

**A COMPLETE COURSE OF
ARITHMETICAL EXAMPLES AND
EXERCISES. FOR THE USE OF
SCHOOLS AND STUDENTS
PREPARING FOR EXAMINATIONS**

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A Complete Course of Arithmetical Examples and Exercises. For the Use of Schools and Students Preparing for Examinations by Thomas W. Piper

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THOMAS W. PIPER

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BY

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PREFACE.

THIS book consists of Examples and Exercises, and is intended to supply a progressive and properly-graduated course of Arithmetic. It is hoped that the book will be found especially suited to the wants of Middle Class and Higher Schools: that it may also commend itself for use in Training Colleges and by Pupil Teachers, is my wish and design.

As the book has been written for use with my *Advanced Arithmetic* or some other text-book, I have not here repeated the *examples* of methods which such books supply; I have tried rather to supplement those examples with others showing shorter or otherwise more convenient methods. Properly to understand the geography of a mountain it is necessary to climb it on different sides and to cross it in different directions; and fully to understand an arithmetical problem it is, at least, convenient to consider it from more than one point of view and to work through it in different ways. For this reason I have made it a point to show more than one method of working individual sums.

The *Exercises* are intended to be continually progressive and continually recapitulatory. The miscellaneous exercises which I have given here and there through the book, and in which

comparatively easy work is provided in the midst of greater difficulties, will serve as resting places for the pupil, even as a stretch of more open country gives rest to the soldier wearied with a march through rugged hills, and renews his strength and his spirits for the still more difficult march in the distance before him. And just as an able general would take advantage of this opportunity for remedying such defects in his forces as the previous march had discovered, so the careful teacher will take advantage of these easier exercises to give such further explanations of elementary principles and operations as he sees are needed.

The *Appendix* contains a number of papers which have been set in various examinations by public bodies. These supply a very useful collection of miscellaneous exercises, and will, I trust, be of special service to students preparing for such examinations.

T. W. P.

TOTTENHAM, August 1882.

EXAMPLES AND EXERCISES IN ARITHMETIC.

Example I.

If 2 tons of coal cost £2, 3s., what will be the cost of 3 tons?

Method.

Here, £2, 3s. 0d. = cost of 2 tons ;

therefore, $\frac{£2, 3s. 0d.}{2}$ = cost of 1 ton ;

therefore, $\frac{£2, 3s. 0d.}{2} \times 3$ = cost of 3 tons.

Working.

$$\begin{array}{r} 2 \mid £2, 3s. 0d. \\ \quad \quad \quad £1, 1s. 6d. \\ \quad \quad \quad \quad \quad 3 \\ \hline \quad \quad \quad \quad \quad £3, 4s. 6d. \text{ Answer.} \end{array}$$

EXERCISE 1.

1. What is the value of 8 horses at £38, 19s. 8½d. each?
2. Find the cost of 11 tons of sugar at sixteen pounds, nine shillings, and eightpence halfpenny per ton.
3. Add together the cost of 7 houses at £193, 13s. 4d. each, and 9 pieces of land at £80, 19s. 6d. each.

* The pupil must clearly understand that $\frac{£2, 3s. 0d.}{2}$ is another way of writing £1, 1s. 6d. + 2.

4. If the cost of an acre of land be £26, 13s. 7½d., what will be the cost of 87 acres?
5. Multiply £80 by 12, and take from it the price of 7 horses at £82, 10s. 8d. each.
6. What will be the cost of 4 houses if the cost of 3 be just £1000?
7. Nine acres of land are worth £1500; what is the value of 7 acres?
8. If 5 horses be worth £1523, what is the value of 11 horses?
9. Find the value of 7 tons of wood when 5 tons are worth £95, 11s. 3d.
10. What will be the value of 8 bushels of wheat when 17 bushels are worth £12, 16s.?

Example II.

What will be the value of 28 cwt. of coals if 7 cwt. be worth 8s. 2d.?

1st Method (*the same as in Exercise 1*).

Here, 7 cwt. are worth 8s. 2d.

therefore, 1 cwt. is worth $\frac{8s. 2d.}{7}$

therefore, 28 cwt. are worth $\frac{8s. 2d.}{7} \times 28$.

2d Method.

Since, 28 cwt. = 4 times 7 cwt.,

it follows that the cost of 28 cwt. = 4 times the cost of 7 cwt.;

therefore, the answer, = 4 times 8s. 2d.

= £1, 12s. 8d.

EXERCISE 2.

1. If 12 tons 8 cwt. of coal can be bought for £10, how much coal can be bought for £50?
2. A cubic foot of stone weighs 11 cwt. 13 lb., what will be the weight, in pounds, of 19 cubic feet?
3. Five cubic feet of water weigh 312 lb. 8 oz., what will be the weight of 25 cubic feet?

