



代數學不定方程式諺解下卷

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新海

米	虫	三斗七升	虫	蝕
此代金百	蝕	兩	銀拾三及八分	

但 米相場金壹兩壹斗三升
銀兩替六拾又

上圖の如き書付り虫蝕所の米高及ひ代金找補ふ其數幾何

羊亭發微卷下

洋算發微卷一
 一
 答曰 代金百九十五兩十銀十三匁八分
 米高二十五石三斗七升九合九夕

百兩以下代金 = x

百兩以下米 = y

- (1) 端銀米 = $\frac{13.8 \times 13}{60} = 2.99$ 故 $0.99 =$ 年下虫銀
- (2) 百兩ノ米 = $13 \times 100 = 1300$
- (3) $37 - 2 = 43x - y$
- (4) $13x = y + 35$
- (5) $x = \frac{y + 35}{13} = 2 + \frac{y + 9}{13}$ (6) $\frac{y + 9}{13} = x$
- (7) $x = 2 + x$ (8) $y + 9 = 13x$

故

$$x = 2 + x$$

$$(9) \quad y = 13x - 9$$

$$x = 93 \text{ と假定}$$

$$x = 95$$

$$y = 1200$$

$$\text{代金} = 100 + x + 13.8 \text{ 銀}$$

$$\text{則} \quad 195 \text{ 金 } 13.8 \text{ 銀}$$

$$\text{米高} = 1300 + y + 37 + 0.99 \quad \text{則} \quad 2537.99$$

銀貳貫 **む** 五匁貳分

貳百五十三人ニ割

一人前 銀 **く** 四分

上圖の如き書付
 有り虫蝕所の銀
 以補ふ其數幾何

答曰 銀二貫百二十五匁二分
一人前銀八匁四分

總銀虫蝕—— x

一人銀虫蝕—— y

- (1) $253(y+0.4) = 2000 + 10x + 5.2$
- (2) $253y + 101.2 = 2005.2 + 10x$
- (3) $253y = 1904 + 10x$
- (4) $10x = 253y - 1904$
- (5) $x = \frac{253y - 1904}{10} = 25y - 190 + \frac{3y - 4}{10}$
- (7) $x = 25y - 190 + z$ (6) $\frac{3y - 4}{10} = z$

- (8) $3y - 4 = 10z$
 - (9) $3y = 10z + 4$
 - (10) $y = \frac{10z + 4}{3} = 3z + 1 + \frac{z + 1}{3}$
 - (11) $\frac{z + 1}{3} = t$ (12) $y = 3z + 1 + t$
 - (13) $z + 1 = 3t$ (15) $y = 3(3t - 1) + 1 + t = 10t - 2$
 - (14) $z = 3t - 1$
 - (16) $x = 25(10t - 2) - 190 - 3t - 1 = 253t - 241$
- 故 $x = 253t - 241$ $y = 10t - 2$

