

**A KEY TO THE
ELEMENTARY
ALGEBRA; FOR THE
USE OF TEACHERS ONLY**

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A Key to the Elementary Algebra; For the Use of Teachers Only by Benjamin Greenleaf

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BENJAMIN GREENLEAF

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KEY

TO THE

ELEMENTARY ALGEBRA.

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KEY

TO

GREENLEAF'S NEW ELEMENTARY ALGEBRA.

DEFINITIONS AND NOTATION.

SIGNS.

EXAMPLES, page 9.

<p>2. Ans. 14.</p> <p>4. Ans. 10.</p> <p>7. Ans. $44 - 5 = 39$.</p> <p>9. Ans. $120 + 12 = 10$.</p>		<p>11. Ans. $108 - 6 = 102$.</p> <p>12. Ans. $16 > 12$.</p> <p>13. Ans. $4 < 6$.</p>
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ALGEBRAIC EXPRESSIONS.

EXAMPLES, pp. 15, 16.

<p>4. Ans. $x + 2y - z$.</p> <p>8. Ans. $\frac{4a}{3c}$.</p> <p>9. Ans. $\frac{a-b}{ab}$.</p> <p>11. Ans. $2a + \frac{b}{c}$.</p>		<p>13. Ans. $\frac{a^4 - b^4}{a - b}$.</p> <p>15. Ans. $\frac{15a^3 + b^3}{a^3 - b^3} + 2c$.</p> <p>17. Ans. $\frac{1}{ab^3} - \frac{1}{a^2 + c^2}$.</p> <p>21. Ans. $\sqrt[3]{x} - \sqrt{x}$.</p>
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INTERPRETATION OF ALGEBRAIC EXPRESSIONS

EXAMPLES, pp. 17, 18.

1. $12 + 3 - 2 + 4 = 17.$
2. $36 + 2 - 4 = 34.$
3. $48 - 15 + 8 - 28 = 13.$ Ans. 13.
4. $(12 - 3) \times (2 + 4) = 9 \times 6 = 54.$
5. $81 \times 2 + 4 = 162 + 4 = 166.$
6. $\frac{15}{5} + 45 = 3 + 45 = 48.$
7. $4 \times 15 - \frac{12}{4} = 60 - 3 = 57.$ Ans. 57.
8. $4 \times 9 - 5 \times 4 = 36 - 20 = 16.$
9. $2 \times 144 \times 2 - \frac{144}{2} + \frac{12}{4} = 576 - 72 + 3 = 507.$
10. $\frac{12 + 9 + 8}{18} \times \frac{144 - 27}{9} = \frac{29}{18} \times 13 = 29.$
11. $\left(\frac{11}{11} + 12\right) \times (3 - 2) - 4 = 13 \times 1 - 4 = 9.$
12. $256 - 256 + 12 - 6 = 6.$ Ans. 6.
13. $252 + 1 \times 1 = 253.$
14. $60 - 7 \times 4 = 60 - 28 = 32.$
15. $4 \times 4 + 8 \times 12 - 112 = 16 + 96 - 112 = 0.$
Ans. 0.
16. $\sqrt{16} + \sqrt{100} - \sqrt{81} = 4 + 10 - 9 = 5.$
17. $12\sqrt{25 - 24} + \sqrt{48 + 16} = 12 + 8 = 20.$
18. $\sqrt{81} - \sqrt[3]{8} + \sqrt{4} = 9 - 2 + 2 = 9.$
19. $10 + 8\sqrt{16} - 2\sqrt[3]{8} = 10 + 32 - 4 = 38.$

ALGEBRAIC PROCESSES.

(Ans. 46, pp. 20-22.)

