

KCATM – Algebra Team Test

- 1) Find the point where $y = 2x - 4$ intersects $2x + y = 0$.
- A) (1, 2) B) (1, -2) C) (-1, 2) D) (-1, -2) E) (-1, -6)
- 2) Solve the inequality: $3x + 5 < 2(x - 9)$.
- A) $x < -23$ B) $x > -23$ C) $x < -14$ D) $x > -14$ E) $x > 9$
- 3) Solve for x: $\frac{3}{2x} = \frac{x}{6}$
- A) $x = 1, 4$ B) $x = 0, 9$ C) $x = -3, 3$ D) $x = 2, 4$ E) not given
- 4) Solve for x: $(2x - 1)^{2/3} = 9$
- A) $x = 4$ B) $x = 7$ C) $x = 10$ D) $x = 14$ E) $x = 18$
- 5) Solve for x: $\frac{3}{x-1} + \frac{x}{x-2} = 3$
- A) $x = 1, 4$ B) $x = 4, 1/2$ C) $x = 4, 0$ D) $x = 4, 4$ E) $x = 4, 3/2$
- 6) Solve for x: $\begin{bmatrix} 2 & 3 \\ 1 & x \end{bmatrix} \begin{bmatrix} 4 & 0 \\ -3 & 1 \end{bmatrix} = \begin{bmatrix} -1 & 3 \\ 7 & -1 \end{bmatrix}$
- A) $x = -2$ B) $x = -1$ C) $x = 0$ D) $x = 1$ E) $x = 2$
- 7) Solve for x: $\ln(2x - 9) = 0$
- A) $x = 1$ B) $x = 2$ C) $x = 3$ D) $x = 4$ E) $x = 5$
- 8) Solve for x: $8^{2x-1} = 16^{4x-7}$
- A) $x = 2$ B) $x = 5/2$ C) $x = 3$ D) $x = 5/2$ E) $x = 7/2$
- 9) Solve for x: $\sqrt{3x-8} = -4$
- A) $x = 8$ B) $x = 4/3$ C) $x = 0$ D) $x = -8$ E) no solution
- 10) Solve for x: $\frac{6}{7} = \frac{3}{x+3}$
- A) $x = 1/2$ B) $x = 3/2$ C) $x = 5/2$ D) $x = -1/2$ E) $x = -3/2$

11) Solve the system:
$$\begin{cases} 3x - 4y = 29 \\ 2x - 5y = 38 \end{cases}$$

- A) (-1, -8) B) (-5, -11) C) (1, 8) D) (5, 11) E) not given

12) Solve for x: $(x-3)^{-1/2} = \frac{1}{2}$

- A) x = 5 B) x = 6 C) x = 7 D) x = 8 E) x = 9

13) Solve for x: $|2x-3|=5$

- A) x = 4, 2 B) x = 4, -4 C) x = 4, 0 D) x = 4, -1 E) x = 4 only

14) Solve for x: $\log_2(3x+8) = 5$

- A) x = 5 B) x = 6 C) x = 7 D) x = 8 E) x = 9

15) Solve for x: $x^2 = 9x$

- A) x = 1, 4 B) x = 0, 9 C) x = -3, 3 D) x = 2, 4 E) x = 9 only

16) Solve for x: $2(x-3)^2 = 50$

- A) x = 5, -1 B) x = 6, -2 C) x = 7, -1 D) x = 8, -2 E) not given

17) Solve for x: $\left(\frac{y^3}{5x}\right)^{-2} = \frac{25}{y^6}$

- A) x = 1, -1 B) x = 2, -2 C) x = 3, -3 D) x = 4, -4 E) not given

18) Solve for x: $\frac{4x}{x-5} - \frac{3}{x-2} = 2$

- A) x = 1, -3/2 B) x = 3, -1/2 C) x = 1, -5/2 D) x = 3, -7/2 E) not given

19) Solve for x: $\sum_{n=1}^x n(n+1) = 112$

- A) x = 5 B) x = 6 C) x = 7 D) x = 8 E) x = 9

20) Solve for x: $x^4 - 5x^2 = -4$

- A) x = 1, -1 B) x = 2, -2 C) x = 3, -3 D) A & B E) A & C

21) Solve for x: $5x - 19 = 8(x - 5)$

- A) $x = 5$ B) $x = 6$ C) $x = 7$ D) $x = 8$ E) $x = 9$

22) Solve for x: $x - 5x^{-1} = 4$

- A) $x = 5, -1$ B) $x = 6, -2$ C) $x = 7, -3$ D) $x = 8, -4$ E) $x = 9, -5$

23) Solve for x: $\begin{bmatrix} 3 & 4 \\ 1 & -9 \end{bmatrix} + \begin{bmatrix} 4x-3 & -5 \\ 2 & -1 \end{bmatrix} = \begin{bmatrix} 12 & -1 \\ 3 & -10 \end{bmatrix}$

- A) $x = 1$ B) $x = 2$ C) $x = 3$ D) $x = 4$ E) $x = 5$

24) Solve for x: $\frac{3x}{x-2} - \frac{x}{8} = 3$

- A) $x = 5, -10$ B) $x = 6, -9$ C) $x = 7, -7$ D) $x = 8, -6$ E) $x = 9, -8$

25) Find the equation of the line perpendicular to $3x - 5y = 17$ that passes through the point $(5, 1)$. Express your answer in general form.

- A) $5x + 3y = 28$ B) $3x + 5y = 20$ C) $3x - 5y = 10$ D) $5x - 3y = 22$ E) $x - y = 4$

26) Solve for x: $\log_3(4x - 7) - \log_3(2x - 1) = 2$

- A) $x = 1/7$ B) $x = 2/7$ C) $x = 3/7$ D) $x = 4/7$ E) no solution

27) Find the complex zeros: $x^4 - 3x^3 + 11x^2 - 27x + 18 = 0$

- A) $x = i, -i$ B) $x = 2i, -2i$ C) $x = 3i, -3i$ D) $x = 4i, -4i$ E) $x = 5i, -5i$

28) Solve for x: $[\log_5 x]^{-1} + \frac{3}{2} = \ln(e^2)$

- A) $x = 5$ B) $x = 10$ C) $x = 15$ D) $x = 20$ E) $x = 25$

29) How many rational zeros does the function $f(x) = x^5 - 5x^3 + x^2 - 5$ have?

- A) 1 B) 2 C) 3 D) 4 E) 5

30) How many potential rational roots does the function $f(x) = 3x^8 + x^7 - 5x^2 - x + 16$ have?

- A) 5 B) 10 C) 15 D) 20 E) 40

