

pg. 513 #42-45

$$42. \frac{x^2 - 4x + 3}{x^2 - 6x + 9} = \frac{(x-3)(x-1)}{(x-3)(x-3)} = \frac{x-1}{x-3} \quad \boxed{D}$$

$$43. \text{F. } \frac{x^2 - x}{x^2 - 1} = \frac{x(x-1)}{(x+1)(x-1)} = \frac{x}{x+1}$$

$$G. \frac{x^2 - 1}{x^2 + 1} = \frac{(x+1)(x-1)}{x^2 + 1}$$

$$H. \frac{x^2 - 1}{x+1} = \frac{(x+1)(x-1)}{x+1} = x-1$$

$$J. \frac{x+3}{x^2 + 4x + 3} = \frac{x+3}{(x+3)(x+1)} = \frac{1}{x+1}$$

$$44. \frac{4x^2 - 1}{2x^2 - 5x - 3} \cdot \frac{x^2 - 6x + 9}{2x^2 + 5x - 3}$$

$$\frac{(2x+1)(2x-1)}{(2x+1)(x-3)} \cdot \frac{(x-3)(x-3)}{(2x+1)(x+3)} = \boxed{\frac{x-3}{x+3}}$$

$$45. \frac{x^2 - x - 2}{x^2 - 9} \div \frac{x - 8}{x^2 + 10x + 25}$$

$$\frac{(x-2)(x+1)}{(x+3)(x-3)} \times \frac{(x+5)(x+5)}{x-8}$$

$$x \neq -3, 3, 8, -5 \quad \boxed{H}$$

pg. 519 #56-67

$$56. \frac{x^2 - 1}{(x+1)(x-1)} \quad \frac{x^2 - x}{x(x-1)}$$

$$\text{LCM: } x(x+1)(x-1) \quad \boxed{B}$$

$$57. \frac{1}{x^2 - 2x - 3} + \frac{1}{x^2 - 4x + 3}$$

$$\frac{1}{(x-3)(x+1)} + \frac{1}{(x-3)(x-1)}$$

$$\text{LCD: } (x-3)(x+1)(x-1)$$

$$\frac{1 \cdot (x-1)}{(x-3)(x+1)(x-1)} + \frac{1 \cdot (x+1)}{(x-3)(x+1)(x-1)}$$

$$= \frac{x-1 + x+1}{(x+3)(x+1)(x-1)} = \frac{2x}{(x+3)(x+1)(x-1)} \quad \boxed{H}$$

$$58. \quad \frac{5x}{x^2-9} - \frac{4x}{x^2+5x+6}$$

$$\frac{5x}{(x+3)(x-3)} - \frac{4x}{(x+2)(x+3)}$$

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

$$\frac{5x \cdot (x+2)}{(x+3)(x-3)(x+2)} - \frac{4x(x-3)}{(x+2)(x+3)(x-3)}$$

$$= \frac{5x(x+2) - 4x(x-3)}{(x+3)(x-3)(x+2)}$$

$$= \frac{5x^2 + 10x - 4x^2 + 12x}{(x+3)(x-3)(x+2)}$$

$$= \frac{x^2 + 22x}{(x+3)(x-3)(x+2)} \quad \boxed{C}$$

$$59. \quad \frac{\frac{2}{x} - 5}{\frac{6}{x} - 3} = \frac{\frac{2}{x} - \frac{5x}{x}}{\frac{6}{x} - \frac{3x}{x}} = \frac{\frac{2-5x}{x}}{\frac{6-3x}{x}}$$

$$= \frac{2-5x}{x} \times \frac{x}{6-3x} = \frac{2-5x}{6-3x} \quad \boxed{F}$$

$$60. \quad \frac{1}{x^2 - 5x - 6} \quad \frac{1}{x^2 - 12x + 36}$$

$$\frac{1}{(x-6)(x+1)} \quad \frac{1}{(x-6)(x-6)}$$

LCD: $\frac{(x-6)(x-6)(x+1)}{(x-6)^2(x+1)}$

$$61. \quad y = \frac{2x-1}{x+15}$$

U.A. @ $x = -15$

H.A. @ $y = 2$

$$62. \quad \frac{4x^3}{3y^4} \div \frac{16x^2}{9y^2} = \frac{4x^3}{3y^4} \times \frac{9y^2}{16x^2} = \frac{36x^3y^2}{48x^2y^4}$$

$$\boxed{\begin{array}{l} R: x \neq 0 \\ y \neq 0 \end{array} = \frac{3x}{4y^2}}$$

$$63. \quad \frac{7ax^3}{8by^2} \div \frac{14ax^4}{4by} = \frac{7ax^3}{8by^2} \times \frac{4by}{14ax^4}$$

$$= \frac{28abx^3y}{112abx^4y^2} = \boxed{\frac{1}{4xy}}$$

$$\boxed{\begin{array}{l} R: a \neq 0 \quad b \neq 0 \\ x \neq 0 \quad y \neq 0 \end{array}}$$

$$64. \frac{6x^2}{y} \div \frac{12x^4}{y^3} = \frac{6x^2}{y} \times \frac{y^3}{12x^4} = \frac{6x^2y^3}{12x^4y}$$

$$\boxed{R: x \neq 0 = \frac{y^2}{2x^2}}$$

$$65. \frac{3x^2-9x}{x-2} \div \frac{x^2-9}{4x-8} = \frac{3x(x-3)}{x-2} \times \frac{4(x-2)}{(x+3)(x-3)}$$

$$\boxed{R: x \neq 2, \pm 3 = \frac{12x}{x+3}}$$

$$66. \frac{3x-6}{2x+2} \div \frac{x^2-5x+6}{3x^2-12} = \frac{3(x-2)}{2(x+2)} \times \frac{3(x^2-4)}{(x-3)(x-2)}$$

