Sample Prompt

CHAPTER-07

Personal life related solution from DeepSeek

01 Solve Mathematical Problems

Tips for Creating Effective Math Problem Prompts

1. **Be Clear & Specific**

   o Avoid vague phrasing. Instead of "Solve an equation," use "Solve 2x+3=72x+3=7 for xx."

2. **Specify the Format**

   o Indicate if you want a step-by-step solution, final answer, or proof.

3. **Include Constraints**

   o Example: "Find the smallest positive integer solution to 5x≡3mod 75x≡3mod7."

4. **Use Proper Notation**

   o Write x2x2 instead of "x squared" for clarity.

5. **Vary Difficulty Levels**

   o Mix basic arithmetic with advanced topics like calculus or proofs.

6. **Encourage Explanations**

   o Ask for reasoning: "Prove why the sum of angles in a triangle is 180 degrees."

7. **Incorporate Real-World Context**

   o Example: "Calculate mortgage payments for a $300,000 loan at 4% over 30 years."

8. **Test Different Math Domains**

   o Cover algebra, geometry, statistics, logic, etc.

9. **Use Open-Ended Challenges**

   o Example: "Find three different Pythagorean triples."

10. **Leverage Computational Tools**

- "Write a Python script to compute Fibonacci numbers."

Top 100 Sample Prompts for Solving Mathematical Problems

Basic Arithmetic

1. Solve: $25+37=?$
2. Calculate $143-89$.
3. Multiply 12×15.
4. Divide $225\div9$.
5. What is 73?

Algebra

6. Solve for x: $3x+5=20$.
7. Factorize x^2-9.
8. Simplify $2(x+3)-4x$.
9. Solve the quadratic equation: $x^2-5x+6=0$.
10. Expand $(2x-3)^2$.

Geometry

11. Find the area of a circle with radius 7 cm.
12. Calculate the hypotenuse of a right triangle with legs 3 and 4.
13. What is the volume of a cube with side length 5?
14. Find the perimeter of a rectangle with length 8 and width 6.
15. Determine the angle sum of a pentagon.

Trigonometry

16. Find $\sin(30°)$.
17. Solve $\tan(\theta)=1$.
18. Calculate $\cos(45°)$.
19. Simplify $\sin^2x+\cos^2x$.
20. Find the exact value of $\sin(60°)$.

Calculus

21. Find the derivative of $f(x)=3x^2+2x-5$.
22. Compute $\int 4x^3\,dx$.
23. Find the limit $\lim_{x\to2}(x^2-4)$.
24. Differentiate $y=e^{2x}$.
25. Integrate $\int_0^1 x^2\,dx$.

