

■ LINEAR EQUATIONS IN ONE UNKNOWN ■

Form 1 Regular Course
Vol 2

Part 3B – Complicated Equations (B)

1. (a) $\frac{x}{3} + \frac{x}{5} = 24$

$$5x + 3x = 360$$

$$8x = 360$$

$$x = 45$$

(b) $\frac{3x}{2} + \frac{x}{4} = 0$

$$x = 0$$

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

$$3(5x-2) = 2(2x+3)$$

$$15x-6 = 4x+6$$

$$11x = 12$$

$$x = \frac{12}{11}$$

(d) $\frac{7x-13}{6} = \frac{-5x-3}{8}$

$$4(7x-13) = 3(-5x-3)$$

$$28x-52 = -15x-9$$

$$43x = 43$$

$$x = 1$$

$$(e) \quad \frac{x-3}{x^2-1} = \frac{3-x}{4-x^2}$$

$$(x-3)(4-x^2) = (3-x)(x^2-1)$$

$$4x - x^3 - 12 + 3x^2 = 3x^2 - 3 - x^3 + x$$

$$3x = 9$$

$$x = 3$$

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

$$3(2x+1) + 4(x+2) = 72$$

$$6x + 3 + 4x + 8 = 72$$

$$10x = 61$$

$$x = \frac{61}{10}$$

$$(g) \quad \frac{y-2}{4} - \frac{y-1}{8} = 1$$

$$2(y-2) - (y-1) = 8$$

$$2y - 4 - y + 1 = 8$$

$$y = 11$$

$$(h) \quad -\frac{x+3}{2} - \frac{x+1}{5} = 10$$

$$-5(x+3) - 2(x+1) = 100$$

$$-5x - 15 - 2x - 2 = 100$$

$$-7x = 117$$

$$x = -\frac{117}{7}$$

$$(i) \quad \frac{x}{2} - \frac{3x-10}{4} = 1$$

$$2x - (3x-10) = 4$$

$$2x - 3x + 10 = 4$$

$$x = 6$$

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

$$15(x-1) - (3x-1) = 2(2x+1)$$

$$15x - 15 - 3x + 1 = 4x + 2$$

$$8x = 16$$

$$x = 2$$

$$2. \quad (a) \quad \frac{y-2}{4} - \frac{y-1}{8} = 1$$

$$2(y-2) - (y-1) = 8$$

$$2y - 4 - y + 1 = 8$$

$$y = 11$$

(b) Sub $y = x + 3$ into the equation in (a), we get the desired equation.

Thus, we have $x = 11 - 3 = 8$ as the required solution.

$$3. \quad (a) \quad -\frac{x+3}{2} - \frac{x+1}{5} = 10$$

$$-5(x+3) - 2(x+1) = 100$$

$$-5x - 15 - 2x - 2 = 100$$

$$-7x = 117$$

$$x = -\frac{117}{7}$$

(b) Sub $x = -13y$ into the equation in (a), we get the desired equation.

Thus, we have $y = -\frac{117}{7} \times \left(-\frac{1}{13}\right) = \frac{9}{7}$ as the required solution.

$$4. \quad (a) \quad \frac{x}{2} - \frac{3x-10}{4} = 1$$

$$2x - (3x - 10) = 4$$

$$2x - 3x + 10 = 4$$

$$x = 6$$

(b) Sub $x = \frac{y}{3}$ into the equation in (a), we get the desired equation.

Thus, we have $y = 3 \times 6 = 18$ as the required solution.

$$5. \quad (a) \quad \frac{5x}{2} - \frac{3x+2}{6} = \frac{2x+3}{3}$$

$$15x - (3x + 2) = 2(2x + 3)$$

$$15x - 3x - 2 = 4x + 6$$

$$8x = 8$$

$$x = 1$$

(b) Sub $x = \frac{y-5}{2}$ into the equation in (a), we get the desired equation.

Thus, we have $y = 1 \times 2 + 5 = 7$ as the required solution.

Part 4 - Number Problem

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

$$6x-2 = 3x+6+1$$

$$3x = 9$$

$$x = 3$$

2. Let x be the smaller number.

$$x+2+2x = 44$$

$$3x = 42$$

$$x = 14$$

The numbers are 14 and 16.

3. Let x be the ten digit.

$$10x+(12-x) = x+52$$

$$8x = 40$$

$$x = 5$$

The number is 57.

4. Let x be the unit digit.

$$2[10x+(10-x)] = 10(10-x) + x + 1$$

$$2(9x+10) = 100-10x+x+1$$

$$18x+20 = 101-9x$$

$$27x = 81$$

$$x = 3$$

The original number is 73.

Part 5A - 2 Parties Problem

1. A

Let x be the number of \$100 tickets.

$$100x + 80(20 - x) = 1680$$

$$20x = 80$$

$$x = 4$$

The number of \$100 ticket is 4.

2. C

Let x be the number of English novels.

$$50(2x) + 70x = 340$$

$$170x = 340$$

$$x = 2$$

He buys 4 Chinese novels.

3. B

Let x be the number of \$12 books.

$$8(12 - x) + 12x = 112$$

$$4x = 16$$

$$x = 4$$

The number of \$12 books is 4.