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2024-2025 Math League Preliminary Round

(Grade 5)

(Unofficial version, for reference only)

1. The smallest possible number of Mondays that can occur during a period of 45 consecutive days is

   A) 5 B) 6 C) 7 D) 9

2. Jack was 8 when Jill was 2. Now that Jack is twice as old as Jill, he is teaching her how to ice skate. The sum of their ages now is



   A) 8 B) 9 C) 12 D) 18

3. As shown, a circle of diameter 2 is drawn inside a square of side 4. To the nearest tenth, what is the perimeter of the shaded region?



   A) 3.4 B) 12.9 C) 22.3 D) 28.6

4. My dog was 100 m from home, and my cat was 80 m from home. I called them, and they both ran directly home. If my dog ran twice as fast as my cat, how far from home was my cat when my dog reached home?

   A) 20 m B) 30 m C) 40 m D) 50 m

5. The square of a certain whole number N is N^2. If 60 is a factor of N^2, it's possible that _?_ is *not* a factor of N^2.

   A) 16 B) 25 C) 36 D) 100

6. The Town of *Us*, with 3400 people, gains 70 people each month. The town of *Them*, with 10 600 people, loses 130 people each month. In how many months will *Us* and *Them* have equal populations?



   A) 36 B) 70 C) 72 D) 120

7. The average measure of two of a right triangle's angles could be

A) 30º B) 40º C) 50º D) 90º

8. A side of rectangle R is 5 cm long, and one of its diagonals is 13 cm long. R's area is _?_ cm^2.

A) 34 B) 36 C) 60 D) 65

9. Every birthday of my life, I put as many pennies in a jar as my age in years. I now have \$1.20 in the jar. How old am I?

A) 10 B) 12 C) 15 D) 20

10. If the sum of 2000 consecutive integers is 1000, then the sum of the digits of the *greatest* of these 2000 integers is

A) 1 B) 2 C) 9 D) 27

11. How many ordered pairs of integers (x, y) satisfy $x^2 + y^2 = 2$?

A) 2 B) 4 C) 6 D) 8

12. Mom complains she has 1 million things to do. If she takes 5 minutes to do each thing, she will be done in _?_ hours.

A) 120 000 B) 200 000 C) $66\,666\frac{2}{3}$ D) $83\,333\frac{1}{3}$

13. A car is driven at the rate of 30 km per hour. The distance the car covers in one minute is

A) 15 km B) 2 km C) $\frac{1}{2}$ km D) 4 km

14. If $x + 1995$ represents the smallest of 1995 consecutive odd integers, then _?_ represents the 1995^{th} of these same odd integers.

A) $x + 3989$ B) $x + 3990$ C) $x + 5983$ D) $x + 5985$

15. If the pattern of the first 4 letters of *MATHMATHMATH* … continues to the right, the 1989th letter would be

A) *A* B) *T* C) *H* D) *M*

16. Five people met. If everyone shook hands once with everyone else, what is the total number of handshakes that occurred?

A) 4 B) 5 C) 10 D) 20

17. The greatest common factor of 6^3 and 4^5 is

A) 8 B) 12 C) 16 D) 136

18. Each side of a triangle has a whole-number length. If the sum of two sides is 5 cm, then the third side could *not* be __?__ long.

A) 1 cm B) 2 cm C) 3 cm D) 4 cm

19. The product 1.25×10^n is the cube of an integer when n =

A) 1999 B) 2000 C) 2001 D) 2002

20. $12 \times \left(\frac{1}{2} \times \frac{1}{3} \times \frac{1}{4}\right) =$

A) 72 B) 13 C) $\frac{4}{3}$ D) $\frac{1}{2}$

21. If I and II below are true, which of A), B), C), D) below is also true?

I. All 13- and 14-year-old students do well on this contest.

II. Jan is 11 years old.

A) Jan might do well. B) Jan will do well.

C) Jan will not do well. D) Jan will not take the contest.

22. Super man flew from Metropolis to Gotham City at 300 km/hr. He flew back from Gotham City to Metropolis at 600 km/hr (traveling the same distance each way). His average speed for the round trip was

A) 400 km/hr B) 450 km/hr C) 500 km/hr D) 550 km/hr

23. The circumference of a circle, divided by its radius, equals

A) $\frac{\pi}{2}$ B) π C) $\frac{3\pi}{2}$ D) 2π

24. How many whole numbers are factors of both 28 and 32?

A) 2 B) 3 C) 4 D) 5

25. If three-quarters of a number is 24, the number itself must be

A) 32 B) 30 C) 18 D) 16

26. There is a pair of whole numbers a and b, each greater than 1 and less than 10, for which $a^b = b^a + 1$. Find the value of $(a + b)^2$.

A) 9 B) 25 C) 36 D) 49

27. If an *equithagorean* triangle is an equilateral triangle in which the sum of the cubes of two sides is equal to the square of the third side, what is the perimeter of an *equithagorean* triangle?

A) 0.5 B) 1.5 C) 4.5 D) 6

28. How much more than 2^{2000} is 2^{2001}?

A) 2 B) 4 C) 2000 D) 2^{2000}

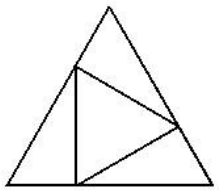
29. If each side of a square is increased by 50%, the area of the square is increased by

A) 50% B) 100% C) 125% D) 225%

30. On an \$800 loan (at a 12% annual interest rate), the simple interest for 9 months is

A) \$24 B) \$48 C) \$72 D) \$96

31. In a large equilateral triangle is inscribed a smaller one, its vertices at trisection points of sides of the larger, as shown. If the perimeter of the larger triangle is 9, what is the square of the perimeter of the smaller equilateral triangle?



A) 27 B) 30

C) 36 D) Answer not shown

32. In a sequence of ten positive numbers, every term from the second term on exceeds the term before it by a positive integer. If the eighth term is 19, what is the least possible value of the last term?

A) 20 B) 21 C) 22 D) 23

33. For how many of the first 100 positive integers x does

$$(6x^2 - 13x + 6)(4x + 3) = (8x^2 - 6x - 9)(3x - 2)?$$

A) less than 85 B) between 85 and 90, inclusive

C) between 91 and 95, inclusive D) greater than 95

34. If $\dfrac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}} = 2003$, what is the value of $\dfrac{x+y}{x-y}$?

A) 2003 B) $\dfrac{1}{2003}$ C) -2003 D) Answer not shown

35. The circle circumscribed about regular heptagon *ABCDEFG* has an area of 196π. If the bisectors of angles *A* and *D* intersect at *P*, what is the length of $\overline{AP}$?

A) less than 16 B) between 16 and 32, inclusive

C) between 33 and 64, inclusive D) greater than 64

Answers										
Question	1	2	3	4	5	6	7	8	9	10
Answer	**B**	**D**	**C**	**B**	**A**	**A**	**C**	**C**	**C**	**A**
Question	11	12	13	14	15	16	17	18	19	20
Answer	**B**	**D**	**C**	**C**	**D**	**C**	**A**	**A**	**B**	**D**
Question	21	22	23	24	25	26	27	28	29	30
Answer	**A**	**A**	**D**	**B**	**A**	**B**	**B**	**D**	**C**	**C**
Question	31	32	33	34	35					
Answer	**A**	**B**	**D**	**C**	**A**					