$t = 1$ と假定す

$x = 12$

$y = 8$

羊年受取表下

銀高——21252

一人銀——84

甲乙二人筆耕者有り甲を一日小紙數三十六枚
乙寫を乙を一日小紙數二十五枚乙寫を書畢て
甲より乙を紙數五枚少くとソふ甲乙の寫日數
各幾何

答曰 甲寫日數五日 乙寫日數七日

甲日數—— x

乙日數—— y

(1) $36x - 25y = 5$

(2) $25y = 36x - 5$

(3) $y = \frac{36x-5}{25} = x + \frac{11x-5}{25}$

(5) $y = x - 2$ (4) $\frac{11x-5}{25} = 2$

(6) $11x - 5 = 25 \times 2$

(7) $11x = 25 \times 2 + 5$

(8) $x = \frac{25 \times 2 + 5}{11}$

(9) $\frac{3x+5}{11} = t$ (10) $x = 2x + t$

(11) $3x + 5 = 11t$

(12) $3x = 11t - 5$

(13) $x = \frac{11t-5}{3} = \frac{12t-5-t}{3} = 4t - 1 - \frac{2+t}{3}$

(15) $x = 4t - 1 - u$ (14) $\frac{2+t}{3} = u$

(18) $z = 4(3u - 2) - 1 - u$ (16) $2 + t = 3u$

$= 11u - 9$ (17) $t = 3u - 2$

(19) $x = 2(11u - 9) + 3u - 2 = 25u + 20$

(20) $y = 25u - 20 + 11u - 9 = 36u - 29$

$x = 25u - 20$ $y = 36u - 29$

$u = 1$ と假定す

$x = 5$ $y = 7$

銀九百九拾八匁越大小の包小して餘りなり

おめんと欲を大壹包百十三匁小一包六十四匁
小して大小各包數幾何

答曰 大包六箇 小包五箇

大包數—— x 小包數—— y

(1) $113x + 64y = 998$

(2) $64y = 998 - 113x$

(3) $y = \frac{998 - 113x}{64} = 15 - x - \frac{49x - 38}{64}$

(5) $y = 15 - x - z$ (4) $\frac{49x - 38}{64} = z$

(6) $49x - 38 = 64z$

洋算彙編卷下

四

(7) $49x = 64z + 38$

(8) $x = \frac{64z + 38}{49} = z + \frac{15z + 38}{49}$

(9) $\frac{15z + 38}{49} = t$ (10) $x = z + t$

(11) $15z + 38 = 49t$

(12) $15z = 49t - 38$

(13) $z = \frac{49t - 38}{15} = 3t - 2 + \frac{4t - 8}{15}$

(15) $z = 3t - 2 + u$ (14) $\frac{4(t-2)}{15} = u$

(20) $z = 3(15t + 2) - 2 + 4t$ (16) $\frac{t-2}{15} = v$

$= 49t + 4$ (17) $u = 4t$

(18) $t - 2 = 15v$

(19) $t = 15v + 2$

(21) $x = 49v - 4 + 15v + 2 = 64v + 6$

(22) $y = 15 - 64v - 6 - 49v - 4 = 5 - 113v$

故 $x = 6 + 64v$ $y = 5 - 113v$

$v = 0$ と假定ス

$x = 6$ $y = 5$

南北小關あり上士下士之邊城守る南者一組乃
上士二拾一人下士八十五人北者一組乃上士九
人下士百二十二人但南北共小上士合する數者

(19) $t-2=15t$

(20) $t=15t+2$

(22) $y=49t+4+15t+2=64t+6$

(23) $x=15-64t-6-49t-4=5-113t$

故 $x=5-113t$ $y=6+64t$

$t=0$ と假定す

$x=5$ $y=6$

或人米銭買ふ其出金銭あるを金壹兩ニ付一斗五升の米銭買ふ小四斗五升俵よりて端あり又

一斗六升の相場小買ふ時三斗八升俵よりて端米二斗八升何りとしよ出金及前後俵數各幾何

但
下
不
盡
ち

出金五拾四兩

答曰 前俵數十八俵

后俵數二十二俵ト二斗八升

出金—— x 前俵數—— y 后俵數—— z

(1) $15x=45y$ (3) $16x=38z+28$
 $15)$ $x=3y$ (4) $8x=19z+14$

- (5) $x = \frac{19z+14}{8} = 2z+1 + \frac{3z+6}{8}$
- (7) $x = 2z+1+t$ (6) $\frac{3(z+2)}{8} = t$
- (12) $x = 2(8u-2)+1+3v(8)$ $\frac{z+2}{8} = u$
 $= 19u-3$ (9) $3u = t$
- (13) $3y = 19u-3$ (11) $z+2 = 8u$
- (14) $y = \frac{19u-3}{3} = 6u-1 + \frac{u}{3}$ (15) $\frac{u}{3} = v$
- (16) $y = 6u-1+v$ (17) $u = 3v$
- (18) $y = 18v-1+v = 19v-1$ (20) $z = 24v-2$
- (19) $x = 57v-3$

故 $x = 57v-3$ $y = 19v-1$ $z = 24v-2$

$v = 1$ と假定す

$x = 54$ $y = 18$ $z = 22$

或人三種乃布袷合して二拾丈四尺一寸袷金二拾一兩して買ふ但金壹兩ニ付上布為八尺中布為九尺三寸下布為一丈一尺とす上中下三種乃代金各幾何

但下不盡

答曰
 上布代金五兩 中布代金七兩
 下布代金九兩

上布代 = x 中布代 = y 下布代 = z

(1) $80x + 93y + 110z = 2041$

(2) $x + y + z = 21$

(3) $110x + 110y + 110z = 2310$ (110)

$80x + 93y + 110z = 2041$

(4) $30x + 17y = 269$

(5) $17y = 269 - 30x$

(6) $y = \frac{269 - 30x}{17}$ $15 - x = \frac{13x - 14}{17}$

(8) $y = 15 - x - t$ (7) $\frac{13x - 14}{17} = t$

(9) $13x - 14 = 17t$

(10) $13x = 17t + 14$
(11) $x = \frac{17t + 14}{13} = 1 + t + \frac{1 + 4t}{13}$

(12) $\frac{1 + 4t}{13} = w$ (13) $x = 1 + t + w$

(14) $1 + 4t = 13w$

(15) $4t = 13w - 1$

(16) $t = \frac{13w - 1}{4}$ (17) $\frac{w - 1}{4} = v$

$3w + \frac{w - 1}{4}$ (19) $w - 1 = 4v$

(18) $t = 3w + v$ (20) $w = 4v + 1$

(21) $t = 3(4v + 1) + v = 13v + 3$

(22) $x = 1 + 13v + 3 + 4v + 1 = 5 + 17v$

(23) $y = 15 - 5 - 17u - 13v - 3 = 7 - 30v$

(24) $z = 21 - x - y = 21 - 5 - 17u - 7 + 30v = 9 + 13v$

故 $x = 5 - 17u$ $y = 7 - 30v$ $z = 9 + 13v$

$u = 0$ と假定

$x = 5$ $y = 7$ $z = 9$

米三千俵以上下小分て出さむ十一人小て拾三俵つゝ出さ以上と共七人小て六俵つゝ出さ以下と共上下各人数幾何但上下人数の差最少き俵要と共

答曰 上千四百五十二人 下千四百九十八人

上人数 $= x$ 下人数 $= y$

(1) $\frac{13x + 6y}{11} = 3000$ (77)

