CCGPS Adv Alg | Rationals 2A:Rev WS 2A.6 | Name Key

1. When is a rational expression undefined? when denominator = 0

2. What value of x makes $\frac{(x+4)(2x-1)}{(x+3)(3x-4)}$ undefined? $x \neq -3, 4/3$

Simplify. Identify any x-values for which the expression is undefined.

3. $\frac{5xy^4z^2}{20x^3yz^6}$ $\frac{y^3}{4x^2z^4}$, $x \neq 0$

4. $\frac{4x+12}{6x+18}$ $\frac{2}{3}$, $x \neq -3$

Multiply. Assume all expressions are defined.

5. $\frac{2x^3y^6}{5x^2y^3} \cdot \frac{15x^2y^2}{10x^4y}$ $\frac{3y^4}{5x}$

6. $\frac{2x+14}{x^2-25} \cdot \frac{8x+40}{6x+42}$ $\frac{8}{3(x-5)}$

7. $\frac{4x^3+12x^2}{2x^3-16x^2} \cdot \frac{2x^2-10x-48}{x+3}$ $4(x+3)$

Divide. Assume all expressions are defined.

8. $\frac{4x^3y^2}{2x^6y} \div \frac{xy+2y}{x^2-3x-10}$ $\frac{2(x-5)}{x^3}$

9. $\frac{3x^2+6x-24}{x^2-x-20} \div \frac{3x^3-9x^2+6x}{x}$ $\frac{1}{(x-5)(x-1)}$

10. $\frac{4x^3y^{12}}{y^5x^2} \div \frac{6y^7m^3x^3}{3m^3y}$ $\frac{2y}{x^2}$

Add or subtract. Identify any x-values for which the expression is undefined.

11. $\frac{2x-3}{x+4} + \frac{4x-5}{x+4}$ $\frac{6x-8}{x+4} \rightarrow \frac{2(3x-4)}{(x+4)}$, $x \neq -4$

12. $\frac{x+12}{2x-5} - \frac{3x-2}{2x-5}$ $\frac{-2x+14}{2x-5} \rightarrow \frac{-2(x-7)}{2x-5}$, $x \neq 5/2$

13. $\frac{x+4}{x^2-x-12} + \frac{2x}{x-4}$ $\frac{2x^2+7x+4}{(x-4)(x+3)}$, $x \neq 4, -3$

14. $\frac{3x^2-1}{x^2-3x-18} - \frac{x+2}{x-6}$ $\frac{(2x-7)(x+1)}{(x-6)(x+3)}$, $x \neq 6, -3$

15. $\frac{x+2}{x^2-2x-15}+\frac{x}{x+3}$

$\frac{x^2-4x+2}{(x+3)(x-5)}, \; x \neq -3, 5$

16. $\frac{x+6}{x^2-7x-18}-\frac{2x}{x-9}$

$\frac{-1(2x^2+3x-6)}{(x-9)(x+2)}, \; x \neq 9, -2$

Solve each equation.

17. $\frac{12r}{r+2}+6=\frac{4}{r+2}$

$R = -4/9$

18. $\frac{4x}{x-4}=\frac{2x+8}{x-4}$

NO SOLUTION

19. $\frac{2}{d+2}+\frac{8}{d-2}=\frac{14}{d^2-4}$

$d = 1/5$

20. List all of the extraneous solutions for the equation $\frac{2x}{x+4}=\frac{x}{x-1}$. $x \neq -4, 1$

21. Team A can wash all the windows in the school in x hours. It takes Team B 13 hours to do the same job. If the teams work together, they can complete the job in 8.5 hours. How long does it take Team A to do the job alone?

24.6 hrs

22. 27. A swimmer spends the afternoon exercising on a river. She travels 5 miles upstream and 5 miles downstream in a total of 6 hours. In still water, the swimmer can travel at an average speed of 2 mi/h. Based on this information, what is the average speed of the river's current?

.8 mi/h

Solve each inequality algebraically.

23. $\frac{6}{x+1}<-3$

$(-3, -1)$

24. $\frac{x+6}{x-2}\geq 0$

$(-\infty, -6] \cup (2, \infty)$

Simplify.

25. $\frac{\frac{x^2-3x-40}{5x}}{x+5}$

$\frac{(x-8)}{5x}$

26. $\frac{\frac{x^2-9}{5x+10}}{\frac{x-3}{5x^2-20}}$

$(x+3)(x-2)$

4. $\frac{4(x+3)}{6(x+3)} = \boxed{\frac{2}{3}, \quad x \neq -3}$

5. $\frac{30x^5y^8}{50x^6y^4} = \boxed{\frac{3y^4}{5x}}$

6. $\frac{2(x+7)}{(x+5)(x-5)} \cdot \frac{8(x+5)}{6(x+7)} = \boxed{\frac{8}{3(x-5)}}$

7. $\frac{4x^2(x+3)}{2x^2(x-8)} \cdot \frac{2(x^2-5x-24)}{(x+3)} = \boxed{4(x+3)}$

$\boxed{\quad}$

8. $\frac{4x^3y^7}{2x^4y} \cdot \frac{(x-5)(x+2)}{4(x+2)} = \boxed{\frac{2(x-5)}{x^3}}$

9. $\frac{3(x+4)(x-2)}{3(x^2+2x-8)} \cdot \frac{*}{3(x^2-3x+2)} = \boxed{\frac{1}{(x-5)(x-1)}}$

