Name_____

Review - Rational Functions

Simplify each expression.

1) $\dfrac{x+6y}{15xy^2} - \dfrac{x+3y}{15xy^2}$

2) $\dfrac{2}{7} - \dfrac{6}{7p-3}$

3) $2 + \dfrac{n+3}{n^2+4n-5}$

4) $\dfrac{8b}{2b^2+b-3} + \dfrac{3}{8}$

5) $\dfrac{20}{5} \cdot \dfrac{8x}{18}$

6) $\dfrac{10}{19} \cdot \dfrac{4n^2}{13}$

7) $\dfrac{8a^2}{28a + 8} \div \dfrac{8}{28a + 8}$

8) $\dfrac{2v - 8}{2} \div \dfrac{v^2 + v - 20}{v + 7}$

9) $\dfrac{7n^2 - 64n - 60}{14n + 12} \cdot \dfrac{10n - 4}{5n^2 + 48n - 20}$

10) $\dfrac{x + 1}{20x - 40} \cdot \dfrac{20x - 40}{24x}$

11) $\dfrac{49k^2 - 35k - 24}{7k + 3} \div \dfrac{49k^2 - 91k + 40}{7k^2 + 2k - 5}$

Solve each equation. Remember to check for extraneous solutions.

12) $\dfrac{7}{n^2 + 7n} = \dfrac{1}{n + 7} - \dfrac{1}{n^2 + 7n}$

13) $\dfrac{1}{x^2 + 3x} - \dfrac{1}{x} = \dfrac{x - 2}{x^3 + 4x^2 + 3x}$

Simplify each expression.

14) $\dfrac{\dfrac{x - 5}{25} + \dfrac{x - 5}{5}}{\dfrac{25}{x + 5} - \dfrac{2x - 10}{x + 5}}$

15) $\dfrac{\dfrac{4}{2x - 5} + \dfrac{2x - 5}{4}}{\dfrac{2x - 3}{x - 5} - \dfrac{4}{2x - 5}}$

Identify the holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each. Then sketch the graph.

16) $f(x) = \dfrac{x^2 - x - 2}{3x^2 + 6x - 9}$

17) $f(x) = \dfrac{x - 4}{3x + 9}$

18) $f(x) = \dfrac{2x^2 - 8x}{x^2 - 7x + 12}$

19) $f(x) = \dfrac{x^2 + 7x + 12}{-2x^2 - 10x - 12}$

Find the domain by factoring completely and then graphing.

20) $\sqrt{x^6 - 3x^4 - 25x^2 + 75}$

Answers to Review - Rational Functions

1) $\dfrac{1}{5xy}$

2) $\dfrac{14p - 48}{7(7p - 3)}$

3) $\dfrac{2n^2 + 9n - 7}{(n + 5)(n - 1)}$

4) $\dfrac{67b + 6b^2 - 9}{8(2b + 3)(b - 1)}$

5) $\dfrac{16x}{9}$

6) $\dfrac{40n^2}{247}$

7) a^2

8) $\dfrac{v + 7}{v + 5}$

9) $\dfrac{n - 10}{n + 10}; \left\{ -\dfrac{6}{7}, \dfrac{2}{5}, -10 \right\}$

10) $\dfrac{x + 1}{24x}; \{2, 0\}$

11) $k + 1; \left\{ -\dfrac{3}{7}, \dfrac{5}{7}, -1, \dfrac{8}{7} \right\}$
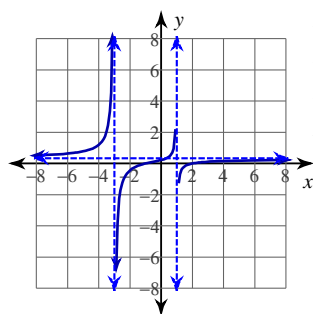
12) $\{8\}$

13) $\{-4\}$

14) $\dfrac{6x^2 - 150}{875 - 50x}$

15) $\dfrac{141x - 205 + 4x^3 - 40x^2}{16x^2 - 80x + 140}$
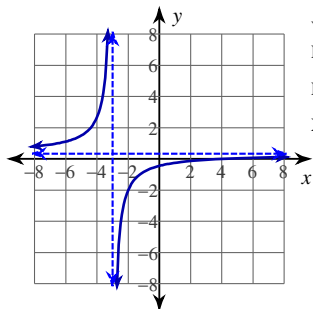
16)

Vertical Asym.: $x = 1$, $x = -3$
Holes: None
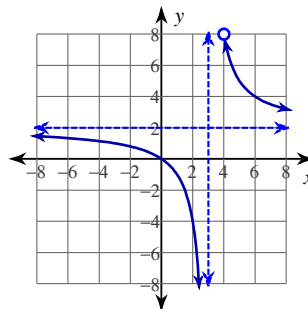Horz. Asym.: $y = \dfrac{1}{3}$
X-intercepts: 2, −1

17)

Vertical Asym.: $x = -3$
Holes: None
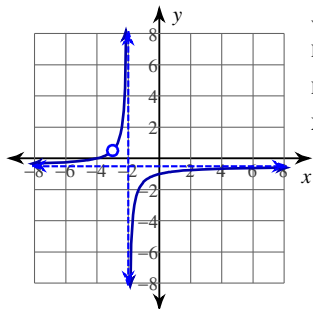Horz. Asym.: $y = \dfrac{1}{3}$
X-intercepts: 4

18)

Vertical Asym.: $x = 3$
Holes: $x = 4$
Horz. Asym.: $y = 2$
X-intercepts: 0

19)

Vertical Asym.: $x = -2$
Holes: $x = -3$
Horz. Asym.: $y = -\dfrac{1}{2}$
X-intercepts: −4

20) $(x^2 - 3)(x^2 - 5)(x^2 + 5) = 0$