Pre-Calculus

Chapter 1 Test Review

Name_____

Express the inequality using interval notation.

1. $-2 < x \leq 9$
2. $x \geq -3$
3. $x < 5$

Express the interval in terms of inequalities.

4. $[-5, 1)$
5. $(-\infty, 6]$
6. $(-1, 3)$

Simplify the expression.

7. $\frac{(x^2y^3)^4(xy^4)^{-3}}{x^2y}$
8. $(3xy^2)^3\left(\frac{2}{3}x^{-1}y\right)^2$
9. $(3ab^2c)\left(\frac{2a^2b}{c^3}\right)^{-2}$

10. $\left(\frac{9x^3y}{y^{-3}}\right)^{\frac{1}{2}}$
11. $\left(-2a^{\frac{3}{4}}\right)\left(5a^{\frac{3}{2}}\right)$
12. $\left(c^{\frac{1}{2}}d^3\right)^{-\frac{1}{3}}$

Factor completely.

13. $9x^2 - 36x - 45$
14. $2x^2 + 5x + 3$
15. $x^6 - y^3$

16. $x^3 - x^2 - 4x + 4$
17. $x^{\frac{5}{2}} - 2x^{\frac{3}{2}} - 3x^{\frac{1}{2}}$
18. $x^4 - 12x^2 + 27$

19. $\sin^2 x + 2\sin x - 15$
20. $2(x-3)^2 + (x-3) - 1$

21. $2(6x)(x-5)^4 - 6(6x)^2(x-5)^3$

Find the domain of the expression. Give your answer in interval notation.

22. $x^2 + 6$

23. $\sqrt{6 - x}$

24. $\frac{x}{x+3}$

Simplify the rational expression.

25. $\frac{x^2-x-6}{x^2+2x} \cdot \frac{x^3+x^2}{x^2-2x-3}$

26. $\frac{x^2-2x-15}{x^2-6x+5} \div \frac{x^2-x-12}{x^2-1}$

27. $\frac{3}{x} + \frac{5}{x+1}$

28. $\frac{1}{x+1} - \frac{1}{x+2}$

29. $\frac{x}{x^2-4} + \frac{1}{x-2}$

30. $\frac{\frac{x}{y} - \frac{y}{x}}{\frac{1}{x^2} - \frac{1}{y^2}}$

Find all real solutions. For #35 & 36, write your answer in interval notation.

31. $2x^2 + 7x = -3$

32. $5x^2 - 7x + 5 = 0$

33. $\frac{4}{x-1} + \frac{2}{x+1} = \frac{35}{x^2-1}$

34. $x^{\frac{3}{2}} + 3x^{\frac{1}{2}} - 10x^{-\frac{1}{2}} = 0$

35. $x^2 - 2x - 8 > 0$

36. $x^2 \leq 9$

Find the equation of a line that satisfies the given conditions.

37. Through (-1, -2) and (4, 3)

38. Through (4, 5) and **parallel** to the line 2x + y = 5

39. Through (-1, 3) and **perpendicular** to the line x + 2y = 4

Answers

1. $(-2, 9]$
2. $[-3, \infty)$
3. $(-\infty, 5)$
4. $-5 \leq x < 1$
5. $x \leq 6$
6. $-1 < x < 3$
7. $\frac{x^3}{y}$
8. $12xy^8$
9. $\frac{3c^7}{4a^3}$
10. $3x^{\frac{3}{2}}y^2$
11. $-10a^{\frac{9}{4}}$
12. $\frac{1}{c^{\frac{1}{6}}d}$
13. $9(x-5)(x+1)$
14. $(2x+3)(x+1)$
15. $(x^2-y)(x^4+x^2y+y^4)$
16. $(x-1)(x+2)(x-2)$
17. $x^{\frac{1}{2}}(x-3)(x+1)$
18. $(x^2-3)(x+3)(x-3)$
19. $(\sin x + 5)(\sin x - 3)$
20. $(2x-7)(x-2)$
21. $12x(x-5)^3(-17x-5)$
22. $(-\infty, \infty)$
23. $(-\infty, 6]$
24. $(-\infty, -3)U(-3, \infty)$
25. x
26. $\frac{x+1}{x-4}$
27. $\frac{8x+3}{x(x+1)}$
28. $\frac{1}{(x+1)(x+2)}$
29. $\frac{2(x+1)}{(x+2)(x-2)}$
30. $-xy$
31. $x = \frac{-1}{2}, -3$
32. No Real Solutions
33. $x = \frac{11}{2}$
34. $x = -5, 2$
35. $(-\infty, -2)U(4, \infty)$
36. $[-3, 3]$
37. $y = x - 1$
38. $y = -2x + 13$
39. $y = 2x + 5$