4. Three cubic feet of water weigh 6 qr. 19 lb. 8 oz.; what will be the weight of 1 cubic yard?
5. If 18 Turkish cannon cost the Sultan £7300, what will be the cost of 23 such cannon?
6. Find the value of $\frac{18 \text{ tons } 9 \text{ cwt. } 3 \text{ qr. } 20 \text{ lb.}}{11} \times 16$.
7. What will be the cost of 118 casks of brandy if the cost of 73 casks be £255, 10s.?
8. If the cost of 101 acres of land be £96,048, 17s. 11d., what is the price per acre?
9. In how many hours will a man earn £96 if he earn £19, 5s. in 11 days of 6 hours each?
10. How many cubic feet of timber can be bought for £73, 6s. if the price of 19 cubic feet be £4, 0s. 9d.

Example III.

The price of a ton of coal being £1, 7s. 6d., what will be the cost of $4\frac{1}{2}$ tons?

1st Method.

- (a) Find the cost of 4 tons by multiplying £1, 7s. 6d. by 4;
- (b) Find the cost of $\frac{1}{2}$ ton by dividing £1, 7s. 6d. by 2;
- (c) Add the two results together, and thus find the cost of $4\frac{1}{2}$ tons.

2d Method.

- (a) Find the cost of $\frac{1}{2}$ ton by dividing £1, 7s. 6d. by 2;
- (b) Then, since $4\frac{1}{2}$ tons = 9 half-tons, multiply the result by 9.

Workings.

1st Method.	2d Method.
$\begin{array}{r} \text{£ s. d.} \\ 1 \ 7 \ 6 \\ \quad \quad 4 \\ \hline 5 \ 10 \ 0 = \text{cost of 4 tons.} \\ \quad 13 \ 9 = \text{cost of } \frac{1}{2} \text{ ton.} \\ \hline \text{Answer, } 6 \ 8 \ 9 = \text{cost of } 4\frac{1}{2} \text{ tons.} \end{array}$	$\begin{array}{r} \text{£ s. d.} \\ 2 \ \ 1 \ 7 \ 6 \\ \hline 13 \ 9 = \text{cost of } \frac{1}{2} \text{ ton.} \\ \quad \quad 9 \\ \hline \text{Answer, } 6 \ 8 \ 9 = \text{cost of } 4\frac{1}{2} \text{ tons.} \end{array}$

EXERCISE* 3.

1. What will be the cost of $7\frac{1}{2}$ gallons of wine at 19s. 9d. per gallon?
2. Multiply £7086, 16s. 10d. by $15\frac{1}{2}$.
3. Multiply £83,847, 16s. 9d. by $9\frac{1}{2}$.
4. Multiply £6032, 18s. $4\frac{1}{2}$ d. by $9\frac{1}{4}$.
5. Multiply 7806 tons 17 cwt. 2 qr. by $8\frac{1}{2}$.
6. If 2 tons 18 cwt. of coal can be bought for £1, how much coal can be had for £9, 10s.?
7. 90 miles 7 fur. 38 poles $\times 19\frac{1}{2}$.
8. 109 miles 4 fur. 30 poles $\times 61\frac{1}{2}$.
9. 26 yd. 2 ft. 11 in. $\times 17\frac{1}{2}$.
10. How much sugar can be purchased for £12, 10s. if 3 cwt. 2 qr. 6 lb. can be had for a sovereign?

Example IV.

Multiply £30, 16s. 8d. by $7\frac{1}{2}$.

1st Method.

- (a) Multiply £30, 16s. 8d. by 7.
- (b) Multiply £30, 16s. 8d. by $\frac{1}{2}$; i.e., get $\frac{1}{2}$ of it; i.e., divide it by 2.
- (c) Multiply £30, 16s. 8d. by $\frac{1}{4}$; i.e., get $\frac{1}{4}$ of it; i.e., divide it by 4.
- (d) Add together the results found under (a) (b) (c).

Working.

£	s	d.	
30	16	8	
		7	
<hr/>			
215	16	8	= 7 times £30, 16s. 8d.
15	8	4	= £30, 16s. 8d. $\div 2 = \frac{1}{2}$ of £30, 16s. 8d.
7	14	2	= £30, 16s. 8d. $\div 4 = \frac{1}{4}$ of £30, 16s. 8d.
<hr/>			
298	19	2	= £30, 16s. 8d. $\times 7\frac{1}{2} = \text{Answer.}$

2d Method.

- (a) Reduce $7\frac{1}{2}$ to an improper fraction; thus, $7\frac{1}{2} = \frac{15}{2}$.
- (b) Multiply £30, 16s. 8d. by 31, and divide the result by 4.

* Before proceeding to this exercise the pupils must have been carefully shown how to convert a mixed number into an improper fraction.