

第十三課 一元一次方程式(第十三級)

各位同學知道一元一次方程式中，往往會有分數出現的，以下是一個例子：

$$\frac{2}{3}x - \frac{1}{5} = 2x$$

我們的解法如下：

$$\frac{2}{3}x - 2x = \frac{1}{5}$$

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

$$\frac{-4}{3}x = \frac{1}{5}$$

$$x = \frac{\frac{1}{5}}{\frac{-4}{3}}$$

$$x = \left(\frac{1}{5}\right) \times \left(\frac{3}{-4}\right)$$

$$x = -\frac{3}{20}$$

有些同學在處理分數加減的時候會犯錯，因此我們在此介紹一種方法來設法解除分數。以上題為例：

$$\frac{2}{3}x - \frac{1}{5} = 2x$$

我們先求 3 和 5 的最小公倍數，它是 15

將原式的左右式都乘以 15

$$15 \times \left(\frac{2}{3}x - \frac{1}{5}\right) = 15(2x)$$

$$10x - 3 = 30x$$

$$10x - 30x = 3$$

$$-20x = 3$$

$$x = -\frac{3}{20}$$

各位同學有沒有感到去掉分數以後，運算會變得比較容易？以下是一些例子：

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

2 和 3 的最小公倍數是 6

$$6\left(\frac{1}{2}x - \frac{1}{3}\right) = 6(5x)$$

$$3x - 2 = 30x$$

$$3x - 30x = 2$$

$$-27x = 2$$

$$x = -\frac{2}{27}$$

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

$$6\left(3x - \frac{1}{3}\right) = 6\left(\frac{x}{2}\right)$$

$$18x - 2 = 3x$$

$$18x - 3x = 2$$

$$15x = 2$$

$$x = \frac{2}{15}$$

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

$$15\left(-\frac{2}{5}x + 3\right) = 15\left(\frac{1}{3}x\right)$$

$$-6x + 45 = 5x$$

$$-11x = -45$$

$$x = \frac{45}{11}$$

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

$$12(2 - \frac{1}{3}x) = 12(\frac{x}{4})$$

$$24 - 4x = 3x$$

$$-4x - 3x = -24$$

$$-7x = -24$$

$$x = \frac{24}{7}$$

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

$$6\left(-\frac{1}{2} + \frac{2}{3}x\right) = 6\left(\frac{x}{3}\right)$$

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

$$4x - 2x = 3$$

$$2x = 3$$

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

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

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

$$-6x + 10 = 3x$$

$$-6x - 3x = -10$$

$$-9x = -10$$

$$x = \frac{10}{9}$$

$$(7) \quad -\frac{1}{2} + \frac{x}{4} = \frac{3}{2}x$$

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

$$-2+x=6x$$

$$x-6x=2$$

$$-5x=2$$

$$x = -\frac{2}{5}$$

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

3、2、4 的最小公倍數是 12

$$12\left(\frac{x}{3} - \frac{1}{2}\right) = 12\left(\frac{3}{4}x\right)$$

$$4x-6=9x$$

$$4x-9x=6$$

$$-5x=6$$

$$x = -\frac{6}{5}$$

$$(9) \quad \frac{2}{3}x - \frac{1}{2} = \frac{x}{2}$$

$$6\left(\frac{2}{3}x - \frac{1}{2}\right) = 6\left(\frac{x}{2}\right)$$

$$4x-3=3x$$

$$4x-3x=3$$

$$x=3$$

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

$$10\left(-x + \frac{1}{2}\right) = 10\left(\frac{x}{5}\right)$$

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

$$-10x-2x=-5$$

$$-12x=-5$$

$$x = \frac{5}{12}$$

$$(11) \quad \frac{1}{3} - \frac{x}{2} = \frac{-4x}{3}$$

$$6\left(\frac{1}{3} - \frac{x}{2}\right) = 6\left(\frac{-4x}{3}\right)$$

$$2 - 3x = -8x$$

$$-3x + 8x = -2$$

$$5x = -2$$

$$x = -\frac{2}{5}$$

$$(12) -\frac{x}{3} - \frac{1}{2} = \frac{x}{4}$$

$$12\left(-\frac{x}{3} - \frac{1}{2}\right) = 12\left(\frac{x}{4}\right)$$

$$-4x - 6 = 3x$$

$$-4x - 3x = 6$$

$$-7x = 6$$

$$x = -\frac{6}{7}$$

$$(13) \frac{x}{5} - \frac{1}{2} = \frac{x}{2}$$

$$10\left(\frac{x}{5} - \frac{1}{2}\right) = 10\left(\frac{x}{2}\right)$$

$$2x - 5 = 5x$$

$$2x - 5x = 5$$

$$-3x = 5$$

$$x = -\frac{5}{3}$$

$$(14) -\frac{1}{3} + \frac{x}{2} = \frac{2}{3}x$$

$$6\left(-\frac{1}{3} + \frac{x}{2}\right) = 6\left(\frac{2}{3}x\right)$$

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

$$3x - 4x = 2$$

$$-x = 2$$

$$x = -2$$

$$(15) \frac{1}{3} - \frac{x}{5} = \frac{2}{3}x$$

$$15\left(\frac{1}{3} - \frac{x}{5}\right) = 15\left(\frac{2}{3}x\right)$$

$$5 - 3x = 10x$$

$$-3x - 10x = -5$$

$$-13x = -5$$

$$x = \frac{5}{13}$$

習題	答案
(1) $\frac{1}{2}x - 5 = \frac{x}{3}$	$x=30$
(2) $\frac{2}{3}x + 4 = -\frac{4}{3}x$	$x=-2$
(3) $\frac{x}{5} - 1 = \frac{1}{2}$	$x=\frac{15}{2}$
(4) $x - \frac{1}{2} = \frac{x}{3}$	$x=\frac{3}{4}$
(5) $-\frac{2}{3}x - 2 = \frac{4}{3}x$	$x=-1$
(6) $\frac{7}{2}x - \frac{1}{2} = 3x$	$x=1$
(7) $\frac{3}{2}x - 2 = \frac{x}{3}$	$x=\frac{12}{7}$
(8) $\frac{x}{3} - 1 = \frac{3x}{4}$	$x=-\frac{12}{5}$
(9) $-x + \frac{1}{3} = -\frac{x}{2}$	$x=\frac{2}{3}$
(10) $-\frac{x}{5} - \frac{1}{2} = x$	$x=-\frac{5}{12}$
(11) $-\frac{x}{3} + \frac{1}{2} = \frac{x}{2}$	$x=\frac{3}{5}$
(12) $\frac{x}{3} - \frac{1}{2} = \frac{x}{2}$	$x=-3$
(13) $-\frac{x}{5} + \frac{1}{2} = \frac{x}{2}$	$x=\frac{5}{7}$
(14) $-x + \frac{1}{2} = \frac{2}{3}x$	$x=\frac{3}{10}$

(15) $2x - \frac{1}{3} = \frac{2}{3}x$	$x = \frac{1}{4}$
(16) $-\frac{x}{2} + \frac{4}{3} = \frac{-5x}{3}$	$x = -\frac{8}{7}$