

AI 200 Prerequisite Test *

Beaver-Edge AI Institute

If you are not sure whether you are ready to take AI 200, please complete this prerequisites test. There is no time limit on solving problems below.

If you can solve 70% of the problems, you are ready to take AI 200.

1. Linear Equations

1. Solve for x :

$$3x - 7 = 2x + 5$$

2. Solve for (x, y) :

$$y = 2x + 1$$

$$3x = y + 5$$

3. Solve for (x, y, z) :

$$x + y + z = 6$$

$$2x - y + 3z = 14$$

$$-3x + 4y - z = -2$$

4. A movie theater sells adult tickets for \$12 and child tickets for \$8. If 120 tickets were sold for a total of \$1,120, how many of each type were sold?

2. Quadratic Equations

5. Solve for x :

$$x^2 - 5x - 14 = 0$$

6. Write the quadratic equation whose roots are -3 and 5.

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7. A ball is thrown upward with a height function of

$$h(t) = -16t^2 + 64t + 5.$$

Find the maximum height reached.

3. Exponential and Logarithmic Functions

8. Solve for x :

$$2^{x+1} = 32.$$

9. Solve for x :

$$\log_2(x - 3) = 4.$$

10. Simplify using logarithm properties:

$$\log_3 81 + \log_3 9 - \log_3 \sqrt{27}$$

4. Rational and Radical Functions

11. Solve for x :

$$\frac{x}{x-3} + \frac{2}{x+1} = 1.$$

12. Simplify:

$$\frac{x^2 - 16}{x^2 - 4x}.$$

13. Solve for x :

$$\sqrt{x+4} = x - 2.$$

14. Find the horizontal asymptote of

$$f(x) = \frac{2x^2 + 3}{x^2 - 1}.$$

15. Solve for x :

$$\frac{5}{x+2} = \frac{3}{x-1}.$$

5. Sequences and Series

- Find the 15th term of the arithmetic sequence: $\{5, 9, 13, \dots\}$.
- Find the sum of the infinite geometric series:

$$4 + 2 + 1 + \frac{1}{2} + \dots$$

- Expand using the Binomial Theorem: $(x - 3)^5$.

6. Analytic Geometry

- Find the equation of the circle centered at $(3, -2)$ with a radius of 5.
- Let $A = (-4, 7)$ and $B = (6, -3)$. Compute the coordinates of C satisfying $\vec{AC} = 3\vec{AB}$.
- Find the distance between points $(2, -1)$ and $(-3, 5)$.
- Find the equation of the perpendicular bisector of the segment joining $(2, 3)$ and $(6, 7)$.
- Find the distance between the point $A = (3, -4)$ and the line l with equation $x - 5y = 10$. Also compute the coordinates of the foot dropped from point A to line l .
- Let $A = (-3, 6)$, $B = (8, 3)$, $C = (-10, 7)$. Compute the inner product $\vec{AB} \cdot \vec{AC}$ and $\cos \angle BAC$.
- Let $A = (5, 2)$ rotate about point $B = (1, 3)$ counterclockwise by 60° to get to point A' . Compute the coordinates of A' .