

SHOW ALL WORK. If no or insufficient work is shown then no credit will be given. If answers are irrational numbers give them in their exact form NOT decimal approximations.

Simplify the rational expressions:

$$1. \frac{x^2 - 25}{5 - x} \qquad 2. \frac{x^2 - 9}{x^3 + x^2 - 9x - 9}$$

Perform the indicated operations. Leave answers in simplest form.

$$3. \frac{x^2 + 2x - 3}{x^2 + 8x + 16} \cdot \frac{3x + 12}{x - 1} \qquad 4. \frac{x - 4}{x^2 - 4} \div \frac{x^2 - 3x - 4}{x^2 + 5x + 6} \qquad 5. \frac{3}{x - 1} + \frac{x}{x + 2}$$

$$6. \frac{1}{x^2 - 1} - \frac{2}{(x + 1)^2} \qquad 7. \frac{2}{x} + \frac{3}{x - 1} - \frac{4}{x^2 - x}$$

Simplify the compound fraction. Leave answers in simplest form.

$$8. \frac{\frac{x}{y} + 1}{1 + \frac{y}{x}} \qquad 9. \frac{\frac{1}{a + h} - \frac{1}{a}}{h} \qquad 10. \frac{(1 + x^2)^{\frac{1}{2}} - x^2(1 + x^2)^{-\frac{1}{2}}}{1 + x^2}$$

$$11. \text{Solve the equation: } x - \frac{1}{3}x - \frac{1}{2}x - 5 = 0$$

$$12. \text{Solve the equation: } \frac{4}{x - 1} + \frac{2}{x + 1} = \frac{25}{x^2 - 1}$$

$$13. \text{Solve by factoring: } 2x^2 = 19x + 33$$

$$14. \text{Solve by completing the square, leave answer in simplest form: } x^2 - 4x + 2 = 0$$

$$15. \text{Solve by completing the square, leave answer in simplest form: } 2x^2 + 8x + 1 = 0$$

$$16. \text{Solve by using the quadratic formula, leave answer in simplest form: } 2x^2 - 6x + 1 = 0$$

$$17. \text{Solve the equation by method of your choice: } 9x^4 + 16x^2 = 24x^3$$

$$18. \text{Solve the equation: } \sqrt{6x + 1} = x - 1$$

$$19. \text{Solve the equation: } (x - 1)^{\frac{1}{2}} - (x - 1)^{\frac{3}{2}} = 0$$

$$20. \text{Solve the equation: } 4 \left| 1 - \frac{3}{4}x \right| + 7 = 10$$

Solve the following inequalities. Write solution in interval form.

$$21. -16 \leq 7 - 2x \leq 5 \qquad 22. |3x - 1| > 2 \qquad 23. |4x + 3| \leq 5$$