Linear Algebra

26. Multiply matrices [1234][1324] and [5678][5768].

27. Find the determinant of [2−134][23−14].

28. Solve the system: $2x+y=5$ $2x+y=5$, $x−y=1$ $x−y=1$.

29. Find the inverse of [1101][1011].

30. Compute the dot product of [1,2,3][1,2,3] and [4,5,6][4,5,6].

Probability & Statistics

31. Calculate the mean of [5,10,15,20][5,10,15,20].

32. Find the standard deviation of [2,4,6,8][2,4,6,8].

33. What is the probability of rolling a 6 on a fair die?

34. If $P(A) = 0.3$ and $P(B) = 0.4$, find $P(A \cup B)$ $P(A \cup B)$ if A and B are independent.

35. Compute the binomial probability for 3 successes in 5 trials with $p=0.5$.

Number Theory

36. Is 17 a prime number?

37. Find the GCD of 48 and 60.

38. Compute the LCM of 12 and 18.

39. Solve $x \equiv 3 \mod 5$ $x \equiv 3 \mod 5$.

40. Factorize 84 into primes.

Word Problems

41. If 5 apples cost $2, how much do 15 apples cost?

42. A train travels 300 km in 4 hours. What is its speed?

43. A rectangle's length is twice its width. If the perimeter is 36, find the dimensions.

44. If 20% of a number is 50, what is the number?

45. A shop offers a 15% discount on a $200 item. What's the final price?

Advanced Mathematics

46. Solve $\log_2(x)=5$ $\log_2(x)=5$.

47. Find the Taylor series expansion of e^x e^x at $x=0$ $x=0$.

48. Compute the Fourier transform of $f(t)=\sin(t)$ $f(t)=\sin(t)$.

49. Solve the differential equation $\frac{dy}{dx}=2y$ $\frac{dy}{dx}=2y$.

50. Find the eigenvalues of [3113][3113].

Logic & Puzzles

51. If all A are B and some B are C, can we say some A are C?

52. Prove that the square root of 2 is irrational.

53. Solve: A man is twice as old as his son. In 20 years, he will be 1.5 times as old. Find their current ages.

54. How many ways can you arrange the letters in "MATH"?

55. What is the next number in the sequence: 2, 6, 12, 20, 30, …?

Real-World Applications

56. Calculate compound interest on $1000 at 5% for 3 years.

57. If a car accelerates from 0 to 60 mph in 6 seconds, what is its acceleration?

58. A population grows at 2% per year. How long until it doubles?

59. Find the break-even point if fixed costs are $500 and variable cost per unit is $500 and variable cost per unit is $10, selling at $15.

60. Calculate the ROI if an investment of $2000 yields $2000 yields $2400 after a year.

Challenging Problems

61. Solve $x3-6x2+11x-6=0$ $x3-6x2+11x-6=0$.

62. Prove Fermat's Little Theorem.

63. Find all integer solutions to $x2+y2=25$ $x2+y2=25$.

64. Compute $\sum k=1100k$ $\sum k=1100k$.

65. Solve $\int exsin(x) dx \int exsin(x)dx$.

Visual & Graph-Based Problems

66. Graph the function $y=x2-4x+3$ $y=x2-4x+3$.

67. Find the slope of the tangent to $y=1x$ $y=x1$ at $x=2$ $x=2$.

68. Plot the polar curve $r=2sin(\theta)$ $r=2sin(\theta)$.

69. Find the area between $y=x2$ $y=x2$ and $y=x$ $y=x$ from $x=0$ $x=0$ to $x=1$ $x=1$.

70. Sketch the vector field $\vec{F}=(y,-x)$ $F=(y,-x)$.

Algorithmic & Computational Math

71. Write pseudocode to find the factorial of a number.

72. Implement the Euclidean algorithm to find GCD.

73. Write a Python function to check if a number is prime.

74. Generate the first 10 Fibonacci numbers.

75. Explain how the Newton-Raphson method works.

Mathematical Proofs

76. Prove that the sum of two even numbers is even.

77. Show that 33 is irrational.

78. Prove the Pythagorean theorem.

79. Demonstrate that 0.999…=10.999…=1.

80. Prove by induction that $1+2+\ldots+n=n(n+1)2$ $1+2+\ldots+n=2n(n+1)$.

Olympiad & Competition Math

81. Find all real solutions to x+x=6$x+x$=6.

82. Solve $\lfloor x \rfloor + \lfloor 2x \rfloor = 7$ $\lfloor x \rfloor + \lfloor 2x \rfloor = 7$.

83. Maximize xyxy given x+y=10$x+y$=10.

84. Find the smallest positive integer nn such that n!n! is divisible by 10001000.

85. In how many ways can 5 identical balls be placed in 3 distinct boxes?

Math in Science & Engineering

86. Derive the kinematic equation v=u+at$v$=u+at.

87. Solve the Schrödinger equation for a free particle.

88. Calculate the escape velocity from Earth.

89. Find the equivalent resistance of two 10Ω resistors in parallel.

90. Derive the Navier-Stokes equation for incompressible flow.

Math History & Concepts

91. Explain the significance of Euler's identity $e^{i\pi}+1=0$ $e^{i\pi}+1=0$.

92. Who discovered calculus, Newton or Leibniz?

93. What is the Riemann Hypothesis?

94. Explain the concept of imaginary numbers.

95. Describe the Banach-Tarski paradox.

Interactive & Exploratory Prompts

96. "Explain step-by-step how to solve a Rubik's Cube using group theory."

97. "Simulate the Monty Hall problem and explain the probability."

98. "Generate a fractal using the Mandelbrot set and explain its properties."

99. "Design a math puzzle that involves the Golden Ratio."

100. "Explain how encryption works using prime factorization (RSA)."