(2) $91x + 66y = 231000$

(3) $66y = 231000 - 91x$

(4) $y = \frac{231000 - 91x}{66} = 3500 - x - \frac{25x}{66}$

(6) $y = 3500 - x - z$ (5) $\frac{25x}{66} = z$

(7) $25x = 66z$

(8) $x = \frac{66z}{25} = 2z + \frac{16z}{25}$

(9) $\frac{16x}{25} = t$ (10) $x = 2z + t$

(11) $16x = 25t$

(12) $z = \frac{25t}{16} = t + \frac{9t}{16}$ (13) $\frac{9t}{16} = z$

(14) $z = t + x$ (15) $9t = 16z$

(16) $t = \frac{16z}{9} = \frac{18z - 2z}{9} = 2z - \frac{2z}{9}$

(17) $\frac{2x}{9} = v$ (18) $t = 2z - v$

(19) $2x = 9v$

(20) $x = \frac{9v}{2} = 4v + \frac{v}{2}$ (21) $\frac{v}{2} = x$

(22) $x = 4v + w$ (23) $v = 2w$

(24) $w = 9w$ (25) $t = 18w - 2w = 16w$

(26) $x = 16w + 9w = 25w$

(27) $x = 50w + 16w = 66w$

(28) $y = 3500 - 66w - 25w = 3500 - 91w$

故 $x = 66w$ $y = 3500 - 91w$

$w = 22$ と假定す

$x = 1452$ $y = 1492$

$y - x = 46$ 至少差なり

軍將小其卒也る慶乃兵士哉問一不答て曰我兵

士一千より少し今四十八人つゝ分て一隊と
 爲せも十五人找餘を又四十二人つゝ分て一隊
 と爲せも三人找餘を若亦三十人つゝ分て九
 人不足といふ今卒ゆる處の兵士幾人ありや

總兵士五百九十一人

答曰 初 十二隊 次 十四隊

末 二十隊

總兵—— x

初隊—— a

次隊—— b

末隊—— c

(1)

$$x = 48a + 15$$

(2)

$$x = 42b + 3$$

(3) $x = 30c - 9$

(4) $48a + 15 = 42b + 3$

(5) $48a + 12 = 42b$

(6) $8a + 2 = 7b$

(7) $7b = 8a + 2$

(8) $b = \frac{8a+2}{7} = a + \frac{a+2}{7} = y$ (9) $\frac{a+2}{7} = y$

(10) $b = a + y$ (11) $a + 2 = 7y$

(13) $b = 7y - 2 + y = 8y - 2$ (12) $a = 7y - 2$

(14) $x = 48(7y - 2) + 15 = 336y - 81$

(15) $30c = x + 9 = 336y - 72$

(16) $C = \frac{336y-72}{30} = \frac{56y-12}{5} = 11y-2+\frac{y-2}{5}$

(18) $C = 11y-2+y$ (17) $\frac{y-2}{5} = y$

(19) $y-2=5y$

(20) $y=5y+2$

(21) $a = 7(5y+2)-2 = 35y+12$

(22) $b = 8(5y+2)-2 = 40y+14$

(23) $c = 11(5y+2)-2+y = 56y+20$

(24) $x = 48(35y+12)+15 = 1680y+591$

(25) $x = 42(40y+14)+3 = 1680y+591$

(26) $x = 30(56y+20)-9 = 1680y+591$

故 $x = 591-1680y$ $a = 12-35y$

$b = 14-40y$ $c = 20-56y$

$x < 1000$ $y = 0$ と假定す

$x = 591$ $a = 12$ $b = 14$ $c = 20$

一礮臺小三種の彈丸有り其重さ共小二千一百
 介有り而して第一種の彈丸を各重さ二十一介
 第二種を各重さ五十介第三種を各重さ七十二
 介あり今第一種の彈丸二分の一と第二種の彈
 丸三分の一と第三種の彈丸四分の三枚放發し

其残り三種の重さ合せて七百六十五斤ありと
よふ然る時を三種の弾丸各幾箇あるや

答曰
第一種一十箇 第二種九箇
第三種二十箇

第一个数=x 第二个数=y 第三个数=z

x = 2a y = 3b z = 4c

(1) $2a \times 21 + 3b \times 50 + 4c \times 72 = 2100$

(2) $42a + 150b + 288c = 2100$

(3) $7a + 25b + 48c = 350$

$$\begin{aligned} (4) \quad & 2100 - (a \times 21 + b \times 50 + 3c \times 72) = 765 \\ (5) \quad & 21a + 50b + 216c = 1335 \\ & 14a + 50b + 96c = 700 \end{aligned}$$

(6) $7a + 120c = 635$

(7) $7a = 635 - 120c$

(8) $a = \frac{635 - 120c}{7} = 90 - 17c + \frac{5-c}{7}$

(10) $a = 90 - 17c + t$ (9) $\frac{5-c}{7} = t$

(13) $a = 90 - 17(5-7t) + t$ (11) $5-c = 7t$

$= 5 + 120t$ (12) $c = 5 - 7t$

(14) $25b = 350 - 7a - 48c = 350 - 7(5 + 120t)$

$$-48(5-7t) = 75-504t$$

$$(15) \quad b = \frac{75-504t}{25} = 3-20t - \frac{4t}{25}$$

$$(17) \quad b = 3-20t-u \quad (16) \quad \frac{4t}{25} = u$$

$$(18) \quad 4t = 25u$$

$$(19) \quad t = \frac{25u}{4} = 6u + \frac{u}{4}$$

$$(20) \quad \frac{u}{4} = v \quad (22) \quad t = 6u+v = 25v$$

$$(21) \quad u = 4v$$

$$(23) \quad a = 5+120(25v) = 5+3000v$$

$$(24) \quad b = 3-20(25v)-4v = 3-504v$$

$$(25) \quad c = 5-7(25v) = 5-175v$$

$$(26) \quad \frac{a = 5+3000v}{x = 10+6000v} \quad (27) \quad \frac{b = 3-504v}{y = 9-1512v} \quad (3)$$