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

$$\boxed{R: x \neq \pm 2, 3}$$

$$= \frac{9(x-2)}{2(x-3)} = \boxed{\frac{3(x-2)}{4(x-3)}}$$

$$67. \frac{5x+15}{10x-10} \div \frac{x^2+6x+9}{3x^2-3} = \frac{5(x+3)}{10(x-1)} \times \frac{3(x^2-1)}{(x+3)(x+3)}$$

$$= \frac{5(x+3)}{10(x-1)} \times \frac{3(x+1)(x-1)}{(x+3)(x+3)} = \frac{15(x+1)}{10(x+3)}$$

$$\boxed{R: x \neq \pm 1, -3}$$

$$= \boxed{\frac{3(x+1)}{2(x+3)}}$$

pg. 520 # 1-10

$$1. \frac{3x-6}{5x-20} \times \frac{x-8}{5x-10} = \frac{3(x-2)}{5(x-4)} \times \frac{x-8}{5(x-2)}$$

$$\boxed{R: x \neq 4, 2}$$

$$= \frac{3(x-8)}{25(x-4)}$$

$$2. \frac{4x+7}{4x-6} \times \frac{8x-12}{42x+21} = \frac{7(2x+1)}{2(2x-3)} \times \frac{4(2x-3)}{21(2x+1)}$$

$$\boxed{R: x \neq \frac{3}{2}, -\frac{1}{2}}$$

$$= \frac{28}{42} = \frac{2}{3}$$

$$3. \frac{y^2-25}{(y+5)^2} \div \frac{2y-10}{4y+20} = \frac{(y+5)(y-5)}{(y+5)(y+5)} \times \frac{4(y+5)}{2(y-5)}$$

$$\boxed{R: x \neq \pm 5}$$

$$= \frac{4}{2} = 2$$

$$4. \frac{y^2-25}{y^2-16} \div \frac{2y+10}{y^2-4y} = \frac{(y+5)(y-5)}{(y+4)(y-4)} \times \frac{y(y-4)}{2(y+5)}$$

$$\boxed{R: x \neq \pm 4, -5}$$

$$= \frac{y(y-5)}{2(y+4)}$$

$$5. \frac{8}{3x^3y} + \frac{4}{9xy^3}$$

$$\underline{\text{LCD: } 9x^3y^3}$$

$$\frac{8 \cdot 3y^2}{9x^3y^3} + \frac{4 \cdot x^2}{9x^3y^3} = \boxed{\frac{24y^2 + 4x^2}{9x^3y^3}}$$

$$6. \frac{7}{5y+25} + \frac{4}{3y+15} = \frac{7}{5(y+5)} + \frac{4}{3(y+5)}$$

$$\underline{\text{LCD: } 15(y+5)}$$

$$\frac{7 \cdot 3}{15(y+5)} + \frac{4 \cdot 5}{15(y+5)} = \frac{21 + 20}{15(y+5)}$$

$$= \boxed{\frac{41}{15(y+5)}}$$

$$7. \frac{5x}{2y+4} - \frac{6}{y^2+2y} = \frac{5x}{2(y+2)} - \frac{6}{y(y+2)}$$

$$\underline{\text{LCD: } 2y(y+2)}$$

$$\frac{5x \cdot y}{2y(y+2)} - \frac{6 \cdot 2}{2y(y+2)}$$

$$= \boxed{\frac{5xy - 12}{2y(y+2)}}$$

$$8. \quad 3x - \frac{x^2 + 5x}{x^2 - 2} = \frac{3x}{1} - \frac{x^2 + 5x}{x^2 - 2}$$

$$\underline{\text{LCD: } x^2 - 2}$$

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

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

$$\frac{3x^3 - 6x - x^2 - 5x}{x^2 - 2}$$

$$\boxed{\frac{3x^3 - x^2 - 11x}{x^2 - 2}}$$

$$9. \quad \frac{\frac{3}{2y}}{\frac{6}{8x}} = \frac{3}{2y} \times \frac{8x}{6} = \frac{24x}{12y} = \boxed{\frac{2x}{y}}$$

$$10. \quad \frac{\frac{1}{x} + 3}{4 + \frac{5}{y}} = \frac{\frac{1}{x} + \frac{3x}{x}}{\frac{4y}{y} + \frac{5}{y}} = \frac{\frac{1+3x}{x}}{\frac{4y+5}{y}} = \frac{1+3x}{x} \times \frac{y}{4y+5} = \boxed{\frac{y(1+3x)}{x(4y+5)}}$$

