

## Fundamentals of Algebra Sample Final Exam

This final exam contains 30 questions. Twenty of the questions are multiple choice and ten are open-ended. This is an in-class, closed book exam. A scientific calculator is allowed.

1. Solve:  $2(3x - 3) = 3x - 12$

A)  $x = -2$

B)  $x = -18$

C)  $x = -6$

D)  $x = -3$

2. The sum of the three angles of a triangle is  $180^\circ$ . Two angles of a triangle measure  $19^\circ$  and  $79^\circ$ . What is the measure of the third angle?

3. Divide:  $\frac{y^3 + 2y^2 + 4y - 7}{y - 1}$

4. Two planes, which are 1905 miles apart, fly toward each other. One plane is flying at a speed 35 mph faster than the other. If they pass each other in 3 hours, what is the speed of each?

5. Solve for  $w$ :  $V = lwh$

A)  $w = \frac{V}{wh}$

B)  $w = \frac{V}{lh}$

C)  $w = \frac{V}{h}$

D)  $w = Vlh$

6. Compute:  $\frac{-7}{8} \cdot \frac{10}{3} \cdot \frac{11}{5}$

7. Perform the indicated operation and reduce your answer to lowest terms:  $\frac{3x^2}{x^2 - 4} + \frac{4}{x + 2}$

A)  $\frac{3x^2 + 4x - 8}{2x^2 - 8}$

B)  $\frac{3x^2 + 4}{x^2 - 4}$

C)  $\frac{3x^2 + 4x - 8}{x^2 - 4}$

D)  $\frac{3x^2 + 4x - 8}{x^2 + x - 2}$

8. Find the product:  $(x + 6y)^2$

A)  $x^2 - 12xy + 36y^2$

B)  $x^2 - 36y^2$

C)  $x^2 + 12xy + 36y^2$

D)  $x^2 + 36y^2$

9. Multiply:  $(x^3y)(6xy^2)$

10. Factor completely. If the polynomial cannot be factored, write "Not factorable."

$$2x^2 - 16x + 24$$

11. After an 11% discount from the list price, the sale price of a key chain was \$15.13. What was the list price of the key chain?

12. Compute:  $\frac{8x}{5y} \div 0$

A) 0

B)  $\frac{8x}{5y}$

C) Undefined

D)  $\frac{5y}{8x}$

13. Perform the indicated operation and simplify:  $(2x^2 + 9) - (-8x^2 + 6x + 2)$

- A)  $-6x^2 + 11 + 6x$     B)  $10x^2 - 6x + 7$     C)  $10x^2 + 6x + 7$     D)  $10x^2 + 6x - 7$

14. Solve:  $15v - 14v = 16 - 14$

- A)  $v = 0.07$     B)  $v = 30$     C)  $v = 2$     D)  $v = -2$

15. Factor completely. If the polynomial cannot be factored, write "Not factorable."

$$3x^2 + 13x + 4$$

16. Solve:  $-5x = \frac{-1}{5}$

- A)  $x = 1$     B)  $x = 25$     C)  $x = \frac{1}{25}$     D)  $x = \frac{-1}{25}$

17. Divide:  $\frac{-8x^2 + 4x - 7}{-4x}$

18. Translate the phrase into an algebraic expression (not simplified). Use the variable names 'x' or 'y' to describe the unknowns.

two less than a number

19. Solve:  $8.8w - 7.8w + 8.6 = 5.3$

- A)  $w = -0.2$     B)  $w = 13.9$     C)  $w = 3.3$     D)  $w = -3.3$

20. Multiply:  $(-2x - 2)(-2x^2 + 4x + 4)$

- A)  $-4x^3 - 2x^2 + 4x + 2$     B)  $-7x^3 + 3x^2 - 4x - 8$   
 C)  $4x^3 - 4x^2 - 16x - 8$     D)  $4x^3 - 4x^2 - 16x - 8x^3$

21. Compute:  $\frac{1}{9} + \frac{3}{5} - \frac{1}{10}$

- A)  $\frac{11}{18}$     B)  $\frac{-7}{18}$     C)  $\frac{3}{4}$     D)  $\frac{-53}{90}$

22. Perform the indicated operation and reduce your answer to lowest terms:  $\frac{-9x - 8}{x - 6} + \frac{2x + 3}{x - 6}$

- A)  $\frac{-7x - 5}{x - 6}$     B)  $\frac{-7x - 5}{x^2 - 12x + 36}$     C)  $\frac{-7x - 5}{2x - 12}$     D)  $\frac{-7x - 5}{2x}$

23. Simplify:  $3^{-2}$

- A)  $\frac{1}{9}$     B) 9    C) -9    D)  $-\frac{1}{9}$

24. Two investments totaling \$40,000 produce an annual income of \$3085. One investment yields 8% a year, while the other yields 7% per year. How much is invested at each rate?