10. $\frac{4x^3y^{12}}{y^5x^2} \cdot \frac{3m^3y}{6y^7m^3x^3} = \frac{12m^3x^5y^{13}}{6m^3x^5y^{12}} = \boxed{\frac{2y}{x^2}}$

13. $\frac{x+4}{(x-4)(x+3)} + \frac{2x}{(x-4)} \cdot \frac{(x+3)}{(x+3)} = \frac{x+4+2x^2+6x}{(x-4)(x+3)}$

$= \frac{2x^2+7x+4}{(x-4)(x+3)}, \quad x \neq 4, -3$

$(2x+1)(x+4)$

14. $\frac{3x^2-1}{(x-6)(x+3)} - \frac{(x+2)}{(x-6)} \cdot \frac{(x+3)}{(x+3)} = \frac{3x^2-1}{(x-6)(x+3)} - \frac{x^2+5x+6}{(x-6)(x+3)}$

$= \frac{3x^2-1-x^2-5x-6}{(x-6)(x+3)}$

$2x^2-5x-7 \leftarrow$

$(2x-7)(x+1)$

$= \frac{(2x-7)(x+1)}{(x-6)(x+3)}, \quad x \neq 6, -3$

15. $\frac{x+2}{(x-5)(x+3)} + \frac{x}{(x+3)} \cdot \frac{(x-5)}{(x-5)} = \frac{x+2+x^2-5x}{(x+3)(x-5)}$

$= \frac{x^2-4x+2}{(x+3)(x-5)}, \quad x \neq -3, 5$

16. $\frac{x+6}{(x-9)(x+2)} - \frac{2x}{(x+9)} \cdot \frac{(x+2)}{(x+2)} = \frac{x+6}{(x-9)(x+2)} - \frac{2x^2+4x}{(x-9)(x+2)}$

$= \frac{x+6-2x^2-4x}{(x-9)(x+2)}$

$-2x^2-3x+6 \leftarrow$

$-1(2x^2+3x-6)$

$-1(2x-3)(x+2)$

$= \frac{-1(2x^2+3x-6)}{(x-9)(x+2)}, \quad x \neq 9, -2$

17. $\frac{12R}{R+2} = \frac{4}{R+2} - 6$ $\quad \cdot(R+2)$ $\quad \cdot(R+2)$ $\quad \cdot(R+2)$

$X \neq -2$

LCM = $(R+2)$

$12R = 4 - 6(R+2)$

$12R = 4 - 6R - 12$

$+6R \qquad +6R$

$18R = -8$

$\boxed{R = -4/9}$

18. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$

$X \neq 4$

$4x = 2x + 8$

$2x = 8$

$x = 4$

NO SOLUTION

19. $\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{d^2-4}$ $\quad \cdot(d+2)(d-2)$ $\quad \cdot(d+2)(d-2)$ $\quad \cdot(d+2)(d-2)$

$X \neq -2, 2$

LCM = $(d+2)(d-2)$

$(d+2)(d-2)$

$2(d-2) + 8(d+2) = 14$

$2d - 4 + 8d + 16 = 14$

$10d + 12 = 14$

$10d = 2$

$\boxed{d = 1/5}$

21. $\frac{8.5}{x} + \frac{8.5}{13} = 1$ $\cdot 13x$ $\quad x \neq 0$, LCM $= 13x$

$110.5 + 8.5x = 13x$

$110.5 = 4.5x$

$24.6 = x$

24.6 hrs

22. $\frac{5}{2+x} + \frac{5}{2-x} = \frac{6}{(2+x)(2-x)}$ $\quad x \neq 2, -2$, LCM $= (2+x)(2-x)$

$5(2-x) + 5(2+x) = 6$

$10 - 5x + 10 + 5x = 6(4 - 2x + 2x - x^2)$

$20 = 24 - 6x^2$

$-4 = -6x^2$

$\sqrt{2/3} = \sqrt{x^2}$

$.8 = x$

.8 mi/h

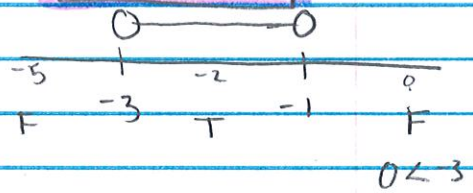
23. $\frac{6}{x+1} < -3$ $\quad x \neq -1$

$6 < -3x - 3$

$9 < -3x$

$-3 > x$

$(-3, -1)$



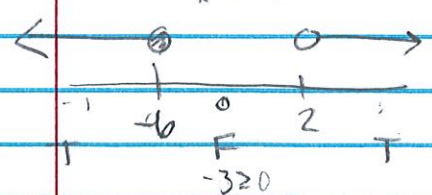
24. $\frac{x+6}{x-2} \geq 0$

$x+6 = 0$, $x = -6$

$x - 2$

$[\ ]$, except @ 2

$(-\infty, -6] \cup (2, \infty)$



$\frac{1}{1-2} \geq 0 \rightarrow \frac{1}{-1} \geq 0$ F

25. $\frac{x^2-3x-40}{5x} \div \frac{x+5}{1}$

$\frac{(x-8)(x+5)}{5x} \cdot \frac{1}{(x+5)} = \frac{(x-8)}{5x}$

$\boxed{\frac{(x-8)}{5x}}$

26. $\frac{x^2-9}{5x+10} \div \frac{x-3}{5x^2-20}$

$5(x^2-4)$

$\frac{(x+3)(x-3)}{5(x+2)} \cdot \frac{5(x+2)(x-2)}{(x-3)} = (x+3)(x-2)$

$\boxed{(x+3)(x-2)}$