Name: Due Date: Teacher: Parent Sign:

Answers

1. Undefined.

2. 0.

3. Indeterminate ($\frac{0}{0}$).

4. Undefined.

5. 0.

6. Undefined (denominator = 0).

7. 0.

8. $\frac{0}{0} \rightarrow$ indeterminate (expression undefined at x = 0).

9. Undefined ($\frac{9}{0}$).

10. 0.

11. False.

12. True.

13. Indeterminate.

14. Undefined.

15. (x + 2)/(x + 2) at x = -2 gives $\frac{0}{0} \rightarrow$ indeterminate; the expression is undefined at x = -2.

16. x = 0 ($\frac{1}{x}$ is undefined at x = 0).

17. x = -5.

18. x = 3 (gives $\frac{0}{0}$ at x = 3; the expression is undefined there).

19. x = 2 (undefined there; gives $\frac{0}{0}$).

20. x = 0 (denominator $x^2 = 0$ when x = 0).

21. x + 1 = 3(x - 2) $\rightarrow$ x + 1 = 3x - 6 $\rightarrow$ -2x + 7 = 0 $\rightarrow$ x = $\frac{7}{2}$. Excluded: x   2.

22. For x   0, (2x)/x = 2, so 2 = 4 is false $\rightarrow$ no solution. x = 0 is excluded (division by zero).

23. Simplifies to x + 1, but at x = 1 the original fraction is $\frac{0}{0}$ so it is undefined (indeterminate at x = 1).

24. Mathematically undefined (division by zero has no meaning).

25. 0.

26. No — $\frac{0}{0}$ is indeterminate (not a well-defined number).

27. Undefined (division by zero).

28. x^2 - 4 = 0 $\rightarrow$ x = 2 or x = -2 (undefined at ±2).

29. Denominator x^2 - 16 = (x - 4)(x + 4) $\rightarrow$ undefined at x = 4 and x = -4. Note: at x = 4 the numerator is 0 too ($\frac{0}{0}$ indeterminate), at x = -4 it's $\frac{nonzero}{0}$ (undefined).

30. $\frac{0}{x} = 0$ for all nonzero real x. It is undefined when x = 0.

31. Zero.

32. No. Although algebraic simplification gives x + 3, the original fraction at x = 3 is $\frac{0}{0}$ (indeterminate) and thus undefined there.

33. False — canceling is only valid for values that do not make the denominator zero; you cannot remove a value that makes the denominator 0 without noting the expression is undefined there.

34. x = 1.

35. All real numbers except x = 0 (for x ≠ 0, $\frac{x}{x} = 1$).

36. 0 ÷ (-0) is $\frac{0}{0}$ → indeterminate.

37. False.

38. 0 (-0 is the same as 0).

39. No — it is undefined at x = 1 ($\frac{0}{0}$).

40. x = 0 (denominator is x).

41. (2x - 2)/(x - 1) = 2 for x ≠ 1, but the expression is undefined at x = 1 (would be $\frac{0}{0}$ if plugged in).

42. $\frac{0}{0}$ is indeterminate; $\frac{5}{0}$ is undefined.

43. 0 ÷ 1 = 0.

44. (a) If a ≠ 0 and b = 0 then $\frac{a}{0}$ is undefined (no real value). (b) If a = 0 and b = 0 then $\frac{0}{0}$ is indeterminate.

45. Denominator x^2 + x - 6 = (x + 3)(x - 2) → excluded x = -3 and x = 2.

46. $(x^2$ - 5x + 6)/(x - 2) = (x - 2)(x - 3)/(x - 2) → simplifies to x - 3 for x ≠ 2; the original expression is undefined at x = 2 ($\frac{0}{0}$).

47. $\frac{1}{0}$ = undefined (not a real number).

48. 0.

49. k = 1.

50. No — division by zero does not produce a real number (it is undefined; $\frac{0}{0}$ is indeterminate).