$$(28) \quad \frac{c = 5-175v}{z = 20-700v} \quad (4)$$

故 $x = 10+6000v$ $y = 9-1512v$

$$z = 20-7000v$$

$v = 0$ と假定す

$$x = 10 \quad y = 9 \quad z = 20$$

甲乙の入砵試る小甲の入玉數三百四十枚

發中乙の人を玉數四百枚發せ而して甲乙の人
 發せし中玉合せて七百十一何り各何分の中
 里ありや 但厘位小
 止當り盡ふ

答曰
 甲中り九分五厘
 乙中り九分七厘

甲中 = x

乙中 = y

(1) 340x + 400y = 711

(2) 340x = 711 - 400y

(3) x = $\frac{711 - 400y}{340} = 2 - y - \frac{60y - 31}{340}$

(5) x = 2 - y - z

(4) $\frac{60y - 31}{340} = z$

(6) 60y - 31 = 340z

(7) 60y = 340z + 31

(8) y = $\frac{340z + 31}{60} = 5z + \frac{40z + 31}{60}$

(9) $\frac{40z + 31}{60} = t$ (10) y = 5z + t

(11) 40z + 31 = 60t

(12) 40z = 60t - 31

(13) z = $\frac{60t - 31}{40} = t - \frac{31 - 20t}{40}$

(15) z = t - u (14) $\frac{31 - 20t}{40} = u$

(19) z = 1.55 - 2u - u (16) 31 - 20t = 40u

$$= 1.55 - 3u \quad (17) \quad 20t = 40u - 31$$

$$(18) \quad t = \frac{31 - 40u}{20}$$

$$= 1.55 - 2u$$

$$(20) \quad y = 5(1.55 - 3u) - 1.55 - 2u = 9.3 - 17u$$

$$(21) \quad x = 2 - 9.3 - 17u - 1.55 - 3u = 20u - 8.85$$

$$\text{故} \quad x = 20u - 8.85 \quad y = 9.3 - 17u$$

$$u = 0 \text{ と假定}$$

$$x = -8.85 \quad y = 9.3$$

$$u = 1 \text{ と假定}$$

$$x = 11.15 \quad y = -7.7$$

今uを假し0と定むる時はx負、y得る又uを1と定むる時はx負、y得る且各一箇以上の數を得て問ふ合を以故にuを五分と定む

$$u = 0.5$$

$$x = 1.15 \quad y = 0.8$$

uを五分と定め得る處の兩數を視るに各正數とすともxは一箇の數あり未だ問ふ合を以故にuを四分九厘と定む

$$u = 0.49$$

$$x = 0.95 \quad y = 0.94$$

是ふ於て得る數則答とす

唐機縞貳百五十三反

此代銀 虫 五拾貳反

但壹反ニ付 蝕 反替

上圖の如き
書付何り虫
蝕所の代銀
及ひ一反の

代銀幾何

答曰

虫蝕所の代銀二拾壹貫二百目
壹反ニ付八拾四反

	一及代 = x	虫蝕所代 = y
(1)	$100y + 52 = 253x$	
(2)	$100y = 253x - 52$	
(3)	$y = \frac{253x - 52}{100}$	$2x + \frac{53x - 52}{100}$
(5)	$y = 2x + x$	(4) $\frac{53x - 52}{100} = x$
		(6) $53x - 52 = 100x$
(8)		(7) $53x = 100x + 52$
	$x = \frac{100x + 52}{53}$	$106x + 52 - 6x = 2x + \frac{52 - 6x}{53}$
(9)	$\frac{52 - 6x}{53} = t$	(10) $x = 2x + t$
(11)	$52 - 6x = 53t$	

(12) $6z = 52 - 53t$

(13) $z = \frac{52 - 53t}{6} = \frac{52 - 54t + t}{6} = 8 - 9t + \frac{4+t}{6}$

(15) $z = 8 - 9t + u$ (14) $\frac{4+t}{6} = u$

(18) $z = 8 - 9(6u - 4) + u$ (16) $4+t = 6u$

$= 44 - 53u$ (17) $t = 6u - 4$

(19) $x = 2(44 - 53u) + 6u - 4 = 84 - 100u$

(20) $y = 2(84 - 100u) + 44 - 53u = 212 - 253u$

故 $x = 84 - 100u$ $y = 212 - 253u$

$u = 0$ と假定ス

$x = 84$ $y = 212$

今藏小米何り其俵數杖問へも四斗壹升七合廻
一も一も二千俵不足らむといふ然るも此米三
斗八升壹合廻一斗直一端米二斗壹合何り俵數
を貳千俵餘小あるといふ前後正一き石數杖云
も以是杖算する時多原石及前後俵數各幾何杖
得るあり算士小問へと答ふ乞ふ其數幾何

原石高七百九十二石三斗

答曰 前云千九百俵

后云二千七十九俵

石數 = x 前後 = 1000 + a 右後 = 2000 + b

(1) $x = 417(1000 + a) = 417000 + 417a$

(2) $x^2 = 381(2000 + b) + 201 = 762201 + 381b$

(3) $41700 + 417a = 762201 + 381b$

(4) $417a = 345201 + 381b$

(5) $381b = 417a - 345201$

(6) $381b = 417a - 345201$ (10)

