



2023-2024

Unit 4 Test Review

SCORE:

/

Name _____ Period _____ Date _____

Solve each equation. Show all of your work. Leave answers as fractions. Find any restrictions.
Write any extraneous answers.

1. $|3x + 7| - 10 = -4$

2. $2x - 5 = 1 + 4(3x - 1)$

3. $\frac{1}{3}|-x + 4| - 8 = 12$

4. $3(2x - 6) = 4x + 10$

5. $3x^2 - 7x - 6 = 0$

6. $2x^3 - 5 = 49$

7. $0 = x^2 - 2$

8. $0 = x^3 - 3x^2 - 28x$

9. $(x + 3)^2 - 8 = 41$

10. $-x^2 - 8x - 2 = 3$

11. $(25x^2 - 36)(x - 6) = 0$

12. $\sqrt{x-3} - 7 = 0$

$$13. 4 + \sqrt[3]{x+41} = 5$$

$$14. \sqrt[4]{2x+9} - 3 = 0$$

$$15. -2\sqrt{x-4} + 3 = -2$$

$$16. \sqrt{3x+7} + 1 = x$$

$$17. 3(x-5)^{\frac{2}{3}} = 48$$

$$18. 4 + (x+1)^{\frac{3}{2}} = 12$$

$$19. (x+3)^{\frac{1}{2}} - 1 = x$$

$$20. (x-4)^{\frac{2}{3}} = 5$$

$$21. 3(x-2)^{\frac{3}{4}} = 24$$

Solve each equation by factoring using substitution. Leave answers as exact solutions, no rounding.

22. $15x^{10} - x^5 = 2$

23. $(2x - 5)^2 - 2(2x - 5) - 24 = 0$

24. $x^{\frac{2}{3}} - 6x^{\frac{1}{3}} + 9 = 0$

25. $x - 3\sqrt{x} - 4 = 0$

Solve for the specified variable.

26. $y = \frac{1}{3}x - 6$ (solve for x)

27. $Z = \sqrt{R^2 + (X_L - X_C)^2}$ solve for R

28. $y = \frac{xz}{x-2}$ (solve for z)

29. $g + \frac{cx}{d} - f = b$ (solve for x)

30. $h = \frac{v_0^2 y}{2g}$ solve for y

31. $Q = \frac{P_2 - P_1}{R}$ solve for R

$$32. y = \frac{3x-4}{5x-11} \quad (\text{solve for } x)$$

$$33. y = \frac{x+h}{x-a} \quad (\text{solve for } x)$$

Find the inverse and domain of each function. Show work.

$$34. f(x) = 2x - 3$$

$$35. f(x) = \frac{x^3-2}{4}$$

$$36. f(x) = \sqrt{x+3}$$

$$37. f(x) = 2(x+2)^2 - 3$$

$$38. f(x) = -\sqrt[3]{3x} + 5$$

39. Write the domain of the $f(x)$. Find the inverse of $f(x)$. Then state the domain of $f^{-1}(x)$.

$$f(x) = \frac{3x+5}{2x-1}$$

Domain of $f(x)$: _____

$f^{-1}(x) =$ _____

Domain of $f^{-1}(x)$: _____

Find the indicated composition function and its domain, using the given functions. Show work!

40. $f(x) = 2x^2 + 1$

$g(x) = 3x - 4$

a) $h(x) = (f \circ g)(x)$

b) $h(x) = (g \circ f)(x)$

Evaluate each composition function using the given functions.

41. $f(x) = 2x^2 + 1$

$g(x) = 3x - 4$

a) $h(x) = (f \circ f)(2)$

b) $h(x) = (f \circ g)(-1)$

42. Find $(f \circ g)(x)$. Then find the domain of $(f \circ g)(x)$

$f(x) = \sqrt{x + 2}$ $g(x) = 2x^2 + 1$

43. $f(x) = \frac{x+1}{x-2}$ $g(x) = \frac{1}{x}$ Find the domain of $f \circ g$.

Read and solve the following situations. Be sure to define your variable and show all your work.

44. Amelia runs a catering business. Based on her records, her weekly profit can be approximated by $P = 2x^2 - 44x - 150$, where x is the number of meals she caters and P is her profit. When P is negative, Amelia has lost money. How many meals must Amelia cater to break even (this means she has not lost money, but she has not gained money either). Round to the nearest meal.

45. The area of a rectangle is 40 square meters. If the length is 6 meters more than the width, what is the width? Remember the formula for area of a rectangle is length times width.

46. You want to create a garden with a sidewalk around it. The garden is 10 feet by 15 feet. What should the width of the sidewalk be if the area of the garden and the sidewalk is 336 square feet?