

**ROBINSON'S MATHEMATICAL
SERIES. KEY TO THE
PROGRESSIVE HIGHER
ARITHMETIC: FOR TEACHERS AND
PRIVATE LEARNERS**

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HORATIO N. ROBINSON

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K E Y .

ADDITION.

(67, page 25.)

Ex. 3. Ans. 1982788.	Ex. 4. Ans. 435058.
Ex. 5. Ans. 8189.	Ex. 6. Ans. 289142.
Ex. 7. Ans. 415184.	Ex. 12. Ans. 3001623.
Ex. 13. Ans. 16977.	Ex. 16. Ans. 1881.
Ex. 17. Ans. 6076510.	Ex. 20. Ans. 21184000
Ex. 22. Ans. \$1924950.	

ADDING TWO OR MORE COLUMNS AT ONE OPERATION

(68, page 28.)

Ex. 5. Number of churches,	35887;
" " persons accommodated,	13847902;
Value of church property,	\$85774659.
Ex. 6. Pounds of butter,	312625306;
" " cheese,	105735893;
" " wool,	52516961;
Bushels of wheat,	100485844.

SUBTRACTION.

(75, page 31.)

Ex. 5. Ans. 174333815.	Ex. 6. Ans. 2361650877.
Ex. 7. Ans. 86602389426.	Ex. 9. Ans. 9000989311

(25-31)

- Ex. 10. *Ans.* 86 years. Ex. 13. *Ans.* \$44656518
 Ex. 15. *Ans.* 2121108 square miles; 316636286 population
 Ex. 20. *Ans.* 2657043.

TWO OR MORE SUBTRAHENDS.

(76, page 34.)

- | | |
|--|--|
| <p>Ex. 5. 4568</p> $\begin{array}{r} \underline{1320} \\ 275 \\ 820 \\ \hline 2653 \text{ Ans.} \end{array}$ | <p>Ex. 6. $4756 + 575 + 140 + 84 = 5555$</p> $\begin{array}{r} \underline{1200} \\ 750 \\ 96 \\ \hline 3509 \text{ Ans.} \end{array}$ |
| <p>Ex. 7. \$15760</p> $\begin{array}{r} \underline{2175} \\ 3794 \\ 4587 \\ \hline \$5204 \text{ Ans.} \end{array}$ | <p>Ex. 8. \$75860</p> $\begin{array}{r} \underline{46640} \\ 25175 \\ \hline \$5045 \text{ Ans.} \end{array}$ |
| <p>Ex. 9. 20000</p> $\begin{array}{r} \underline{11000} \\ 7000 \\ \hline \text{Ans. } 2000 \text{ square miles.} \end{array}$ | <p>Ex. 10. 398470</p> $\begin{array}{r} \underline{157548} \\ 148429 \\ \hline 97493 \text{ Ans.} \end{array}$ |
| <p>Ex. 11. \$61357088</p> $\begin{array}{r} \underline{52889800} \\ 234000 \\ \hline \$8233288 \text{ Ans.} \end{array}$ | <p>Ex. 12. $\\$5760 + \\$8575 = \\$9385$</p> $\begin{array}{r} \underline{2746} \\ 4632 \\ \hline \$1967 \text{ Ans.} \end{array}$ |

MULTIPLICATION.

7

Ex. 13. 643186

65038

114624

Ans. 463504

Ex. 14 \$8186793

5700314

904299

\$1582180 Ans.

Ex. 15. \$12722470

7821556

424497

2355016Ans. \$2121401

MULTIPLICATION.

(85, page 38.)

Ex. 7 *Ans.* 43506216.Ex. 8. *Ans.* 48288053.Ex. 16 *Ans.* 24500.Ex. 19. *Ans.* \$31647000Ex. 20. *Ans.* \$909000.

POWERS OF NUMBERS

(91, page 39.)

Ex. 1. $72 \times 72 = 5184.$ Ex. 2. $12 \times 12 \times 12 \times 12 \times 12 = 248832.$ Ex. 3. $25 \times 25 \times 25 = 15625.$ Ex. 4. $7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 = 823543$ Ex. 5. $19 \times 19 \times 19 \times 19 = 130321.$ Ex. 6. $3 \times 3 \times 3 \times 3 \times 3 \times 3 = 729$

(34-40)

Ex. 7. *Ans.* $9^4=59049$; $11^3=1331$; $18^2=324$; $125^4=244140625$; $786^2=617796$; $94^6=689869781056$; $100^4=100000000$; $17^3=4913$; $251^6=996250626251$.

Ex. 8. $8^3=512$; $15^2=225$; and $512 \times 225=115200$, *Ans.*

Ex. 9. $25^2=625$; $3^4=81$; and $625 \times 81=50625$, *Ans.*

Ex. 10. $7^2 \times 200=68600$; $4^4 \times 11^2=30976$; and $68600-30976=37624$, *Ans.*

CONTRACTIONS IN MULTIPLICATION.

(98, page 42.)

Ex. 1. $736 \times 6 \times 4=17664$, *Ans.*

Ex. 2. $538 \times 8 \times 7=30128$, *Ans.*

Ex. 3. $27865 \times 7 \times 3 \times 4$, or $27865 \times 7 \times 12=2840660$, *Ans.*

Ex. 4. $7856 \times 4 \times 4 \times 3 \times 3$, or $7856 \times 12 \times 12=1131264$, *Ans.*

Ex. 5. $\$185 \times 8 \times 7=\10360 , *Ans.*

Ex. 6. $17740872 \times 8 \times 12=1703123712$ cubic feet, *Ans.*

(99.)

Ex. 3. *Ans.* 50000 dollars. Ex. 4. *Ans.* 10000000000

(100, page 43.)