(7) $127b = 139a - 115067$

(8) $b = \frac{139a - 115067}{127} = a - 906 + \frac{12a - 5}{127}$

(10) $b = a - 906 + y$ (9) $\frac{12a - 5}{127} = y$

(11) $12a - 5 = 127y$

(12) $12a = 127y + 5$

(13) $a = \frac{127y + 5}{12} = 10y + \frac{7y + 5}{12}$

(14) $\frac{7y + 5}{12} = x$ (15) $a = 10y + x$

(16) $7y + 5 = 12x$

(17) $7y = 12x - 5$

(18) $y = \frac{12x - 5}{7} = x + \frac{5x - 5}{7}$

(20) $y = x + t$ (19) $\frac{5(x - 1)}{7} = t$

(25) $y = 7x + 1 + 5x$ (21) $\frac{x - 1}{7} = x$

$= 12x + 1$ (22) $t = 5x$

(23) $x-1 = 7x$

(24) $x = 7x+1$

(26) $a = 10(12x+1)+7x+1 = 120x+10+7x,$
 $+ 1 = 127x+11$

(27) $b = 127x+11 - 906+12x+1 = 139x-894$

(28) $x = 41700+417(127x+11) = 41700,$
 $- 26145.9x+4587 = 421587 + 52959x$

(29) $x = 76220.1+381(139x-894) = 76220.1,$
 $+ 52959x - 340614 = 421587+52959x$

故

$x = 421587 + 52959x$

$a = 11+127x \quad b = 894-139x$

$x = 7$ と假定す

$x = 79230 \quad a = 900 \quad b = 79$

前債 = 1000+900 = 1900

右債 = 2000+79 = 2079

今國債找集む事あり上中下の三士找しを三
百九両找さしむ但三士合て五拾人とソ上
士一人の出金拾兩貳分中士一人の出金八兩下

士一人の出金一両二分あり各人數幾何

上士拾三人 中士拾八人

答曰 下士拾九人

上士 $\equiv x$ 中士 $\equiv y$ 下士 $\equiv z$

(1) $x + y + z = 50$

(2) $105x + 8y + 1.5z = 309$

(3) $105x + 80y + 15z = 3090$ (10)

$15x + 15y + 15z = 750$

(4) $90x + 65y = 2340$ (5)

(5) $18x + 13y = 468$

(6) $13y = 468 - 18x$

(7) $y = \frac{468 - 18x}{13} = 36 - x - \frac{5x}{13}$

(9) $y = 36 - x - t$ (8) $\frac{5x}{13} = t$

(10) $5x = 13t$

(11) $x = \frac{13t}{5} = \frac{15t - 2t}{5}$

(12) $\frac{2t}{5} = u$ $= 3t - \frac{2t}{5}$

(14) $2t = 5u$ (13) $x = 3t - u$

(15) $t = \frac{5u}{2} = 2u + \frac{u}{2}$

(17) $t = 2u + u$

(19) $t = 4v - v$ (16) $\frac{v}{2} = v$

$= 5v$ (18) $u = 2v$

(20) $x = 15v - 2v = 13v$

(21) $y = 36 - 13v - 5v = 36 - 18v$

(22) $z = 50 - x - y = 50 - 13v - 36 + 18v = 14 + 5v$

故 $x = 13v$ $y = 36 - 18v$

$z = 14 + 5v$

$v = 1$ と假定ス

$x = 13$ $y = 18$ $z = 19$

今一千間小近き地何り一丈三尺五寸の竿伐以て計る小七尺五寸盈る亦一丈四尺七寸の竿伐以て計るを五尺一寸盈る定間數及初后計數幾何

定間數九百九拾八間

答曰 初計數四百四十三度

后計數四百零七度

定間數—— x 初計數—— y 后計數—— z

(1) $x = \frac{135y + 75}{60}$

(2) $x'' = \frac{147x+51}{60}$

(3) $135y+75 = 147x+51$

(4) $135y = 147x-24$

(5) $y = \frac{147x-24}{135} = x + \frac{12x-24}{135}$

(7) $y = x+t$ (6) $\frac{12(x-2)}{135} = t$

(12) $y = 135u+2+12u$ (8) $\frac{x-2}{135} = u$

$= 147u+2$ (9) $t = 12u$

(10) $x-2 = 135u$

(11) $x = 135u+2$

(13) $x' = \frac{135(147u+2)+75}{60} = \frac{19845u+345}{60}$

(14) $x'' = \frac{147(133u+2)+51}{60} = \frac{19845u+345}{60}$

$= \frac{1323u+23}{4} = 330u+5 + \frac{3u+3}{4}$

(16) $x = 330u+5+v$ (15) $\frac{3(u+1)}{4} = v$

(21) $x = 330(4w-1)+5$ (17) $\frac{u+1}{4} = w$

$+3w = 1320w-330$ (18) $v = 3w$

$+5+3w = 1323w-325$ (19) $u+1 = 4w$

(20) $w = 4w-1$

(22) $x = 135(4w-1)+2 = 540w-133$

(23) $y = 147(4w-1)+2 = 588w-145$

故 $x = 1323w-325$

$$y = 588w - 145$$

$$z = 540w - 133$$

w — 1 と假定

$$x = 998$$

$$y = 443$$

$$z = 407$$

武者屯あり其數伐ちつ平均一坪ニ付七人宛
 あり其總人數伐二十五人つ分是ち九人盈了
 亦三十拾六人つ分是ち拾五人盈了屯坪數幾何
 答曰 五百三十拾七坪

坪數 — x

初分數 — y

后分數 — z

$$(1) \quad x' = \frac{25y+9}{7}$$

$$(2) \quad x'' = \frac{36z+15}{7}$$

$$(3) \quad 25y+9 = 36z+15$$

$$(4) \quad 25y = 36z+6$$

$$(5) \quad y = \frac{36z+6}{25} = z + \frac{11z+6}{25}$$

$$(7) \quad y = z+t \quad (6) \quad \frac{11z+6}{25} = t$$

$$(18) \quad y = 25v+4+11v+2 \quad (8) \quad 11z+6 = 25t$$

$$= 36v+6 \quad (9) \quad 11z = 25t-6$$

$$(10) \quad z = \frac{25t-6}{11} = 2t + \frac{3t-6}{11}$$

$$(11) \quad \frac{3(t-2)}{11} = v$$

$$(12) \quad z = 2t+v$$

(13) $\frac{t-2}{11} = v$ (17) $z = 22v + 4 + 3v$

(14) $u = 3v$ $= 25v + 4$

(15) $t - 2 = 11v$

(16) $t = 11v + 2$

(19) $x = \frac{25(36v+6)+9}{7} = \frac{900v+159}{7}$

(20) $x' = \frac{36(25v+4)+15}{7} = \frac{900v+159}{7} = 128v + 22 + \frac{4v+5}{7}$

