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°. Two angles of a triangle measure 19° and 79°. What is the measure of the third angle?

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

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) $w = \dfrac{V}{wh}$ B) $w = \dfrac{V}{lh}$ C) $w = \dfrac{V}{h}$ 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: $\dfrac{3x^2}{x^2-4} + \dfrac{4}{x+2}$

   A) $\dfrac{3x^2+4x-8}{2x^2-8}$ B) $\dfrac{3x^2+4}{x^2-4}$ C) $\dfrac{3x^2+4x-8}{x^2-4}$ D) $\dfrac{3x^2+4x-8}{x^2+x-2}$

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: $\dfrac{8x}{5y} \div 0$

    A) 0 B) $\dfrac{8x}{5y}$ C) Undefined D) $\dfrac{5y}{8x}$

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: $\dfrac{-8x2 + 4x - 7}{-4x}$

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: $\dfrac{-9x - 8}{x - 6} + \dfrac{2x + 3}{x - 6}$

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

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: $\dfrac{36y}{24yx}$

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

A) 125 B) $15x^3y^3$ C) $125x^3y^3$ D) $\dfrac{125x^3y^5}{y^3}$

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

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

A) $\dfrac{3a^2}{4b^3}$ B) $\dfrac{14ab}{27b^2a}$ C) $\dfrac{3a^2}{4b^2}$ D) $\dfrac{-5a^2}{-2b^3}$

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: $\dfrac{z^2-9z+18}{z+6}\cdot\dfrac{z+6}{z^2+5z-24}$

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

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

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: $-6+[-12\div(6-1\cdot4)]$

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. $-12\le\frac{5}{2}x+3\le-2$

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

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: $7+4^2\div(3-5)\cdot3$

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

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?