Ex. 3. *Ans.* 10350000. Ex. 5. *Ans.* 192128000

(102, page 44.)

Ex. 1. 5784

246

84704

138816

1422364 *Ans.*

Ex. 2. 3785

721

26495

79485

2728985 *Ans.*

(40-44)

MULTIPLICATION.

9

Ex. 3. 472856	Ex. 4. 43785
54918	7153
<hr/>	<hr/>
4255704	181855
8511408	656775
25534224	306495
<hr/>	<hr/>
25968305808 <i>Ans.</i>	313194105 <i>Ans.</i>
Ex. 5. 573042	Ex. 6. 78563721
24816	127869
<hr/>	<hr/>
4584888	707073489
9168672	2823298956
18753008	2121220467
<hr/>	78563721
14220610272 <i>Ans.</i>	<hr/>
	10006582580049 <i>Ans.</i>
Ex. 7. 48725652	Ex. 8. 8578426785
5187914	64532164
<hr/>	<hr/>
898580868	14818707140
787061736	57254828560
306079564	114509657120
612159128	17892133925
218628260	229019314240
<hr/>	<hr/>
226847922169928 <i>Ans.</i>	280923624151612740 <i>Ans.</i>
Ex. 9. 2708605	Ex. 10. 9462108
4249784	16824
<hr/>	<hr/>
18925235	75696864
132476645	227090592
118551410	151893728
227102820	<hr/>
<hr/>	159190504992 <i>Ans.</i>
11489737271320 <i>Ans.</i>	

EXAMPLES COMBINING THE PRECEDING RULES

(Page 45.)

Ex. 1. $\$28 \times 175 = \4900 ; $\$37 \times 320 = \11840 ; $\$4900 + \$11840 = \$16740$, *Ans.*

Ex. 2. $\$1200 - (\$364 + \$275 + \$150 + \$187) = \224 ; and $\$224 \times 5 = \1120 , *Ans.*

Ex. 3. $29 + 32 = 61$; $61 \times 17 = 1037$ miles, *Ans.*

Ex. 4. $\$34 \times 127 = \4318 ; $\$47 \times 97 = \4559 ; and $\$4318 + \$4559 = \$8877$, cost; $127 + 97 = 224$; $\$40 \times 224 = \8960 , sold for; $\$8960 - \$8877 = \$83$, profit, *Ans.*

Ex. 5. $77 + 66 = 133$; $675 - 133 = 542$, multiplicand. $3 \times 156 = 468$; $214 - 28 = 186$; $468 - 186 = 282$, multiplier. $542 \times 282 = 152844$, *Ans.*

Ex. 6. $37 + 50 = 87$; $87 \times 6 = 522$; $98 + 522 = 620$, multiplicand. $64 - 50 = 14$; $14 \times 5 = 70$; $70 - 10 = 60$, multiplier. $620 \times 60 = 37200$, *Ans.*

Ex. 7. $14 \times 25 = 350$; $9 \times 36 = 324$; $350 - 324 + 4324 = 4350$, multiplicand. $280 - 112 = 168$; $376 + 42 = 418$; $418 \times 4 = 1672$; $168 + 1672 = 1840$, multiplier. $4350 \times 1840 = 8004000$, *Ans.*

Ex. 8. $\$2751 \times 29967 = \82439217

$\$5030 \times 23905 = \120242150

 $\$37802938$ *Ans.*

Ex. 9. $1449075 \times 203 = 294162225$ acres cultivated;
 $1922890880 - 294162225 = 1628728655$ acres, *Ans.*

Ex. 10. $\$2258 + \$105 = \$2363$, valuation per farm;
 $\$2363 \times 1449075 = \3424164225 , *Ans.*

Ex. 11. $2^4 \times 5^6 = 50000$; $7^3 = 343$;
 $50000 - 343 = 49657$, *Ans.*

(45, 46)

MULTIPLICATION.

11

Ex 12. $15^2=3375$; $3^2 \times 2^2=288$; $208^2=43264$; $9 \times 2^4=144$. $3375+43264=46639$; $288+144=432$; $46639-432=46207$, *Ans.*

Ex 13. $4+27+256+3125+46656=50068$, *Ans.*

Ex 14. $1200000 \times 400=480000000$ pounds, *Ans.*

Ex 15. - - - \$2450, value of house;
 $\$2450 \times 6 = \$500 = 14200$, " " farm;
 $\$2450 \times 2 = 4900$, " " stock;

Ans. \$21550, total value.

Ex 16. $1500 \times \$7 = \10500 ; $800 \times \$10 = \8000 ; $700 \times \$6 = \4200 ; $\$8000 + \$4200 = \$12200$; $\$12200 - \$10500 = \$1700$, *Ans.*

Ex 17. $(\$450 + \$780 + \$1250 + \$2275) \times 3 = \$14265$, *Ans.*

Ex 18. $\$115 \times 35000 = \4025000 , *Ans.*

Ex 19. $\$485 \times 2500 = \1212500

$\$1450 \times 10 = 14500$

$\$1250 \times 25 = 81250$

Ans. \$1258250

Ex 20. $1401944 \times \$20 = \28038880 , value of double eagles;

$62990 \times \$10 = 629900$, " " eagles;

$154555 \times \$5 = 772775$, " " half eagles;

$22059 \times \$3 = 66177$, " " \$3 pieces.

Ans. \$29507732, total value.

DIVISION.

(111, page 49.)

Ex. 1. *Ans.* 78972.

Ex. 2. *Ans.* 121562.

Ex. 3. *Ans.* 152329.

Ex. 4. *Ans.* 6086847.