(22) $x = 128v + 22 + w$ (21) $\frac{4v+5}{7} = w$

(23) $4v+5 = 7w$

(24) $4v = 7w - 5$

(25) $v = \frac{7w-5}{4} = \frac{8w-w-5}{4} = 2w-1 - \frac{w+1}{4}$

(26) $\frac{w+1}{4} = p$ (27) $v = 2w-1-p$

(28) $w = 4p-1$ (29) $v = 8p-2-1, -p = 7p-3$

(30) $x = 28(7p-3) - 22 - 4p - 1 = 896p - 384 - 22 - 4p,$

$-1 = 900p - 363$

(31) $z = 25(7p-3) + 4 = 175p - 71$

(32) $y = 36(7p-3) + 6 = 252p - 102$

故 $x = 900p - 363$ $y = 252p - 102$

$z = 175p - 71$

p — 1 と假定

$x = 537$

$y = 150$

$z = 104$

某數何り三拾四箇杖乘し八除する時を六箇杖餘を又二拾除する時を拾四箇杖餘を亦二十七除する時を二拾三箇杖餘をといふ此某數幾何

答曰 一十一箇

某數 = x 八因段數 = a 二十四因段數 = b 二十七因段數 = c

(1) $34x = 8a + 6$

- (2) $34x = 20b + 14$
- (3) $34x = 27c + 23$
- (4) $8a + 6 = 20b + 14$
- (5) $8a = 20b + 8$
- (6) $\overset{4)}{2a} = 5b + 2$
- (7) $a = \frac{5b+2}{2} = 2b + 1 + \frac{b}{2}$
- (8) $\frac{b}{2} = y$
- (9) $a = 2b + 1 + y$
- (10) $b = 2y$
- (11) $a = 4y + 1 + y$
- (12) $20b + 14 = 27c + 23$

(13) $206 = 27C + 9$

(14) $40y = 27C + 9$

(15) $27C = 40y - 9$

(16) $C = \frac{40y-9}{27} = y + \frac{13y-9}{27}$

(18) $C = y + z$ (17) $\frac{13y-9}{27} = z$

(19) $13y - 9 = 27z$

(20) $13y = 27z + 9$

(21) $y = \frac{27z+9}{13} = 2z + \frac{x+9}{13}$

(22) $\frac{x+9}{13} = t$ (23) $y = 2z + t$

(24) $x + 9 = 13t$ (26) $y = 26t - 18 + t$

(25) $x = 13t - 9 = 27t - 18$

(27) $C = 27t - 18 + 13t - 9 = 40t - 27$

(28) $t = 2(27t - 18) = 54t - 36$

(29) $a = 5(27t - 18) + 1 = 135t - 89$

(30) $34x = 8(135t - 89) + 6 = 1080t - 706$

(31) $34x' = 20(54t - 36) + 14 = 1080t - 706$

(32) $34x'' = 24(40t - 27) + 23 = 1080t - 706$

故 $34x = 1080t - 706$ $a = 135t - 89$

$t = 54t - 36$ $C = 40t - 27$

十 $\frac{1}{13}$ 假定

$$34x = 374$$

$$x = 11$$

$$a = 46$$

$$b = 18$$

$$c = 13$$

一書册有り其紙數七枚つゝ算を並ぶ一枚残
り亦拾枚つゝ算されも六枚餘る又三枚つゝ算
を並ぶ其數盡くすと其紙數幾何

答曰 紙數二百四拾六枚

紙數 = x

初算度 = a

中算度 = b

末算度 = c

(1)

$$x = 7a + 1$$

(2)

$$x = 10b + 6$$

(3)

$$x = 3c$$

(4)

$$7a + 1 = 10b + 6$$

(5)

$$7a = 10b + 5$$

(6)

$$a = \frac{10b+5}{7} = b + \frac{3b+5}{7}$$

(8)

$$a = b + y$$

(7)

$$\frac{3b+5}{7} = y$$

(17)

$$a = 7z + 3 + 3z + 2$$

(9)

$$3b + 5 = 7y$$

$$= 10z - 5$$

(10)

$$3b = 7y - 5$$

(11)

$$b = \frac{7y-5}{3} = 2y-1 + \frac{y-2}{3}$$

(12)

$$\frac{y-2}{3} = z$$

(13)

