Use Algebraic Notation AND Show All of Your Work

Find all numbers for which each rational expression is undefined. If the rational expression is defined for all real numbers, so state.

[8 pts]

1. $\dfrac{7x+1}{4x-16}$

Ans:_____

[12 pts]

2. $\dfrac{x-4}{2x^2+x-3}$

Ans:_____

Simplify each rational expression.

[12 pts]

3. $\dfrac{y^2+3y}{y^2-y-12}$

Ans:_____

[14 pts]

4. $\dfrac{x^2-2x-15}{x^2-9}$

Ans:_____

[14 pts]

5. $\dfrac{3x^2 - 2x}{8 - 12x}$

Ans:_____

Perform the indicated operations. Simplify your answer if possible.
[21 pts]

6. $\dfrac{x^2 - 8x + 16}{2x - 8} \bullet \dfrac{x^2 - 2x - 24}{x^2 - 16}$

Ans:_____

[24 pts]

7. $\dfrac{x^2 - 3xy + 2y^2}{2xy + 2y^2} \div \dfrac{x^2 + 5xy - 14y^2}{8x + 8y}$

Ans:_____

[16 pts]

8. $\dfrac{3y + 5}{4y - 8} - \dfrac{5 - y}{4y - 8}$

Ans:_____

[16 pts]

9. $\dfrac{9x-1}{3x-2} + \dfrac{6x-2}{2-3x}$

Ans:_____

[24 pts]

10. $\dfrac{y^2-16}{y^2+9y+18} - \dfrac{y-4}{y+6}$

Ans:_____

[28 pts]

11. $\dfrac{x+1}{3x^2-5x-2} - \dfrac{x-1}{2x^2-5x+2}$

Ans:_____

[16 pts]

12. $\dfrac{\dfrac{3}{8}+\dfrac{1}{16}}{\dfrac{1}{2}-\dfrac{1}{4}}$

Ans:_____

[20 pts]

13. $\dfrac{\dfrac{12}{x}+3}{1-\dfrac{16}{x^2}}$

Ans:_____

Solve each equation. State the solution set.
[24, 3 pts]

14. $\dfrac{x-3}{x}=\dfrac{5}{x+4}$

Solution Set:_____

[27, 3 pts]

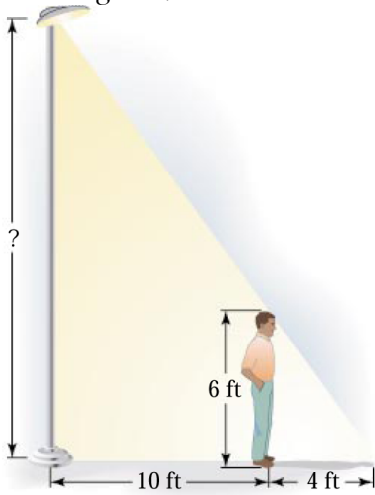15. $\dfrac{6}{x+4} - \dfrac{5}{x+2} = \dfrac{-20}{x^2+6x+8}$

Solution Set:_____

[27, 3 pts]

16. $\dfrac{1}{y-1} + \dfrac{2}{y} = \dfrac{y}{y-1}$

Solution Set:_____

[2, 9, 13, 2 pts]
17. A person who is 6 feet tall is standing 10 feet from the base of a lamppost. The person's shadow has a length of 4 feet How tall is the lamppost? *(Define a variable, create an equation, solve using algebra, and answer in a sentence.)*

?

6 ft

10 ft   4 ft

Ans:_____

[6, 2, 9, 18, 2 pts]
18. In still water, a boat averages 20 miles per hour. It takes the boat the same amount of time to travel 72 miles downstream, with the current, as 48 miles upstream, against the current. What is the rate of the river's current? *(Set-up an organizational chart structure, define a variable, create an equation, solve using algebra, and answer in a sentence.)*

Ans:_____

[7, 2, 9, 16, 2 pts]
19. A painter can paint a fence around a house in 6 hours. Working alone, the painter's apprentice can paint the same fence in 12 hours. How many hours would it take them to do the same job if they worked together? *(Set-up an organizational chart structure, define a variable, create an equation, solve using algebra, and answer in a sentence.)*

Ans:_____

[2, 9, 13, 2 pts]
20. To determine the number of trout in a lake, a conservationist catches 112 trout, tags them, and returns them to the lake. Later, 82 trout are caught and 32 of them are found to be tagged. How many trout are in the lake? *(Define a variable, create an equation, solve using algebra, and answer in a sentence.)*

Ans:_____