2. Let $x =$ number of cents spent,
and $2x =$ number of cents left.
Then $3x = 45$ cents, the whole number,
and $x = 15$ cents, the number spent.
3. Let $x =$ number of apples each has.
Then $2x = 56$ apples, the whole number,
and $x = 28$ apples, the number each has.
Ans. 28 apples.
4. Let $x =$ length of part left standing,
and $3x =$ length of part broken off.
Then $4x = 60$ feet, the whole length,
 $x = 15$ feet, the part left standing,
and $3x = 45$ feet, the part broken off.
5. Let $x =$ the less number,
and $5x =$ the greater number.
Then $6x = 126$, their sum;
 $x = 21$, the less number,
and $5x = 105$, the greater number.
6. Let $x =$ value of the chaise,
and $3x =$ value of the horse.
Then $4x = 340$ dollars, the value of both,
 $x = 85$ dollars, the value of the chaise,
and $3x = 255$ dollars, the value of the horse.
7. Let $x =$ A's share,
and $4x =$ B's share.
Then $5x = 2500$ dollars, the whole sum,
 $x = 500$ dollars, A's share,
and $4x = 2000$ dollars, B's share.

9. Let $x = A$'s share,
 $2x = B$'s share,
 and $2x = C$'s share.
 Then $5x = 300$ dollars, the whole sum,
 $x = 60$ dollars, A 's share,
 $2x = 120$ dollars, B 's share,
 and $2x = 120$ dollars, C 's share.

10. Let $x =$ price of the apples,
 $2x =$ price of the pears,
 and $4x =$ price of the oranges.
 Then $7x = 63$ cents, the sum paid for the whole,
 $x = 9$ cents, the price of the apples,
 $2x = 18$ cents, the price of the pears,
 and $4x = 36$ cents, the price of the oranges.

Ans. Apples, 9 cts.; pears, 18 cts.; and oranges, 36 cts.

11. Let $x = A$'s age,
 $2x = B$'s age,
 and $3x = C$'s age.
 Then $6x = 78$ years, the sum of their ages,
 $x = 13$ years, A 's age,
 $2x = 26$ years, B 's age,
 and $3x = 39$ years, C 's age.

12. Let $x =$ price of the sheep,
 $7x =$ price of the cow,
 and $28x =$ price of the horse.
 Then $36x = 180$ dollars, the amount received for all,
 $x = 5$ dollars, the price of the sheep,
 $7x = 35$ dollars, the price of the cow,
 and $28x = 140$ dollars, the price of the horse.

13. Let $x =$ the first number,
 $4x =$ the second number,
 and $2x =$ the third number.

- Then $7x = 350$, their sum,
 $x = 50$, the first number,
 $4x = 200$, the second number,
 and $2x = 100$, the third number.
14. Let $x =$ distance traveled the first day,
 $3x =$ distance traveled the second day,
 and $2x =$ distance traveled the third day.
 Then $6x = 84$ miles, the whole distance,
 $x = 14$ miles, distance traveled the first day,
 $3x = 42$ miles, dist. traveled the second day,
 and $2x = 28$ miles, dist. traveled the third day.
15. Let $x =$ sum contributed by A,
 $4x =$ sum contributed by B,
 and $3x =$ sum contributed by C.
 Then $8x = 600$ dollars, the whole sum,
 $x = 75$ dollars, sum contributed by A,
 $4x = 300$ dollars, sum contributed by B,
 and $3x = 225$ dollars, sum contributed by C.

ADDITION.

(ART. 49, pp. 23-25.)

7. Ans. — $21 \frac{1}{2} x$. 9. Ans. $17 a + 5 b$.
 8. Ans. $17 m n^2$. 10. Ans. $12 c^2 d - 5 a^2 c$.

$$\begin{array}{r}
 (13.) \\
 2x + 3y \\
 x + 8y \\
 3x + y \\
 6x + 2y \\
 x + 4y \\
 4x + y \\
 \hline
 17x + 19y
 \end{array}$$

$$\begin{array}{r}
 (14.) \\
 7a^2 - b \\
 3a^2 - 3b \\
 6a^2 - 2b \\
 2a^2 - b \\
 4a^2 - 6b \\
 a^2 - 4b \\
 \hline
 23a^2 - 17b
 \end{array}$$