$$b = 2y-1+z$$

(14) $y - 2 = 3x$ (16) $t = 2(3x + 2)$

(15) $y = 3x + 2$ $- 1 + x = 7x + 3$

(18) $7a + 1 = 3c$

(19) $7(10x + 5) + 1 = 3c$

(20) $3c = 70x + 36$

(21) $c = \frac{70x + 36}{3} = 23x + 12 + \frac{x}{3}$

(23) $c = 23x + 12 + t$ (22) $\frac{x}{3} = t$

(25) $c = 69t + 12 + t$ (24) $x = 3t$

$= 70t + 12$

(26) $t = 21t + 3$

(27) $a = 30t + 5$

(28) $x = 7(30t + 5) + 1 = 210t + 36$

(29) $x = 10(21t + 3) + 6 = 210t + 36$

(30) $x = 3(70t + 12) = 210t + 36$

故 $x = 210t + 36$ $a = 30t + 5$

$t = 21t + 3$ $c = 70t + 12$

$t = 1$ と假定す

$x = 246$ $a = 35$

$t = 24$ $c = 82$

又 $t = 0$ と假定す

$$x = 36 \quad a = 5$$

$$b = 3 \quad c = 12$$

某數より三十五乗四十二除して三拾五箇杖餘
 を亦四拾四乗三拾二除して二拾八箇杖餘を亦
 四十五乗五十除して三十五箇杖餘をといふ此
 某數幾何

答曰 某數一拾三箇

某數 — x 初商 — a 次商 — b 末商 — c

- (1) $35x = 42a + 35$
- (2) $44x = 32b + 28$
- (3) $45x = 50c + 35$
- (4) $9(42a + 35) = 7(50c + 35)$
- (5) $378a + 315 = 350c + 245$
- (6) $378a + 70 = 350c$
- (7) $189a + 35 = 175c$
- (8) $c = \frac{189a + 35}{175} = \frac{27a + 5}{25} = a + \frac{2a + 5}{25}$
- (9) $c = a + y$
- (10) $c = a + y$
- (11) $2a + 5 = 25y$

洋算發微卷下

廿三

$$\begin{aligned} &= 27x+11 & (12) & \quad 2a = 25y-5 \\ (13) & \quad a = \frac{25y-5}{2} = 12y-2 + \frac{y-1}{2} \\ (14) & \quad \frac{y-1}{2} = x & (15) & \quad a = 12y-2+x \\ (16) & \quad y-1 = 2x & (18) & \quad a = 12(2x+1)-2+x \\ (17) & \quad y = 2x+1 & & \quad = 25x+10 \\ (20) & \quad 44(50c+35) = 45(32b+28) \\ (21) & \quad 2200c+1540 = 1440b+1260 \\ (22) & \quad 2200c+280 = 1440b \\ & \quad 40) \frac{55c+7}{36b} = 36b \\ (24) & \quad 36b = 55(27x+11)+7 = 1485x+612 \end{aligned}$$

$$\begin{aligned} (25) & \quad b = \frac{1485x+612}{36} = \frac{165x+68}{4} \\ (27) & \quad b = 41x+17+t & & = 41x+17+\frac{x}{4} \\ (29) & \quad b = 164t+17+t & (26) & \quad \frac{x}{4} = t \\ & & & = 165t+17 & (28) & \quad x = 4t \\ (30) & \quad a = 25(4t)+10 = 100t+10 \\ (31) & \quad c = 27(4t)+11 = 108t+11 \\ (32) & \quad x = \frac{42(100t+10)+35}{35} = \frac{4200t+455}{35} \\ & & & = 120t+13 \\ (33) & \quad x = \frac{32(165t+17)+28}{44} = \frac{5280t+572}{44} \\ & & & = 120t+13 \end{aligned}$$

洋算發微卷下

廿三

算術發微卷一

九三

$$(34) \quad x^2 = \frac{50(108t+11)+35}{45} = \frac{5400t+585}{45} = 120t+13$$

故 $x = 13+120t \quad a = 10+100t$

$$b = 17+165t \quad c = 11+108t$$

$t = 0$ と假定す

$$x = 13 \quad a = 10$$

$$b = 17 \quad c = 11$$

今米は貯ふ其俵數は x より甲の人算して曰其米の俵數を二拾九分の二拾三と爲す時を a 以上

の數は i より其末九拾三俵あり乙の人亦算して曰拾一分の八と爲す時を其末九拾二俵あり丙の人亦算して曰拾九分の拾七と爲す時を其末七拾七俵あり因て此貯米及各算する處の俵數幾何

答曰

- 貯米九拾〇万〇〇三拾九俵
- 甲 四拾七万五千八百九拾三俵
- 乙 四拾三万六千三百九拾二俵
- 丙 五拾三万六千八百七拾七俵

野米— x 甲百粒以上米— a 乙同上— b 丙同上— c

- (1) $\frac{23x}{29} = 100a + 93$
- (2) $23x = 2900a + 2697$
- (3) $x = \frac{2900a + 2697}{23} = 126a + 117 + \frac{2a+6}{23}$
- (5) $x = 126a + 117 + y$ (4) $\frac{2(a+3)}{23} = y$
- (10) $x = 126(23x-3) + 117$ (6) $\frac{a+3}{23} = x$
 $+ 2x = 2900x - 261$ (7) $y = 2x$
- (23) $x = 2900(11t+9) - 261$ (8) $a+3 = 23x$
 $= 31900t + 25839$ (9) $a = 23x - 3$
- (11) $\frac{8x}{11} = 100b + 92$ (24) $a = 23(11t+9) - 3$

- (12) $8x = 1100b + 1012 = 253t + 204$
- (13) $8(2900x - 261) = 1100b + 1012$
- (14) $23200x - 2088 = 1100b + 1012$
- (15) $23200x - 3100 = 1100b$
 $100) \underline{\hspace{1.5cm}}$
- (16) $232x - 31 = 11b$
- (17) $b = \frac{232x-31}{11} = 21x - 2 + \frac{x-9}{11}$
- (19) $b = 21x - 2 + t$ (18) $\frac{x-9}{11} = t$
- (22) $b = 21(11t+9) - 2$ (20) $x - 9 = 11t$
 $+ t = 232t + 187$ (21) $x = 11t + 9$
- (25) $\frac{17x}{19} = 100c + 77$

