

North Carolina School of Science and Mathematics

Admissions Math Assessment - Practice Test 9

Practice Test 9

Instructions: This 30-question practice test is designed to be representative of the NC-SSM Admissions Math Assessment. This assessment is taken without a calculator. Select the best answer for each question.

1. Simplify the expression: $(2x^2 - 5x + 3) - (x^2 + x - 2)$

- A. $x^2 - 6x + 5$
- B. $x^2 - 4x + 1$
- C. $3x^2 - 4x + 1$
- D. $x^2 - 6x + 1$
- E. $3x^2 - 6x + 5$

2. Simplify the expression: $2(3a - b) + 3(a - 2b)$

- A. $9a - 4b$
- B. $9a - 8b$
- C. $6a - 8b$
- D. $9a + 4b$
- E. $6a - 4b$

3. Simplify the expression: $4x(x - 1) - x(x + 2)$

- A. $3x^2 - 2x$
- B. $4x^2 - 6x$
- C. $3x^2 - 6x$
- D. $3x^2 + 2x$
- E. $5x^2 - 2x$

4. Evaluate the expression: $(-3)^2 + (\frac{1}{2})^3$

- A. $9\frac{1}{8}$
- B. $9\frac{1}{6}$
- C. $-9\frac{1}{8}$
- D. $-8\frac{7}{8}$
- E. $6\frac{1}{8}$

5. Evaluate the expression: $64^{\frac{1}{3}} + 25^{\frac{3}{2}}$

- A. 129
- B. 26.5
- C. 41.5
- D. 128
- E. 133

6. Simplify the expression: $(2a^{-2}b^3)^{-3}$

- A. $\frac{a^6}{8b^9}$
- B. $-6a^6b^{-9}$
- C. $\frac{8a^6}{b^9}$
- D. $\frac{a^6}{6b^9}$
- E. $-8a^{-5}b^0$

7. Simplify the expression: $(4x^3y^{-1})^2(x^{-2}y^3)$

- A. $16x^4y$
- B. $8x^4y$
- C. $16x^4y^{-1}$
- D. $8x^4y^{-1}$
- E. $16x^7y$

8. Simplify the expression, assuming no variables are zero: $\frac{(a^2b^{-3})^3}{a^5b^{-10}}$

- A. $\frac{a}{b^{19}}$
- B. $a^{11}b^{-19}$
- C. ab
- D. $\frac{a}{b}$
- E. ab^{-1}

9. Simplify the radical expression, assuming all variables represent positive numbers:

$$\sqrt{16x^{16}y^4}$$

- A. $4x^4y^2$
- B. $8x^8y^2$
- C. $4x^8y^2$
- D. $4x^8y$
- E. $16x^8y^2$

10. Simplify the radical expression, assuming all variables represent positive numbers:

$$\sqrt{36m^8n^{14}p^2}$$

- A. $6m^4n^7p$
- B. $6m^6n^7p$
- C. $18m^4n^7p$
- D. $6m^4n^7$
- E. $6m^8n^{14}p$

11. Simplify the expression: $\frac{3}{x+1} - \frac{2}{x}$

- A. $\frac{x-2}{x^2+x}$
- B. $\frac{x+2}{x^2+x}$
- C. $\frac{1}{x^2+x}$
- D. $\frac{5x-2}{x^2+x}$
- E. $\frac{x-1}{x^2+x}$

12. Simplify the expression: $\frac{m}{m-3} + \frac{1}{m+3}$

- A. $\frac{m^2+4m-3}{m^2-9}$
- B. $\frac{m+1}{m^2-9}$
- C. $\frac{m+1}{2m}$
- D. $\frac{m^2+2m+3}{m^2-9}$
- E. $\frac{m^2+4m+3}{m^2-9}$

