

Test Two

$$23. \quad x^2 - 13x + 30 = 0$$

$$(x - 10)(x - 3) = 0$$

$$x - 10 = 0$$

$$x = 10$$

$$x - 3 = 0$$

$$x = 3$$

$$15. \quad 3t^5 - 15t^4 + 18t^3$$

$$3t^3(t^2 - 5t + 6)$$

$$3t^3(t - 2)(t - 3)$$

$$5. \quad \frac{-30a^3b}{6ab^7} = - \frac{5a^2}{b^6}$$

$$18. \quad 15x^3 + 17x^2 + 2x$$

$$x \overbrace{(15x^2 + 17x + 2)}$$

$$x \left[\underbrace{15x^2 + 2x}_{\text{blue}} + \underbrace{15x + 2}_{\text{green}} \right]$$

$$x \left[\underbrace{x(15x + 2)}_{\text{blue}} + \underbrace{1(15x + 2)}_{\text{green}} \right]$$

$$x (15x + 2)(x + 1)$$

$$\frac{30}{2,15}$$

$$21. \quad 625m^4 - 256$$

$$(25m^2)^2 - 16^2$$

$$(25m^2 + 16) \underline{(25m^2 - 16)}$$

$$(25m^2 + 16) (5m + 4) (5m - 4)$$

$$16. \quad y(\underline{x^4+8}) - 4(\underline{x^4+8})$$

$$(x^4+8)(y-4)$$

$$3. \quad -7^0 + 9^0 = -1 + 1 = 0$$

$$8. \quad \frac{16p^6 + 12p^5}{4p} = \frac{16p^6}{4p} + \frac{12p^5}{4p}$$
$$= 4p^5 + 3p^4$$

$$7. \frac{(a^5 b^{-2})^{-5}}{(5a^4 b^{-1})^{-2}}$$

$$\frac{a^{-25} b^{+10}}{5^{-2} a^{-8} b^2} = \frac{5^2 b^8}{a^{17}}$$

$$-8 - (-25)$$

$$-8 + 25$$

$$17$$

$$= \frac{25b^8}{a^{17}}$$

$$6. \left(\frac{x^{-3} y^4}{x^5 y^{10}} \right)^3 = (x^{-8} y^{-6})^3$$

$$x^{-24} y^{-18}$$

$$= \frac{1}{x^{24} y^{18}}$$

$$\begin{aligned}
 2. \quad 2^{-1} + 8^{-1} &= 4 \cdot \frac{1}{2} + \frac{1}{8} \\
 &= \frac{4}{2} + \frac{1}{8} \\
 &= \frac{5}{8}
 \end{aligned}$$

$$17. \quad \overbrace{\sqrt{x^2 - 12x + 7}} \qquad \frac{35}{5,7}$$

$$\underbrace{\sqrt{x^2} - \sqrt{x}} - \underbrace{7x} + 7$$

$$\sqrt{x}(\underline{x-1}) - 7(\underline{x-1})$$

$$(x-1)(\sqrt{x}-7)$$

$$20. \quad 2\sqrt{x^2} + 6 \quad \text{prime}$$

$$22. \quad \exists x (x-1) = 0$$

$$x = 0$$

x

$$x = 0$$

$$x-1 = 0$$

$$x = 1$$

Chapter 7: Rational Expressions

7.1: Simplifying Rational Expressions

Note: $\frac{6}{8} = \frac{\overset{|}{\cancel{2}} \cdot 3}{\underset{|}{\cancel{2}} \cdot 4} = \frac{3}{4}$

Rational Expression

A rational expression is an expression that can be written in the form $\frac{P}{Q}$, where P and Q are polynomials and $Q \neq 0$.

EX: $\frac{4}{1}$ $\frac{2x}{1}$ $\frac{x^2 - 3x + 4}{x^2 + 5x + 6}$

Note: $\frac{6}{0} = 12$ $6 = 0.12$

$$6 = 0$$

$$\frac{6}{2} = 3$$

$$6 = 2(3)$$

$$\frac{6}{0} = \text{undefined}$$

undefined

$$\frac{0}{0} = \cancel{0}$$

$$0 = 0.0 \checkmark$$

$$\frac{0}{0} = 1$$

$$0 = 0.1 \checkmark$$

$$\frac{0}{0} = 1492$$

$$0 = 0.1492 \checkmark$$

EX:

$$\frac{x+3}{x-4}$$

Are there numbers
x can't equal?

$$x-1 \neq 0$$

$$x \neq 1$$

Ex: (p 434)

Where are the Following Undefined:

10. $\frac{3}{5x}$ $x \neq 0$

12. $\frac{5x + 1}{x - 9}$ $x \neq 9$

20. $\frac{19x^3 + 2}{x^2 + 4}$

22. $\frac{x}{2x^2 + 15x + 27}$

$x^2 + 4 \neq 0$
 $x^2 \neq -4$
no problems

$$\frac{x}{2x^2 + 15x + 27}$$

$$\frac{54}{9,6}$$

$$2x^2 + 15x + 27 \neq 0$$

$$2x^2 + 9x + 6x + 27 \neq 0$$

$$x(2x + 9) + 3(2x + 9) \neq 0$$

$$(2x + 9)(x + 3) \neq 0$$

$$2x + 9 \neq 0$$

$$2x \neq -9$$

$$x \neq -\frac{9}{2}$$

$$x + 3 \neq 0$$

$$x \neq -3$$

Simplify:

