

Alg 2: Homework 26

$$\textcircled{1} \frac{\left(1 - \frac{2}{a}\right) \frac{a^2}{1}}{\left(\frac{4}{a^2} - 1\right) \frac{a^2}{1}}$$

$$= \frac{a^2 - 2a}{4 - a^2}$$

$$= \frac{a \overset{(-1)}{\cancel{a-2}}}{(2+a)\overset{(-1)}{\cancel{2-a}}}$$

$$= \boxed{\frac{-a}{2+a}}$$

$$\textcircled{2} \left(\frac{2}{x+3} + \frac{4}{x^2-9} \right) \left(\frac{(x+3)(x-3)}{1} \right)$$

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

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

$$= \frac{2x-6+4}{4x-12+2x+6}$$

$$= \frac{2x-2}{6x-6}$$

$$= \frac{\overset{1}{2}(x-1)}{\underset{6}{6}(x-1)}$$

$$= \boxed{\frac{1}{3}}$$

$$\textcircled{3} \quad \frac{2x}{x^2-4} \div \frac{4}{x^2-4x+4} + \frac{12}{x^2-4} \cdot \frac{2-x}{3}$$

$$= \frac{2x}{(x+2)(x-2)} \cdot \frac{(x-2)(x-2)}{4} + \frac{12}{(x+2)(x-2)} \cdot \frac{(2-x)}{3}$$

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

$$= \frac{x(x-2)}{2(x+2)} + \frac{-4}{(x+2)} \left(\frac{2}{2} \right)$$

$$= \frac{x(x-2)}{2(x+2)} + \frac{-8}{2(x+2)}$$

$$= \frac{x^2-2x-8}{2(x+2)}$$

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

$$(4) \quad \frac{x}{x-5} - \frac{2}{x+5} = \frac{50}{x^2-25}$$

$$(x+5)(x-5)$$

$$\frac{(x+5)(x-5)}{(x-5)} \cdot x - \frac{(x+5)(x-5)}{1} \cdot \frac{2}{x+5} = \frac{(x+5)(x-5)}{1} \cdot \frac{50}{(x+5)(x-5)}$$

$$x(x+5) - 2(x-5) = 50$$

$$x^2 + 5x - 2x + 10 = 50$$

$$x^2 + 3x - 40 = 0$$

$$(x+8)(x-5) = 0$$

$$x+8=0 \quad \vee \quad x-5=0$$

$$x=-8 \quad \vee \quad x=5$$

check $(x=-8)$

$$\frac{-8}{-8-5} - \frac{2}{-8+5} \stackrel{?}{=} \frac{50}{(-8)^2-25}$$

$$\frac{-8}{-13} - \frac{2}{-3} \stackrel{?}{=} \frac{50}{64-25}$$

$$\frac{3}{13} + \frac{2}{3} \stackrel{?}{=} \frac{50}{39}$$

$$\frac{24}{39} + \frac{26}{39} \stackrel{?}{=} \frac{50}{39}$$

$$\frac{50}{39} \checkmark \frac{50}{39}$$

check $(x=5)$

$$\frac{5}{5-5} - \frac{2}{5+5} \stackrel{?}{=} \frac{50}{(5)^2-25}$$

$$\frac{5}{0} - \frac{2}{10} \stackrel{?}{=} \frac{50}{0}$$

undefined reject $x=5$

$$\boxed{\{-8\}}$$

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

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

$$9(x-4) + 6(x+3) = 4(x+3)(x-4)$$

$$9x - 36 + 6x + 18 = 4(x^2 - x - 12)$$

$$15x - 18 = 4x^2 - 4x - 48$$

$$0 = 4x^2 - 19x - 30$$

$$0 = (4x + 5)(x - 6)$$

$$4x + 5 = 0 \quad \vee \quad x - 6 = 0$$

$$4x = -5$$

$$x = -\frac{5}{4}$$

$$x = 6$$

Check $(x = -\frac{5}{4})$

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

$$\frac{12}{-5+12} + \frac{8}{-5-16} \stackrel{?}{=} \frac{4}{3}$$

$$\frac{12}{7} - \frac{8}{21} \stackrel{?}{=} \frac{4}{3}$$

$$\frac{36}{21} - \frac{8}{21} \stackrel{?}{=} \frac{4}{3}$$

$$\frac{28}{21} \stackrel{?}{=} \frac{4}{3}$$

$$\frac{4}{3} \stackrel{?}{=} \frac{4}{3}$$

Check $(x = 6)$

$$\frac{3}{6+3} + \frac{2}{6-4} \stackrel{?}{=} \frac{4}{3}$$

$$\frac{3}{9} + \frac{2}{2} \stackrel{?}{=} \frac{4}{3}$$

$$\frac{1}{3} + 1 \stackrel{?}{=} \frac{4}{3}$$

$$\frac{1}{3} + \frac{3}{3} \stackrel{?}{=} \frac{4}{3}$$

$$\frac{4}{3} \stackrel{?}{=} \frac{4}{3}$$

$$\left\{ -\frac{5}{4}, 6 \right\}$$