

$$\textcircled{1} \quad \frac{x-4}{4} - \frac{5x+3}{32} = \frac{7}{16} - \frac{5x}{8}$$

$$\text{lcm}(4, 32, 16, 8) = 32 = 2^5$$

$$4 = 2^2$$

$$32 = 2^5$$

$$16 = 2^4$$

$$8 = 2^3$$

$$\frac{8(x-4)}{32} - \frac{5x+3}{32} = \frac{14}{32} - \frac{20x}{32}$$

$$8(x-4) - (5x+3) = 14 - 20x$$

$$8x - 32 - 5x - 3 = 14 - 20x$$

$$8x - 5x + 20x = 14 + 32 + 3$$

$$23x - 5x = 49$$

$$23x = 49$$

$$\boxed{x = \frac{49}{23}}$$

$$\textcircled{2} \quad 2x - 6 - \frac{2(2x+8)}{3} = 4x - 1$$

$$\frac{6x}{3} - \frac{18}{3} - \frac{4x+16}{3} = \frac{12x}{3} - \frac{3}{3}$$

$$6x - 18 - (4x + 16) = 12x - 3$$

$$6x - 18 - 4x - 16 = 12x - 3$$

$$6x - 4x - 12x = -3 + 18 + 16$$

$$6x - 16x = 34 - 3$$

$$-10x = 31 \Rightarrow \boxed{x = \frac{31}{-10} = -\frac{31}{10}}$$

$$\textcircled{3} \quad \frac{6x+1}{12} - \frac{x-13}{9} = \frac{5x-3}{2} + \frac{x}{30}$$

$$12 = 2^2 \cdot 3$$

$$9 = 3^2$$

$$2 = 2$$

$$30 = 2 \cdot 3 \cdot 5$$

$$\left. \begin{array}{l} 12 = 2^2 \cdot 3 \\ 9 = 3^2 \\ 2 = 2 \\ 30 = 2 \cdot 3 \cdot 5 \end{array} \right\} \text{mcm}(12, 9, 2, 30) = 2^2 \cdot 3^2 \cdot 5 = 4 \cdot 9 \cdot 5 = 20 \cdot 9 = 180$$

$$\frac{15(6x+1)}{180} - \frac{20(x-13)}{180} = \frac{90(5x-3)}{180} + \frac{6x}{180}$$

$$15(6x+1) - 20(x-13) = 90(5x-3) + 6x$$

$$90x + 15 - 20x + 260 = 450x - 270 + 6x$$

$$90x - 20x - 450x - 6x = -270 - 15 - 260$$

$$-386x = -545$$

$$x = \frac{-545}{-386} = \frac{545}{386}$$

$$\boxed{x = \frac{545}{386}}$$

$$\textcircled{4} \quad \frac{2-4x}{3} - 2(5x+2) = \frac{2(4x+6)}{9} + 2(10x+1)$$

$$\frac{3(2-4x)}{9} - \frac{18(5x+2)}{9} = \frac{2(4x+6)}{9} + \frac{18(10x+1)}{9}$$

$$3(2-4x) - 18(5x+2) = 2(4x+6) + 18(10x+1)$$

$$24 - 12x - 90x - 144 = 8x + 12 + 180x + 18$$

$$-12x - 90x - 8x - 180x = 12 + 18 - 24 + 144$$

$$-290x = 150 \quad \Rightarrow \quad x = \frac{150}{-290} = \frac{15}{-29} = -\frac{15}{29}$$

$$\boxed{x = -\frac{15}{29}}$$

$$\textcircled{5} \quad \frac{3x+8}{10} - \frac{9x-9}{14} = \frac{31x-4}{14} + \frac{4x-1}{35}$$

$$10 = 2 \cdot 5$$

$$14 = 2 \cdot 7$$

$$35 = 5 \cdot 7$$

$$\text{mcm}(10, 14, 35) = 2 \cdot 5 \cdot 7 = 70$$

$$\frac{7(3x+8)}{70} - \frac{5(9x-9)}{70} = \frac{5(31x-4)}{70} + \frac{2(4x-1)}{70}$$

$$7(3x+8) - 5(9x-9) = 5(31x-4) + 2(4x-1)$$

$$21x + 56 - 45x + 45 = 155x - 20 + 8x - 2$$

$$21x - 45x - 155x - 8x = -20 - 2 - 56 - 45$$

$$-187x = -123 \quad \Rightarrow \quad \boxed{x = \frac{123}{187}}$$

$$\textcircled{6} \quad \frac{9x-1}{13} - \frac{5x-8}{4} = x+6$$

$$\frac{4(9x-1)}{52} - \frac{13(5x-8)}{52} = \frac{52x}{52} + \frac{312}{52}$$

$$4(9x-1) - 13(5x-8) = 52x + 312$$

$$36x - 4 - 65x + 104 = 52x + 312$$

$$36x - 65x - 52x = 312 + 4 - 104$$

$$-81x = 212$$

$$x = \frac{212}{-81} = -\frac{212}{81}$$

$$\boxed{x = -\frac{212}{81}}$$

$$\textcircled{7} \quad 5x - \frac{2x+1}{2} = 3x + \frac{15x-2}{4}$$

$$\frac{20x}{4} - \frac{2(2x+1)}{4} = \frac{12x}{4} + \frac{15x-2}{4}$$

$$20x - 2(2x+1) = 12x + 15x - 2$$

$$20x - 4x - 2 = 12x + 15x - 2$$

$$20x - 4x - 12x - 15x = -2 + 2$$

$$-11x = 0$$

$$x = \frac{0}{-11} = 0$$

$$\textcircled{8} \quad \frac{4(3x+6)}{5} + 3 = \frac{2(2x+5)}{3} - 3x$$

$$\frac{12(3x+6)}{15} + \frac{45}{15} = \frac{10(2x+5)}{15} - \frac{45x}{15}$$

$$12(3x+6) + 45 = 10(2x+5) - 45x$$

$$36x + 72 + 45 = 20x + 50 - 45x$$

$$36x - 20x + 45x = 50 - 72 - 45$$

$$61x = -67$$

$$x = -\frac{67}{61}$$