

9. A note drawn at 135 days, with interest at 8 per cent. per annum, is discounted by a broker 75 days before maturity; the broker gives \$375.80 for the note and makes at the rate of 10 per cent. per annum on his money. Find the amount for which the note was drawn.

10. Ascertain the cost, at \$35.10 per ton of 2000 lbs., of 864 yards of iron piping, 25 inches internal diameter and half an inch thick, assuming the specific gravity of iron to be 7.77 and a cubic foot of water to weigh $62\frac{1}{2}$ lbs. ($\pi=3\frac{1}{2}$).

ANSWERS.

1. £8 15s. 7d.
2. (1) .072603; (2) .03750.
3. (1) .311769; (2) .0416.
4. \$186.07 +.
5. \$525.25; 4 per cent.
6. 9 of cheaper to 2 of dearer.
7. \$4480.
8. \$1199, \$1848.
9. \$372.50.
10. \$6147.31 +.

ALGEBRA.

1. Find the value of $3x^2 + 54x^3 + 50x^2 - 19x^2 - 35x - 18$ when $x = -17$.

2. Demonstrate the identities:

$$(a) (5m^2 + 4mn + n^2)^2 - (3m^2 + 4mn + n^2)^2 = 4m^2 (2m + n)^2.$$

$$(b) (a + b + c)(ab + bc + ca) - abc = (a + b)(b + c)(c + a).$$

$$(c) (a - b)(c - d) + (b - c)(a - d) + (c - a)(b + d) = 0.$$

3. Divide $(m^2 + an^2)(x^2 + ay^2) - a(nx - my)^2$ by $mx + ny$.

4. Prove that if from the square of the sum of two numbers there be taken four times their product, the remainder is a square.

5. Solve.

$$(a). (x - 1)(x - 2) - (x - 3)(x - 4) = 3.$$

$$(b). \frac{2}{x - 1} + \frac{3}{x - 2} = \frac{8}{x^2 - 3x + 2}.$$

$$(c). (x - a)(b - c) + (x - b)(c - a) + (x - c)(a - b) = x - a - b - c.$$

6. What value of x will make $x^2 + 2ax + b^2$ the square of $x + c$? What is the result when $a = b = c$?

7. A man is thrice as old as his son, five years ago he was four times as old; how old is he?

ANSWERS.

1. -1.

3. $mx + ny$.

5. (a), $3\frac{1}{2}$; (b), 3; (c), $a + b + c$.

$$6. \frac{c^2 - b^2}{2(a - c)}.$$

7. 45 years.

EUCLID.

[N.B.—Eight questions to count a full paper; value, $12\frac{1}{2}$ for each.]

1. [a] Define Scalene Triangle, Point, Straight Line, Square, and distinguish between Problem and Theorem, Direct and Indirect demonstrations.

[b] What propositions in Euclid, Book I, are proved by the latter method?

2. If one side of a triangle be produced the exterior angle is greater than either of the interior opposite angles. Give full proof for one exterior angle.

3. The greater angle of every triangle has the greater side opposite to it.

4. The straight lines which join the extremities of two equal and parallel straight lines towards the same parts, are also themselves equal and parallel.

5. Equal triangles on the same base and on the same side of it are between the same parallels.

6. To describe a parallelogram equal to a given rectilineal figure, and having one of its angles equal to a given rectilineal angle.

7. The difference between any two sides of a triangle is less than the third side.

8. From a given point draw a line making equal angles with two given lines.

9. Straight lines bisecting two adjacent angles of a parallelogram intersect at right angles.

ENGLISH GRAMMAR AND ETYMOLOGY.

1. Explain the terms Apposition, Intransitive Verb, Distributive Pronoun, Pluperfect Tense, Compound Sentence, strong and weak Conjugation, giving an example of each.

2. Write the singular of kine, banditti, virtuosi, Messrs., genera, phenomena; the