

dishonest, so that for every 9 lbs. he gave he got pay for 10. What was his gain per cent.?

Ans. 23 $\frac{1}{3}$ %.

22. \$600 is due on January 1st, 1882, and \$600 on January 1st, 1883; what sum paid on July 1st, 1882, should cancel the debt?

Ans. \$1200.92.

23. A hemispherical vessel whose internal diameter is 1 ft. has lying on its bottom a sphere of such size that a cord stretched across the top of the vessel is tangent to the sphere. How many pounds of water will fill the vessel?

Ans. 12 $\frac{3}{4}$ lbs.

24. A manufacturer sold 600 yds. of cloth, receiving therefor a three-months' note bearing interest at 8 per cent. per annum. This note he immediately discounted at the bank at the rate of 12 per cent. per annum, the banker making \$1.01603 by using bank instead of true discount. Find the price per yard at which the cloth was sold.

Ans. \$1.90.

Will some of our contributors be good enough to send us solutions to the following problems? A teacher, who is a subscriber, asks for them.

ALGEBRA.

1. If $(a^2 + bc)(b^2 + ca)(c^2 + ab) = 0$, prove that

$$\frac{1}{a^3} + \frac{1}{b^3} + \frac{1}{c^3} + \frac{1}{abc} + \frac{a^3 + b^3 + c^3 + abc}{a^2 b^2 c^2} = 0.$$

2. If $x + y + z = 0$, prove that
 $(x^2 + y^2 + z^2)^3 = 27x^3 y^3 z^3$.

ARITHMETIC.

1. A mortgage, dated 1st January, 1872, payable in three equal annual payments of \$200 each, with interest on the whole payable half-yearly at 6 per cent., is sold on 1st July, 1872; what sum must the purchaser pay so that the investment may be worth 8 per cent.?

2. A farmer mixes corn and wheat in the ratio of 8 to 9; had he taken 12 bushels more corn and 9 bushels more wheat, the ratio would have been as 12 to 13; how many bushels of each did he take?

MODERN LANGUAGES.

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ENGLISH.

Selected from various sources.

1. Discuss the influence of Norman French on (1) The vocabulary, and (2) The grammar, of the English language.

2. Why does the addition of *en* change *cat* into *kitten*?

3. What do you understand by "gender" in grammar? Show how your definition applies to each of the following:—*Aunt, sempstress, she, that, man-servant, testatrix, mistress, heroine, margravine*.

4. How many separate vowel sounds are there in English, and how many true diphthongs? Show in what way defect or redundancy in the alphabet disguises the true nature and relations of these various sounds.

5. Rewrite the following passage, substituting words of Saxon origin for those of Greek or Latin origin:—

"The old man trusts wholly to slow contrivance and gradual progression. The youth expects to force his way by genius, vigour, and precipitation. The old man deifies prudence. The youth commits himself to magnanimity and chance. Age looks with anger on the temerity of youth, and youth with contempt on the scrupulosity of age."—*Johnson*.

6. Account for the italicized portions of the following words:—*Newt, coward, streamlet, asleep, enough, atonement, kindred, gain-say, forgive, am, loveth*.

7. Discuss the various uses, forms, meanings and constructions of the verbs *do, own, and think*, respectively, giving examples.

8. Give examples of the way in which the study of the English language illustrates and corroborates what we learn from English history.

9. Give examples of the different uses of *that* and *but*, accounting in each instance for the structure.

10. Give rules for the proper use of *shall* and *will*, and *should* and *would*, in principal and subordinate sentences.

11. "Words indicating relations are often