13. Determine the value of the expression $x(x - 2y)$ if $x = 4$ and $y = 1$.

- A. 16
- B. 8
- C. 4
- D. 12
- E. 24

14. Determine the value of the expression $\frac{a^2-b^2}{a-b}$ if $a = 5$ and $b = 2$.

- A. 3
- B. 21
- C. 9
- D. 7
- E. 29

15. Solve for x : $5(x + 1) = 30$

- A. $x = 6$
- B. $x = 7$
- C. $x = 5$
- D. $x = \frac{29}{5}$
- E. $x = 35$

16. Solve for x : $\frac{3}{5}x + 2 = 8$

- A. $x = 6$
- B. $x = 10$
- C. $x = \frac{18}{5}$
- D. $x = 15$
- E. $x = 30$

17. Solve for y : $9y - 5 = 4y + 10$

- A. $y = 1$
- B. $y = \frac{5}{13}$
- C. $y = 3$
- D. $y = 15$
- E. $y = \frac{15}{13}$

18. Find the solution (x, y) to the system of equations: $y = x - 2$ and $x + 2y = 11$

- A. $(5, 3)$
- B. $(3, 1)$
- C. $(1, -1)$
- D. $(7, 5)$
- E. $(3, 5)$

19. Find the solution (x, y) to the system of equations: $2x - 3y = 4$ and $x + 3y = 5$

- A. $(3, \frac{2}{3})$
- B. $(9, \frac{14}{3})$
- C. $(1, \frac{4}{3})$
- D. $(3, 1)$
- E. $(0, -\frac{4}{3})$

20. Find the solution to the system of equations: $x = 3y + 1$ and $2x - 6y = 3$

- A. $(1, 0)$
- B. $(\frac{1}{2}, -\frac{1}{6})$
- C. Infinite solutions
- D. No solution
- E. $(4, 1)$

21. Solve the inequality: $4(x - 1) > 8$

- A. $x > 2$
- B. $x > 3$
- C. $x < 3$
- D. $x > 1$
- E. $x < 2$

22. Solve the inequality: $12 - 3x \geq 18$

- A. $x \geq -2$
- B. $x \leq 2$
- C. $x \geq 2$
- D. $x \leq -2$
- E. $x \leq -10$

23. Find all solutions to the quadratic equation: $x^2 - 10x + 21 = 0$

- A. $x = -3, x = -7$

- B. $x = 3, x = 7$
- C. $x = -3, x = 7$
- D. $x = 3, x = -7$
- E. $x = 21, x = -10$

24. Find all solutions to the quadratic equation: $3x^2 - 11x = 4$

- A. $x = 4, x = -1$
- B. $x = 4, x = -\frac{1}{3}$
- C. $x = -4, x = \frac{1}{3}$
- D. $x = 1, x = -\frac{4}{3}$
- E. $x = -1, x = \frac{4}{3}$

25. Find all solutions to the quadratic equation: $5x^2 - 45 = 0$

- A. $x = 9, x = -9$
- B. $x = 3, x = -3$
- C. $x = 9$
- D. $x = \sqrt{15}, x = -\sqrt{15}$
- E. $x = 5, x = -5$

26. Factor the expression completely: $15x^4y^2 - 10x^3y^3$

- A. $5x^3y^2(3x - 2y)$
- B. $5x^2y^2(3x^2 - 2xy)$
- C. $5x^3y(3x - 2y^2)$
- D. $10x^3y^2(5x - 2y)$
- E. $5x^3y^2(3x - 10y)$

27. Factor the expression completely: $x^2 - 49y^2$

- A. $(x - 7y)^2$
- B. $(x - 49y)(x + y)$
- C. $(x - 7y)(x + 7y)$
- D. $(x^2 - 7y)(x^2 + 7y)$
- E. $(x + 7y)^2$

28. Factor the quadratic expression: $5x^2 + 14x - 3$

- A. $(5x - 1)(x + 3)$
- B. $(5x + 1)(x - 3)$
- C. $(5x - 3)(x + 1)$
- D. $(5x + 3)(x - 1)$
- E. $(x + 14)(5x - 3)$

29. A baker completes $\frac{1}{3}$ of a job in 2 hours. How many hours will it take to complete the entire job?

- A. 2 hours

- B.** 3 hours
- C.** 5 hours
- D.** 6 hours
- E.** $\frac{2}{3}$ hours

30. 5 pounds of apples cost \$7.50. How much do 3 pounds of apples cost?

- A.** \$4.50
- B.** \$5.00
- C.** \$2.50
- D.** \$3.00
- E.** \$1.50

Answer Key

1. A

- *Explanation:* Distribute the negative sign: $2x^2 - 5x + 3 - x^2 - x + 2$.
- Combine like terms: $(2x^2 - x^2) + (-5x - x) + (3 + 2) = x^2 - 6x + 5$.