pg. 527 # 59-62 and # 64-67

$$59. \frac{3}{x^2-1} + \frac{4x}{x+1} = \frac{1.5}{x-1}$$

$$\frac{3}{(x+1)(x-1)} + \frac{4x}{x+1} = \frac{1.5}{x-1}$$

LCM: $(x+1)(x-1)$

$$\frac{(x+1)(x-1)}{1} \left[\frac{3}{(x+1)(x-1)} + \frac{4x}{x+1} \right] = \left[\frac{1.5}{(x-1)} \right] \frac{(x+1)(x-1)}{1}$$

$$\frac{3(x+1)(x-1)}{(x+1)(x-1)} + \frac{4x(x+1)(x-1)}{x+1} = \frac{1.5(x+1)(x-1)}{x-1}$$

$$\begin{aligned} 3 + 4x(x-1) &= 1.5(x+1) \\ 3 + 4x^2 - 4x &= 1.5x + 1.5 \\ 4x^2 - 5.5x + 1.5 &= 0 \end{aligned}$$

$$\begin{aligned} x &= \frac{5.5 \pm \sqrt{(-5.5)^2 - 4(4)(1.5)}}{2(4)} \\ &= \frac{5.5 \pm \sqrt{6.25}}{8} = \frac{5.5 \pm 2.5}{8} \end{aligned}$$

$$x = \frac{5.5 + 2.5}{8} = \frac{8}{8} = 1 \leftarrow \text{makes den} = 0$$

$$x = \frac{5.5 - 2.5}{8} = \boxed{\frac{3}{8}}$$

$$60. \quad x + \frac{1}{x} = -2$$

$$\underline{\text{LCM}}: x \quad \frac{x}{1} \left[\frac{x}{1} + \frac{1}{x} \right] = [-2] \cdot \frac{x}{1}$$

$$\frac{x^2}{1} + \frac{x}{x} = \frac{-2x}{1}$$

$$x^2 + 1 = -2x$$

$$x^2 + 2x + 1 = 0$$

$$(x+1)(x+1) = 0$$

$$x = -1$$

1

$$61. \quad \frac{2}{x^2} + \frac{1}{x} = 0$$

$$\underline{\text{LCM}}: x^2 \quad \frac{x^2}{1} \left[\frac{2}{x^2} + \frac{1}{x} \right] = [0] \cdot x^2$$

$$\frac{2x^2}{x^2} + \frac{x^2}{x} = 0$$

$$2 + x = 0$$

$$x = -2$$

1 root 3

$$62. \quad \frac{2}{x+7} = \frac{x}{x^2-49}$$

$$2(x^2-49) = x(x+7)$$

$$2x^2 - 98 = x^2 + 7x$$

$$x^2 - 7x - 98 = 0$$

$$(x-14)(x+7) = 0$$

$$\boxed{x=14} \cdot x = -7 \quad \boxed{F}$$

↖ make den = 0

pg. 5a7 #64-67

$$64. \quad \frac{x}{3x+9} = \frac{x+2}{x+3}$$

$$x(x+3) = (3x+9)(x+2)$$

$$x^2 + 3x = 3x^2 + 15x + 18$$

$$0 = 2x^2 + 12x + 18$$

$$0 = 2(x^2 + 6x + 9)$$

$$0 = 2(x+3)(x+3)$$

$$x = -3$$

makes
den = 0

therefore no
solution

$$65. \frac{3y+1}{4y+4} - \frac{2y+7}{2y+2}$$

$$\frac{3y+1}{4(y+1)} - \frac{2y+7}{2(y+1)}$$

LCD: $4(y+1)$

$$\frac{3y+1}{4(y+1)} - \frac{(2y+7) \cdot 2}{4(y+1)} = \frac{3y+1 - 2(2y+7)}{4(y+1)}$$

$$= \frac{3y+1 - 4y - 14}{4(y+1)}$$

$$= \boxed{\frac{-y-13}{4(y+1)}}$$

$$66. \frac{5x}{2y+4} - \frac{6}{y^2+2y} = \frac{5x}{2(y+2)} - \frac{6}{y(y+2)}$$

LCD: $2y(y+2)$

$$= \frac{5x \cdot y}{2y(y+2)} - \frac{6 \cdot 2}{2y(y+2)}$$

$$= \boxed{\frac{5xy - 12}{2y(y+2)}}$$

$$67. \frac{x+1}{2x-2} - \frac{2x}{x^2+2x-3} = \frac{x+1}{2(x-1)} - \frac{2x}{(x+3)(x-1)}$$

$$\underline{\text{LCD}}: 2(x-1)(x+3)$$

$$\frac{(x+1) \cdot (x+3)}{2(x-1)(x+3)} - \frac{2x \cdot 2}{2(x+3)(x-1)}$$

$$\frac{x^2+4x+3-4x}{2(x-1)(x+3)}$$

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