新編 卷上
 五

- (26) $17x = 1900c + 1463$
- (27) $17(31900t + 25839) = 1900c + 1463$
- (28) $542300t + 439263 = 1900c + 1463$
- (29) $542300t + 437800 = 1900c$
 $100) \underline{\hspace{1.5cm}}$
- (30) $5423t + 4378 = 19c$
- (31) $c = \frac{5423t + 4378}{19} = 285t + 230 + \frac{8t+8}{19}$
- (32) $c = 285t + 230 + a$ $\frac{8(t+1)}{19} = a$
- (33) $c = 285(19v - 1)$ $\frac{t+1}{19} = v$
- (34) $c = 285(19v - 1)$ $\frac{t+1}{19} = v$
- (35) $+ 230 + 8v = 5423v - 55$ $u = 8v$
- (36) $t + 1 = 19v$

- (37) $t = 19v - 1$
- (39) $b = 232(19v - 1) + 187 = 4408v - 45$
- (40) $a = 253(19v - 1) + 204 = 4807v - 49$
- (41) $x = 31900(19v - 1) + 25839 = 606100v - 6061$
 故 $x = 606100v - 6061$

- $a = 4807v - 49$
- $b = 4408v - 45$
- $c = 5423v - 55$

$v = 1$ と假定す

- $x = 900039$ $a = 4758$

$$b = 4368$$

$$c = 5368$$

$$\text{甲算米} = 100a + 93 = 475893$$

$$\text{乙算米} = 100b + 92 = 4368392$$

$$\text{丙算米} = 100c + 77 = 536877$$

甲乙の人小元銀同數小借を何り甲を二割乙を二割五分の利あり甲の元利和銀錢三拾三匁宛包餘二拾八匁八分乙の元利の和銀錢貳拾貳匁宛包餘貳匁五分あり又曰甲乙元利和銀合て四拾三匁宛包餘拾三匁三分甲乙元利和銀及各包

數幾何

甲乙元利和銀三貫〇貳拾三匁三分

答曰 初包數四十四 中包數七十

末包數七十

元利和銀 = x 元銀 = y 初包數 = a 中包數 = b 末包數 = c

$$(1) \quad y = \frac{33a + 28.8}{1.2}$$

$$(2) \quad y = \frac{22b + 2.5}{1.25}$$

$$(3) \quad \frac{22b + 2.5}{1.25} = \frac{33a + 28.8}{1.2}$$

$$(4) \quad 1.2(22b + 2.5) = 1.25(33a + 28.8)$$

算術卷一

十一

- (5) $2647+3 = 41,25a+36$
- (6) $2647 = 41,25a+33$ (20)
- (7) $5287 = 825a+660$
- (8) $33) 167 = 25a+20$
- (9) $6 = \frac{25a+20}{16} = a+1 + \frac{9a+4}{16}$
- (11) $6 = a+1+2$ (10) $\frac{9a+4}{16} = 2$
- (22) $6 = 16a-4+1+9a$ (12) $9a+4 = 16a$
 $-2 = 25a-5$ (13) $9a = 16a-4$
- (14) $a = \frac{16a-4}{9} = \frac{18a-2a-4}{9} = 2a - \frac{2(a+2)}{9}$
- (15) $\frac{2(a+2)}{9} = t$ (16) $a = 2a-t$

- (17) $\frac{x+2}{9} = a$ (21) $a = 2(9a-2)$
- (18) $t = 2a$ $-2a = 16a-4$
- (19) $x+2 = 9a$
- (20) $x = 9a-2$
- (23) $y = \frac{33(16a-4)+288}{12} = 440a-86$
- (24) $y = \frac{22(25a-5)+25}{125} = 440a-86$
- (25) $y = 440a-86$
- (26) $x = (12+125)y$
- (27) $(12+125)y = 430+133$
- (28) $245(440a-86) = 430+133$

算術卷一

十一

(29) $1078u - 2107 = 43c + 133$

(30) $1078u - 224 = 43c$

(31) $c = \frac{1078u - 224}{43} = 25u - 5 + \frac{3u - 9}{43}$

(33) $c = 25u - 5 + v$ (32) $\frac{3(u-3)}{43} = v$

(38) $c = 25(43w + 3) - 5$ (34) $\frac{u-3}{43} = w$

$+ 3w = 178w + 70$ (35) $v = 3w$

(36) $u - 3 = 43w$

(37) $u = 43w + 3$

(39) $a = 16(43w + 3) - 4 = 688w + 44$

(40) $b = 25(43w + 3) - 5 = 175w + 70$

(41) $y = 440(43w + 3) - 86 = 18920w + 1234$

(42) $x = 245y = 46354w + 30233$

故

$x = 30233 + 46354w$

$y = 1234 + 18920w$

$a = 44 + 688w$

$b = 70 + 175w$

$c = 70 + 178w$

$w = 0$ 假定

$x = 30233$ $y = 1234$

$a = 44$ $b = 70$ $c = 70$

洋算發微卷下

州州州
九

明治五年壬申春稿成

駿河島田驛

櫻井 三郎孟敦

同 静岡縣

宮川友次郎清明

同

杉本 朔政久

訂同

明治五年壬申歲四月

書

東京芝神明前

和泉屋市兵衛

同 大傳馬町三丁目

袋 屋龜次郎

西京寺町四條上ル

田中 治兵衛

大坂心齋橋南壹丁目

敦賀屋九兵衛

同所

秋田屋市兵衛

静岡江川町

本 屋市 藏 兌 護

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