2. B

- *Explanation:* Distribute the 2: $6a - 2b$. Distribute the 3: $3a - 6b$.
- Combine results: $(6a + 3a) + (-2b - 6b) = 9a - 8b$.

3. C

- *Explanation:* Distribute $4x$: $4x^2 - 4x$. Distribute $-x$: $-x^2 - 2x$.
- Combine results: $(4x^2 - x^2) + (-4x - 2x) = 3x^2 - 6x$.

4. A

- *Explanation:* $(-3)^2 = 9$. $(\frac{1}{2})^3 = \frac{1^3}{2^3} = \frac{1}{8}$.
- Add: $9 + \frac{1}{8} = 9\frac{1}{8}$.

5. A

- *Explanation:* $64^{\frac{1}{3}} = \sqrt[3]{64} = 4$.
- $25^{\frac{3}{2}} = (\sqrt{25})^3 = (5)^3 = 125$.
- Add: $4 + 125 = 129$.

6. A

- *Explanation:* Apply the power (-3) to each factor: $2^{-3} = \frac{1}{8}$. $(a^{-2})^{-3} = a^6$. $(b^3)^{-3} = b^{-9}$.
- Result is $\frac{1}{8}a^6b^{-9} = \frac{a^6}{8b^9}$.

7. A

- *Explanation:* Apply the power (2) to the first term: $(4x^3y^{-1})^2 = 16x^6y^{-2}$.
- Multiply by the second term: $(16x^6y^{-2})(x^{-2}y^3)$.
- Combine: $16 \cdot x^{6+(-2)} \cdot y^{-2+3} = 16x^4y^1 = 16x^4y$.

8. C

- *Explanation:* Apply the power (3) to the numerator: $(a^2b^{-3})^3 = a^6b^{-9}$.
- Divide by the denominator: $\frac{a^6b^{-9}}{a^5b^{-10}}$.
- Subtract exponents: $a^{6-5}b^{-9-(-10)} = a^1b^{-9+10} = a^1b^1 = ab$.

9. C

- *Explanation:* $\sqrt{16} = 4$. $\sqrt{x^{16}} = x^{16/2} = x^8$. $\sqrt{y^4} = y^{4/2} = y^2$.
- Result: $4x^8y^2$.

10. A

- *Explanation:* $\sqrt{36} = 6$. $\sqrt{m^8} = m^{8/2} = m^4$. $\sqrt{n^{14}} = n^{14/2} = n^7$. $\sqrt{p^2} = p^{2/2} = p$.

- Result: $6m^4n^7p$.

11. A

- *Explanation:* Common denominator is $x(x + 1)$.
- $\frac{3}{x+1} \cdot \frac{x}{x} = \frac{3x}{x(x+1)}$.
- $\frac{2}{x} \cdot \frac{x+1}{x+1} = \frac{2(x+1)}{x(x+1)} = \frac{2x+2}{x^2+x}$.
- Subtract numerators: $\frac{3x-(2x+2)}{x^2+x} = \frac{3x-2x-2}{x^2+x} = \frac{x-2}{x^2+x}$.

12. A

- *Explanation:* Common denominator is $(m - 3)(m + 3) = m^2 - 9$.
- $\frac{m}{m-3} \cdot \frac{m+3}{m+3} = \frac{m(m+3)}{m^2-9} = \frac{m^2+3m}{m^2-9}$.
- $\frac{1}{m+3} \cdot \frac{m-3}{m-3} = \frac{1(m-3)}{m^2-9} = \frac{m-3}{m^2-9}$.
- Add numerators: $\frac{(m^2+3m)+(m-3)}{m^2-9} = \frac{m^2+4m-3}{m^2-9}$.

13. B

- *Explanation:* Substitute values: $4(4 - 2(1))$.
- Simplify inside parenthesis: $4(4 - 2) = 4(2)$.
- Multiply: 8.

14. D

- *Explanation:* Substitute values: $\frac{5^2-2^2}{5-2} = \frac{25-4}{3}$.
- Simplify numerator: $\frac{21}{3}$.
- Divide: 7.

