27 \div 9 = 3$  less than 100, for an answer of 97.

19. **When one card is drawn from a standard 52-card deck, what is the probability that it is a 9?**

There are four 9s in the deck of 52 cards, for a probability of  $\frac{4}{52} = \frac{1}{13}$ .

20. **A bag contains 5 red marbles, 7 orange marbles, 5 yellow marbles, 1 green marbles, and 5 blue marbles. When one marble is drawn at random, what is the probability that it is orange?**

There are a total of 23 marbles, 7 of which are orange, for a probability of  $\frac{7}{23}$ .

21. **Evaluate as a fraction:**  $\frac{2}{9} + \frac{7}{8}$

$$\frac{2}{9} + \frac{7}{8} = \frac{16}{72} + \frac{63}{72} = \frac{79}{72}$$

22. **Evaluate as a mixed number:**  $9\frac{5}{8} - 4\frac{1}{9}$

$$9\frac{5}{8} - 4\frac{1}{9} = (9 - 4) + \left(\frac{5}{8} - \frac{1}{9}\right) = 5 + \frac{45-8}{72} = 5\frac{37}{72}$$

23. **What is the name for a triangle with exactly 2 congruent sides?**

You just need to memorize that this is “isosceles”.

24. **When a single fair coin is flipped, what is the probability that it shows tails?**

There are two ways it can land, and one of them is tails, for a probability of  $\frac{1}{2}$ .

25. **My bank requires my PIN to be a letter (A-Z) followed by 3 digits (0-9). How many different PINs might I choose?**

The counting principle gives an answer of  $26 \cdot 10 \cdot 10 \cdot 10 = 26 \cdot 1000 = 26,000$ .

26. **What is the length, in meters, of the hypotenuse of a right triangle with one angle measuring 30 degrees and a short leg measuring 3 meters?**

A 30-60-90 triangle has sides in the ratio  $1:\sqrt{3}:2$ , for an answer of  $2 \cdot 3 = 6$ .

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27. **What is the measure, in degrees, of an interior angle of a regular polygon with 10 sides?**

I find it easier to think about *exterior* angles, with the catch that an exterior angle is defined to be  $180^\circ$  less than you might think; it is the number of degrees you would need to turn if you were walking around that vertex of the polygon, which is just  $\frac{360}{n}$ , so  $\frac{360}{10} = 36^\circ$  for a decagon. The interior angle is supplementary to the exterior angle, so is  $180 - 36 = 144^\circ$ .

28. **If 2 chickens can lay 6 eggs in 5 days, how many eggs could 16 chickens lay in 40 days?**

There are  $16 \div 2 = 8$  times as many chickens, so they will lay 8 times as many eggs in the same amount of time, so they will lay  $8 \cdot 6 = 48$  eggs in 5 days. There are  $40 \div 5 = 8$  times as many days, so the same number of chickens should lay 8 times as many eggs, for an answer of  $48 \cdot 8 = 384$ .

29. **What is the 8th term of the arithmetic (adding or subtracting) sequence whose first three terms are 1, 17, and 33?**

The common difference is  $17 - 1 = 16 = 33 - 17$ , so the 8th term is  $1 + 7 \cdot 16 = 1 + 112 = 113$ .

30. **Two angles in a triangle measure 68 degrees and 44 degrees. What is the measure, in degrees, of the third angle?**

$$180 - 68 - 44 = 180 - 112 = 68$$