

Unit 3: Rational Functions and Equations

ADVANCED · SET 2

Name: _____ Date: _____

Show all work and simplify each answer fully; check every solution against the domain and reject extraneous ones.

1. For $f(x) = (x^2 - 9)/(x^2 - 2x - 15)$, one factor cancels (a hole) and one produces a vertical asymptote. Give the equation of the vertical asymptote.

Answer: _____

3. Solve for x : $3/(x - 2) + 5/(x + 2) = 12/(x^2 - 4)$. If the only candidate is extraneous, answer 'no solution'.

Answer: _____

5. Solve $2/(x - 1) + 3/(x + 2) = 1$. The equation has two valid real solutions; give their sum.

Answer: _____

7. The graph of $f(x) = (x^2 - 7x + 12)/(x + 2)$ has two x -intercepts. Give the one with the greater x -value as an ordered pair.

Answer: _____

9. Simplify the complex fraction $(1/x - 1/3)/(x - 3)$, then evaluate the simplified expression at $x = 5$.

Answer: _____

11. Simplify $((x^2 - 4)/(x^2 + 6x + 9)) \div ((x - 2)/(x + 3))$, then evaluate the result at $x = 7$.

Answer: _____

2. Find the equation of the horizontal asymptote of $f(x) = (6x^2 - 5x + 2)/(3x^2 + 7x - 1)$.

Answer: _____

4. The graph of $f(x) = (x^2 - x - 6)/(x^2 - 9)$ has a hole. Give the coordinates of the hole as an ordered pair.

Answer: _____

6. Find the equation of the slant (oblique) asymptote of $f(x) = (2x^2 + 3x - 4)/(x - 1)$.

Answer: _____

8. The domain of $f(x) = (x + 5)/(2x^2 + x - 6)$ excludes exactly two values of x . Find the sum of those two excluded values.

Answer: _____

10. Solve $x/(x - 2) - 4/(x + 2) = 16/(x^2 - 4)$ for x , rejecting any extraneous root.

Answer: _____

12. The graph of $f(x) = (x^2 + 2x - 1)/(x^2 + 1)$ crosses its horizontal asymptote at exactly one point. Give the x -value where this crossing occurs.

Answer: _____