$$28. \frac{y + 9}{9 + y}$$

$$30. \frac{y - 9}{9 - y}$$

$$32. \frac{3}{9x + 6}$$

$$36. \frac{3x - 9}{4x - 16}$$

$$38. \frac{-4x - 4y}{x + y}$$

$$40. \frac{9x + 99}{x^2 + 11x}$$

$$46. \frac{x^4 - 10x^3}{x^2 - 17x + 70}$$

$$48. \frac{4x^2 + 24x}{x + 6}$$

$$54. \frac{5x^2 - 500}{35x + 350}$$

$$56. \frac{49 - y^2}{y - 7}$$

$$58. \frac{x^2 - 16}{x^2 - 8x + 16}$$

$$60. \frac{m^2 - 4m + 4}{m^2 + m - 6}$$

$$62. \frac{24y^2 - 8y^3}{15y - 5y^2}$$

$$64. \frac{ab + ac + b^2 + bc}{b + c}$$

$$66. \frac{xy - 6x + 2y - 12}{y^2 - 6y}$$

$$72. \frac{2xy + 2x - 3y - 3}{2xy + 4x - 3y - 6}$$

7.2: Multiplying and Dividing Rational Expressions

Ex: (p 442)

$$2. \frac{9x^2}{y} \cdot \frac{4y}{3x^3}$$

$$4. \frac{6x^2}{10x^3} \cdot \frac{5x}{12}$$

$$6. -\frac{9x^3y^2}{18xy^5} \cdot y^3$$

$$8. \frac{4x - 24}{20x} \cdot \frac{5}{x - 6}$$

$$10. \frac{x^2 + x}{8} \cdot \frac{16}{x + 1}$$

$$16. \frac{x^2 + 9x + 20}{x^2 - 15x + 44} \cdot \frac{x^2 - 11x + 28}{x^2 + 12x + 35}$$

$$18. \frac{9y^4}{6y} \div \frac{y^2}{3}$$

$$20. \frac{7a^2b}{3ab^2} \div \frac{21a^2b^2}{14ab}$$

$$22. \frac{(x + 3)^2}{5} \div \frac{5x + 15}{25}$$

$$26. \frac{(m-n)^2}{m+n} \div \frac{m^2-mn}{m}$$

$$28. \frac{x-3}{2-x} \div \frac{x^2+3x-18}{x^2+2x-8}$$

$$30. \frac{x+1}{(x+1)(2x+3)} \div \frac{20x+100}{2x+3}$$

7.3: Adding and Subtracting Rational Expressions with Common Denominators and Least Common Denominator

Ex: (p 449)

$$2. \frac{x+1}{7} + \frac{6}{7}$$

$$4. \frac{3p}{2q} + \frac{11p}{2q}$$

$$6. \frac{8y}{y-2} - \frac{16}{y-2}$$

$$10. \frac{x^2+9x}{x+7} - \frac{4x+14}{x+7}$$

$$12. \frac{3y}{y^2+3y-10} - \frac{6}{y^2+3y-10}$$

$$18. \frac{6x^2}{2x-5} - \frac{25+2x^2}{2x-5}$$

7.4: Adding and Subtracting Rational Expressions with Unlike Denominators

Ex: (p 455)

$$2. \frac{15}{7a} + \frac{8}{6a}$$

$$4. \frac{4c}{d} - \frac{8d}{5}$$

$$10. \frac{5}{x-4} + \frac{4x}{x^2-16}$$

$$12. \frac{5}{y^2} - \frac{y}{2y+1}$$

$$14. \frac{15}{y-4} + \frac{20}{4-y}$$

$$16. \frac{5}{a-7} + \frac{5}{7-a}$$

$$18. \frac{-9}{25x^2-1} + \frac{7}{1-25x^2}$$

$$20. \frac{7}{x^2} - 5x$$

$$24. \frac{7}{2x-3} - 3$$

$$30. \frac{5x}{6} + \frac{11x^2}{2}$$

$$32. \frac{5x}{(x-2)^2} - \frac{3}{x-2}$$

$$36. \frac{6}{x} - 1$$

$$40. \frac{10}{3n-4} - \frac{5}{4-3n}$$

$$42. \frac{5}{(x+1)(x+5)} - \frac{2}{(x+5)^2}$$

$$44. \frac{x}{x^2-4} - \frac{5}{x^2-4x+4}$$

$$50. \frac{-1}{a-2} + \frac{4}{4-2a}$$

$$54. \frac{-7}{y^2-3y+2} - \frac{2}{y-1}$$

$$58. \frac{x+4}{x^2+12x+20} + \frac{x+1}{x^2+8x-20}$$

7.8: Simplifying Complex Fractions

Ex: (492)

$$2. \frac{\frac{1}{8}}{-\frac{5}{12}}$$

$$8. \frac{\frac{3}{4} - \frac{1}{2}}{\frac{3}{8} + \frac{1}{6}}$$

$$12. \frac{\frac{7}{10} - \frac{3}{5}}{\frac{1}{2}}$$

$$18. \frac{\frac{x}{2} + 2}{\frac{x}{2} - 2}$$

$$22. \frac{x - \frac{1}{2x+1}}{1 - \frac{x}{2x+1}}$$

$$28. \frac{3}{1 - \frac{4}{3}}$$

$$30. \frac{\frac{m+2}{m-2}}{\frac{2m+4}{m^2-4}}$$

$$34. \frac{2 + \frac{6}{x}}{1 - \frac{9}{x^2}}$$

$$38. \frac{\frac{2}{x} + \frac{x}{2}}{\frac{2}{x} - \frac{x}{2}}$$

$$40. \frac{\frac{4}{x} + \frac{x}{x+1}}{\frac{1}{2x} + \frac{1}{x+6}}$$