

whole, and the price would then have been \$18. How many pounds did he buy at first?

Ans. 15.

11. One number is 3 times as great as another, how many times will the cube of the first contain the cube of the second? Why is this answer an invariable quantity? From this determine the dimensions of a cubical block just equal in volume to 64 cubes, each 2 inches on an edge.

Ans. 1st, 27; last, 8 in.

12. *A* bought a farm, and spent in repairs 8 per cent. of the assessed value, which was $\frac{3}{4}$ of the price he paid for it. *A* then sold the farm to *B* for such a sum as to clear \$1000 above all expenses, receiving \$2000 down, the rest to be paid at the end of a month; but within the month *B* became bankrupt, paying 85 cents on the dollar of his indebtedness; on this account *A*'s gain was reduced to \$196; what did *A* give for the farm, and what did he sell it for?

Ans. \$6000; \$7360.

Solution. $1000 - 196 = 15$ per cent. of selling price less 2000; $\therefore$ selling price is \$7360. $7360 - 1000 = \text{total cost} = 6360$. $6360 = (\frac{1}{100} + \frac{1}{100} \times \frac{3}{4})$ of 1st cost, $\therefore$ cost = \$6000.

13. A tank that holds 2500 gallons is supplied with 8 emptying taps, 4 large and 4 small; when 2 of the large ones and 3 of the small ones are opened together the tank is emptied in $9\frac{1}{4}$ hours; but when 3 of the large ones and 2 of the small ones are opened the tank is emptied in 7 $\frac{1}{2}$ hours; find how many gallons run through each tap per hour.

Ans. 100; 25.

Solution. 2 large and 3 small in $\frac{18}{5}$ hours empty tank; 3 large and 2 small in $\frac{15}{2}$ hours empty tank. If $\frac{18}{5}$ be multiplied by $\frac{1}{2}$ the result is $\frac{9}{5}$; $\therefore$ times would be same in both cases; but since only $\frac{1}{2}$ of the time is taken in the first case, if the quantity of water remains unchanged the capacity of the taps must be increased by multiplying each by $\frac{1}{2}$, thus 2 large $\times \frac{1}{2}$ and 3 small $\times \frac{1}{2}$ in $\frac{9}{5}$ hours empty tank; 3 large and 2 small in $\frac{15}{2}$ hours empty tank. Now since times and quantities of water are same we get, 2 large $\times \frac{1}{2} + 3$ small $\times \frac{1}{2} = 3$ large + 2 small, or 1 large = 4 small; from this the result is easily obtained.

14. What is the smallest sized hall that can be floored with boards either 3, 4, 5, 6, 7, 8, or 12 inches wide, and either 10, 12, or 15 feet long?

Ans. 60 $\times$ 70 feet.

"TWICE ONE IS TWO," OR "TWICE ONE ARE TWO"?—The difficulty presented by this question is most readily resolved by looking into the meaning of the word "is." Now, in the sentence "twice one is two," the equivalent of "is" is not "exists," but "exists in a particular manner or relation." "Is" is, therefore, a copula carrying over between "twice one" and "two" the idea of some relationship. This relationship is one of identity or of absolute naming, so that when "is" is given its auxiliary form, the sentence appears thus—"twice one is equal to two;" or thus—"twice one is called two." As an auxiliary, the form "is" rather than the form "are" is required, because the substantive is merely "one," a singular, modified by an adverb "twice," an adverb, truly, affecting very intimately its substantive, but still merely

performing the functions of an adverb, and accordingly varying the sense, but not the grammatical structure. Our correspondent will see that the reason necessitating "is" in the sentence given equally necessitates "is" in such a sentence as "twice two is four;" and though "twice two are four" is often heard it is none the less incorrect. Of course, the propriety of "two twos are four" is not hereby called in question, for here the *substantive* is plural, and the verb must therefore be plural in form. It is further to be remembered that "two" is as well an adjective as a substantive, and that sometimes the mere adjective is used where a substantive following such adjective is implied. In these cases the number of the verb is determined by the implied substantive.—*The Oracle.*