

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.

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

24. Find the center and radius for the circle with equation $x^2 + (y+5)^2 = 8$
25. Write the equation of a circle in standard form that has the points (3,9) and (7, 11) as endpoints of the diameter.
26. Use algebra to determine if the following is symmetric with respect to the x axis, y axis or the origin, or none of those: $xy^2 + 10 = 0$
27. The equation of a line is $2x - 5y = 13$ find the following:
- the x intercept
 - the y intercept
 - the slope of the line
 - the equation of the line perpendicular to the line that passes through $(-1, 3)$.
Leave your answer in slope intercept form.
28. Write the equation of the line given the following information. Leave answers in slope intercept form, when possible.
- passes through the points $(3, 2)$ and $(-2, 8)$
 - the slope is undefined and it passes through $(3, -2)$
 - $m = 0$ and it passes through $(3, -2)$