gressed; his views commended themselves to the thoughtful, and in a very short time the methods which he so persistently advocated will have completely triumphed.

It would take up too much of our space to explain these methods. We can only advise our readers to procure at once his "Everyday English" and "Words and their Uses"—two volumes which no teacher of English of the present day can dispense with if he wishes to keep in the front rank, unless he is a "Richard Grant White" to himself. These volumes contain many extravagances, and make no pretention to systematic treatment, but they cannot fail to put the teacher in a new point of view where many things that once troubled him will become plain, just as the movements of the heavenly bodies did to Copernicus when he took his stand in imagination in the sun and saw the planets circling around him. In order that we may not mislead, however, it is necessary to explain that Mr. White's admirable and suggestive volumes are not well adapted to assist teachers in "cramming" either themselves or their pupils for either College or Departmental Examinations as these are nowadays conducted. W. H.

Prize Competition.

ARITHMETICAL PROBLEMS.

FOR FOURTH CLASS.—BY NO. 555.

I. Simplify $\frac{6\frac{1}{2}+5\frac{1}{5}}{6\frac{1}{2}-5\frac{1}{5}}\times\frac{6\frac{1}{2}}{3\frac{1}{4}}+1$ Ans. 19.

Solution. $\frac{6\frac{1}{2}+5\frac{1}{5}}{6\frac{1}{2}-5\frac{1}{5}}\times\frac{6\frac{1}{2}}{3\frac{1}{4}}+1=\frac{11\frac{7}{10}}{1\frac{1}{10}}\times2+1=\frac{117}{10}\times\frac{10}{13}\times2+1=19.$

2. Divide ·008 by $\frac{5}{10000}$, and obtain the result with decimal fractions.

Prove the work by changing the dividend into a vulgar fraction. Ans. 16.

Solution. $\cdot008\div\frac{5}{10000}=\cdot008\div\cdot0005=80\cdot\div5\cdot=16.$

$\cdot008\div\frac{8}{10000}=\frac{8}{10000}\times\frac{10000}{8}=16.$

3. Find the difference between ·03 and ·03. Ans. ·003.

Solution. $\cdot03-\cdot03=\frac{3}{10}-\frac{3}{100}=\frac{30}{100}-\frac{3}{100}=\frac{27}{100}=\frac{1}{300}=$ ·003. Ans. ·003.

4. How many square feet of lumber will cover a shed 20 feet long, 15 feet wide, and 9 feet high, with a flat roof, deducting a doorway 7 feet high and 3 feet wide? Ans. 909 sq. ft.

Solution. The number of square feet required = the perimeter of the shed, 70 feet × 9 feet + 20 feet × 15 feet − 7 feet × 3 feet = 630 square feet + 300 square feet − 21 square feet = 909 square feet.

5. How many square feet of lumber at $600 per 1000 sq. ft., will pay for 80 lbs. dry fish at $3.50 per quintal of 112 lbs.? Ans. $416\frac{2}{3}$ sq. ft.

Solution. Price of fish $=\frac{\$3.50\times50\text{ lbs.}}{112\text{ lbs.}}=\frac{1750}{7}=\$2.50.$

Square feet of lumber $=\frac{\$2.50\times1000}{600}=\frac{1250}{3}=416\frac{2}{3}$ sq. ft.

6. A farmer paid for a cow and a sheep with the price of 2 tons 8 cwt. hay at 60 cents per cwt. The cow was valued 7 times as much as the sheep, what was the price of each?

Ans. The price of the cow, $25.20; of the sheep, $3.60.

Solution. 2 tons 8 cwt. at 60 cents = 48 cwt. × 60c. = $28.80.

The price of the cow = $\frac{7}{8}$ of $28.80 = $25.20; and

" " sheep = $\frac{1}{8}$ of $28.80 = $3.60.

7. How many cords of wood can be stowed in a room 20 ft. long, 10 ft. wide, and 9 ft. high? Ans. $14\frac{1}{10}$ cords.

Solution. $\frac{20\text{ ft.}\times10\text{ ft.}\times9\text{ ft.}}{128\text{c. ft.}}=\frac{225}{16}=14\frac{1}{10}$ cords.

8. How many M. of shingles will be required to cover a surface 60 feet long and 30 feet wide, if the bundles be 20 inches wide, and contain 25 double layers; and if the shingles be laid on the surface 4 inches apart? Ans. $16\frac{1}{2}$ M.

Solution—

1 bun. shingles = 1 layer of 20 in. × 25 × 2 = 1000 in. = $83\frac{1}{3}$ ft.

Layer in 60 ft. by 30 ft. = 60 ft. × $\frac{30}{4}\times\frac{12}{1}$ = 5400 ft.

No. of M. required $=\frac{5400\text{ ft.}}{83\frac{1}{3}\text{ ft}}\div4\text{ bun.}=54\frac{4}{3}\div4=16\frac{1}{2}$ M.

9. How many miles will a ploughman travel in ploughing a field 500 ft. long, and 300 ft. wide,—the furrows being 15 inches wide? Ans. $22\frac{8}{11}$ miles.

