PSE 2025 Grade 3 Problem Set

Instructions: You will have 60 minutes to complete 30 questions. Your answer is the number of problems you get correct. Only answers written on the provided answer sheet will be graded. This is an individual test; anyone caught talking with others will have their score disqualified.

You are allowed a pencil/pen/writing utensil and scratch paper, which will be provided. Calculators, compasses, rulers, protractors, formula sheets, and the Internet are not allowed.

Solve as many problems as you can. Good luck, and have fun!

1. I did 3 hours of homework every day for a week. How many hours of homework did I do in total?
2. Evaluate $2 \cdot 0 + 2 \cdot 5$.
3. Carson has \$3. A pencil costs 17 cents. What is the maximum amount of pencils that he can buy? (Assume he spends whole cents.)
4. Jenny sleeps for the same amount of time each day. If she slept for 4 hours and 19 minutes last week, how much time does she sleep per day (in minutes)?
5. In inches, how much larger is 3 yards than 2 feet?
6. Zach writes out the number "seventy-seven" 77 times. How many times does he write the letter E?
7. How many positive numbers divide 36?
8. A triangular number is defined as a number that can be represented as $1 + 2 + 3 + \ldots$ as long as needed. For example, 10 is triangular because $10 = 1+2+3+4$. Find the largest triangular number that is less than 100.
9. In a group of animals, 40% are cats, $\frac{1}{4}$ are dogs, and the remaining 18 are birds. How many animals are there in total?
10. Find the sum of all the prime numbers less than 20.
11. What is the maximum number of intersection points between 3 circles?
12. In a sequence, the first term is 2, and each term is 3 more than the previous. What is the 15th term?
13. Arch and Bob want to give some of their marbles to Jim, who has no marbles. Arch gives half of his marbles to Bob. Bob then gives a sixth of his marbles to Jim. If Jim now has 16 marbles, and Bob started with 40 marbles, how many marbles did Arch start with?
14. By arranging the digits 1,2,3, and 4, what is the 8th largest number that you can make?
15. Find the sum of the number of edges, vertices, and faces of a pyramid with a hexagonal base.

16. Let $a \oplus b$ equal $\text{lcm}(a, b) + \gcd(a, b)$. Find $(((12 \oplus 18) \oplus 6) \oplus 64)$.

17. A diagonal is a line connecting two vertices of a shape that is not a side of the shape itself. How many diagonals does a regular pentagon have?

18. Aldric is baking pies. 1 pie needs $2\frac{1}{2}$ cups of flour, $1\frac{2}{3}$ cups of milk, and 1 egg. If his pantry has 18 cups of flour, 10 cups of milk, and 8 eggs, what is the maximum number of pies that he can make?

19. Two numbers sum to 30. Find the largest possible product of those two numbers.

20. $N!$ is defined as $n(n-1)(n-2)\cdots 2 \cdot 1$. Find the remainder when $1! + 2! + \cdots + 9!$ is divided by 9.

21. Student council elections are happening in HSN! 375 kids voted for one of 2 candidates, X and Y. All students voted. If X got 135 more votes than Y, what percent of the kids voted for X?

22. Parker collects shapes. He has 83 shapes in his collection, each of them being either a pentagon or a nonagon. If his shapes have 587 sides in total, find the number of pentagons that he has.

23. On January 1st, a Wednesday, John cut his lawn. He then cut his lawn every 20 days after that. He ends up cutting his lawn twice in October. Find the sum of the dates that he cut his lawn on in October.

24. What is the largest prime factor of 3570?

25. Two prime numbers have a difference of 17. Find their sum.

26. $N!$ is defined by $n(n-1)(n-2)\cdots$. How many times does 2 divide into 8!? (i.e., the exponent of 2 in the prime factorization of 8!)

27. A pizza is cut with 8 straight cuts. Considering that slices don't need to be the same size, what is the maximum amount of pieces that can be made?

28. On a coordinate grid, a triangle has vertices at $(1, 1), (-3, 8)$, and $(-1, -4)$. Find the area of the triangle.

29. A 100-digit number is made up of only 1's and 0's. If the number is divisible by 9, find the difference between the maximum and minimum number of 0's in the number.

30. Anna, Ben, Chris, and Dana are each either telling the truth or lying.

    Anna: "Ben and Dana are lying!"
    Ben: "Exactly 2 of us are telling the truth!"
    Chris: "Anna is telling the truth!"
    Dana: "Ben is telling the truth!"

    How many of them are lying?