15. C

- *Explanation:* Divide by 5: $x + 1 = 6$.
- Subtract 1: $x = 5$.

16. B

- *Explanation:* Subtract 2: $\frac{3}{5}x = 6$.
- Multiply by reciprocal $\frac{5}{3}$: $x = 6 \cdot \frac{5}{3} = \frac{30}{3} = 10$.

17. C

- *Explanation:* Subtract $4y$: $5y - 5 = 10$.
- Add 5: $5y = 15$.
- Divide by 5: $y = 3$.

18. A

- *Explanation:* Substitute $y = x - 2$ into the second equation: $x + 2(x - 2) = 11$.
- Distribute: $x + 2x - 4 = 11$. Combine terms: $3x - 4 = 11$.
- Add 4: $3x = 15$. Divide by 3: $x = 5$.
- Find y : $y = 5 - 2 = 3$. Solution is $(5, 3)$.

19. A

- *Explanation:* Use elimination. Add the two equations: $(2x - 3y) + (x + 3y) = 4 + 5$.
- Combine terms: $3x = 9$. Divide by 3: $x = 3$.
- Substitute $x = 3$ into $x + 3y = 5$: $3 + 3y = 5 \rightarrow 3y = 2 \rightarrow y = \frac{2}{3}$.
- Solution is $(3, \frac{2}{3})$.

20. D

- *Explanation:* Substitute $x = 3y + 1$ into the second equation: $2(3y + 1) - 6y = 3$.
- Distribute: $6y + 2 - 6y = 3$.
- Combine y terms: $2 = 3$. This is a false statement, so there is no solution.

21. B

- *Explanation:* Divide by 4: $x - 1 > 2$.
- Add 1: $x > 3$.

22. D

- *Explanation:* Subtract 12: $-3x \geq 6$.
- Divide by -3 . **Flip the inequality sign.**
- $x \leq \frac{6}{-3} \rightarrow x \leq -2$.

23. B

- *Explanation:* Find two numbers that multiply to 21 and add to -10 . The numbers are -3 and -7 .
- Factored form: $(x - 3)(x - 7) = 0$.
- Set factors to zero: $x = 3$ and $x = 7$.

24. B

- *Explanation:* Set to zero: $3x^2 - 11x - 4 = 0$.
- Factor by grouping. $a \cdot c = -12$. $b = -11$. Numbers are -12 and 1 .
- Rewrite: $3x^2 - 12x + 1x - 4 = 0$.
- Group: $3x(x - 4) + 1(x - 4) = 0$.
- Factored form: $(3x + 1)(x - 4) = 0$.
- Set factors to zero: $x = 4$ and $x = -\frac{1}{3}$.

25. B

- *Explanation:* Divide by 5: $x^2 - 9 = 0$.
- Add 9: $x^2 = 9$.
- Take the square root: $x = \pm\sqrt{9} \rightarrow x = 3$ and $x = -3$.

26. A

- *Explanation:* GCF of 15, 10 is 5. GCF of x^4, x^3 is x^3 . GCF of y^2, y^3 is y^2 .
- Overall GCF is $5x^3y^2$.
- Factor it out: $5x^3y^2(3x) - 5x^3y^2(2y) = 5x^3y^2(3x - 2y)$.

27. C

- *Explanation:* This is a difference of squares: $(x)^2 - (7y)^2$.
- Factored form: $(x - 7y)(x + 7y)$.

28. A

- *Explanation:* Factor by grouping. $a \cdot c = -15$. $b = 14$. Numbers are 15 and -1 .
- Rewrite: $5x^2 + 15x - 1x - 3 = 0$.
- Group: $5x(x + 3) - 1(x + 3) = 0$.
- Factored form: $(5x - 1)(x + 3)$.

29. D

- *Explanation:* If $\frac{1}{3}$ of the job takes 2 hours, the full job (which is $\frac{3}{3}$) will take 3 times as long.
- $2 \text{ hours} \cdot 3 = 6 \text{ hours}$.

30. A

- *Explanation:* Find the cost per pound: $\$7.50 \div 5 \text{ lbs} = \1.50 per pound .
- Multiply by the desired amount: $3 \text{ lbs} \cdot \$1.50/\text{lb} = \4.50 .