25. Solve and graph the solution set:  $-2(3z - 5) \leq 2z - 14$

26. A real estate agent works on a 9% commission. What is her commission on a house that she sold for \$581,900? Round your answer to the nearest cent.

27. Solve:  $\frac{-3}{4} \left( z - \frac{1}{6} \right) = \frac{-3}{8} \left( z + \frac{1}{5} \right)$

28. Factor completely. If the polynomial cannot be factored, write "Not factorable."

$$x^2 + 13x + 42$$

29. The sum of three consecutive integers is -345 . Find the three integers.

30. Factor completely:  $64y^3 + x^3$

31. Reduce the fraction to its simplest form:  $\frac{36y}{24yx}$

32. Simplify:  $\left( \frac{5xy^2}{y} \right)^3$

A) 125

B)  $15x^3y^3$

C)  $125x^3y^3$

D)  $\frac{125x^3y^5}{y^3}$

33. Solve:  $2w + 14 = -2(-w - 7)$

34. Perform the indicated operation and simplify:  $\frac{6a}{3b^2} \div \frac{24b}{9a}$

A)  $\frac{3a^2}{4b^3}$

B)  $\frac{14ab}{27b^2a}$

C)  $\frac{3a^2}{4b^2}$

D)  $\frac{-5a^2}{-2b^3}$

35. Factor completely. If the polynomial cannot be factored, write "Not factorable."

$$ar + au + ry + uy$$

36. Solve:  $7v + 6 = -8$

37. Evaluate the expression at  $x = 4$  ,  $y = -3$  and simplify your answer.

$$5x^2 - 5y^2 + 5$$

A) 310

B) 40

C) 120

D) 360

38. Perform the indicated operation and simplify:  $\frac{z^2 - 9z + 18}{z + 6} \cdot \frac{z + 6}{z^2 + 5z - 24}$

39. Simplify:  $\frac{x^3 \cdot x^{-2}}{x^6}$

- A)  $x$                       B)  $\frac{1}{x^3}$                       C)  $\frac{1}{x^7}$                       D)  $\frac{1}{x^5}$

40. Multiply:  $(3x - 2)(2x + 2)$

- A)  $6x^2 + 2x - 4x^2$                       B)  $5x^2 + 2x - 4$   
 C)  $6x^2 + 2x - 4$                       D)  $6x^2 - 4$

41. Compute:  $\frac{-2}{35} \div \frac{9}{20}$

- A)  $\frac{8}{63}$                       B)  $\frac{-9}{350}$                       C)  $\frac{-8}{63}$                       D)  $\frac{-63}{8}$

42. Simplify:  $-6 + [-12 \div (6 - 1 \cdot 4)]$

- A)  $-16$                       B)  $-5.83333$                       C)  $12$                       D)  $-12$

43. Simplify:  $(-10) \cdot (-1) + (4 + 3)^2$

- A)  $-59$                       B)  $289$                       C)  $-120$                       D)  $59$

44. Solve. Express the solution as an interval.  $-12 \leq \frac{5}{2}x + 3 \leq -2$

45. Solve the following inequality and graph the solution set:  $-3z \geq -9$

46. When \$0.55 tax was added to the price of a game, the total bill came to \$7.04. What was the price of the game?

47. Simplify:  $7 + 4^2 \div (3 - 5) \cdot 3$

48. Simplify:  $\frac{2 + \frac{3}{x}}{2 - \frac{5}{x^2}}$

49. Simplify:  $-3(x + 2) - 3(y + 2)$

50. Factor completely:  $-2xy^2 - 6x^2 - 4x$

- A)  $-2x$                       B)  $y^2 + 3x + 2$   
 C)  $-2x(y^2 + 3x + 2)$                       D)  $-2x(-y^2 - 3x + 2)$

51. Factor completely. If the polynomial does not factor, write "not factorable".

$$25x^2 - 4$$

52. 26 less than three times a number is equal to the number. What is the number?