Solution. Number of miles travelled

$=\left(500\text{ ft.}\times\frac{300\text{ ft.}\times12\text{ in.}}{15\text{ in.}}\right)5280\text{ ft.}$

$=\frac{14080000}{5280}=22\frac{8}{11}$ miles.

10. How many square feet are there in an inch board 20 ft. long, 18 in. wide in one end, and 16½ in. in the other? Ans. $28\frac{3}{4}$ sq. ft.

Solution. Number of sq. ft. in the board

$=\frac{18\text{ in.}+16\frac{1}{2}\text{ in.}}{2}\times20\text{ ft.}\div12\text{ in.}$

$=\frac{17\frac{1}{4}\text{ in.}\times20\text{ ft.}}{12\text{ in.}}=28\frac{3}{4}$ sq. ft.

11. How many square ft. (in. board measure) are there in a plank 18 feet long, 9½ in. wide in one end, 8½ in. wide in the other end, and 2½ in. thick? Ans. $33\frac{3}{4}$ sq. ft.

Solution. Number of sq. ft. in the plank

$=\frac{9\frac{1}{2}\text{ in.}+8\frac{1}{2}\text{ in.}}{2}\times18\text{ ft.}\times2\tfrac{1}{2}\text{ in.}\div12\text{in.}$

$=\frac{9\text{ in.}\times18\text{ ft.}\times2\frac{1}{2}\text{ in.}}{12\text{ in.}}=33\frac{3}{4}$ sq. ft.

12. Which is greater ·0025 of a mile, or ·79 of a rod? Ans. ·0025 of a mile

Solution. ·0025 m. × 8 fur. × 40 p. = ·80 of a rod; ∴ ·0025 of a mile is greater.

13. Reduce 7 ft. 6 in. to the fraction of a mile. Ans. $\frac{1}{704}$ of a m.

Solution. $\frac{7\frac{1}{2}\text{ ft.}}{5280\text{ ft.}}=\frac{15}{10560}=\frac{3}{2112}=\frac{1}{704}$ of a m.

14. What will $40.60 amount to in $2\frac{3}{4}$ years at $3\frac{1}{2}$ % per six months? Ans. $48.41 $\frac{11}{20}$.

Solution. Amount $=\$40.60+\frac{\$40.60\times3\frac{1}{2}\%\times2\frac{3}{4}\text{y.}\times2}{100}$

$=\frac{203}{10}\times\frac{7}{2}\times\frac{11}{4}\times\frac{7}{2}\times\frac{1}{2}+\$40.60=\$1.50\frac{301}{20}+\$40.60$

$=\$7.81\frac{1}{20}+\$40.60=\$40.41\frac{1}{20}.$

15. Show that $\frac{1}{2}$ of $\frac{1}{8}$ of $\frac{2}{5}$ of a ton is equal to $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{4}{5}$ of a cwt.

Solution. $\frac{1}{2}$ of $\frac{1}{8}$ of $\frac{2}{5}$ of a ton $=\frac{1}{40}$ of a ton $=\frac{1}{40}\div\frac{20}{1}=\frac{1}{2}$ of a cwt.

and $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{4}{5}$ of a cwt. $=\frac{1}{2}$ of a cwt.

16. If 50 bbls. flour be purchased at $5.50 per bbl., and sold for $300.00, what will be the gain of 1 lb. of flour? Ans. $\frac{25}{98}$c.

Solution. Gain on 1 bbl. flour $=\frac{\$300.00}{50}=\$5.50=\$\cdot50.$

∴ " 1 lb. " $=\frac{\$\cdot50}{196\text{ lbs.}}=\frac{25}{98}$c.

17. Divide $\frac{1}{2}$ of the product of $\frac{5}{8}+\frac{3}{8}$ and $\frac{5}{8}-\frac{3}{8}$ by $\frac{1}{7}$ of the difference between ·7 and ·5.

Solution. $\frac{\frac{1}{2}\text{ of }(\frac{5}{8}+\frac{3}{8})\times(\frac{5}{8}-\frac{3}{8})}{\frac{1}{7}\text{ of }(\frac{7}{10}-\frac{5}{10})}=\frac{\frac{1}{2}\text{ of }\frac{8}{8}+\frac{3}{8}}{\frac{1}{7}\text{ of }\frac{13}{10}}=\frac{1}{2}+\frac{7}{8}+\frac{3}{8}+\frac{7}{1}+\frac{42}{13}$

$=\frac{6615}{832}=7\frac{791}{832}.$

18. A man who walked 120 miles in $4\frac{1}{2}$ days at 12 hours per day, travelled how many feet on an average per minute? Ans. 195⅔ ft.

Solution. No. of feet $=\frac{120\text{ m.}\times5280\text{ ft.}}{4\frac{1}{2}\text{d.}\times12\text{ h.}\times60\text{ m.}}=\frac{880}{1}\times\frac{2}{9}=195$ ft.

19. If a man can do a job of work in 4 days, and a boy can do $\frac{1}{10}$ as much in $\frac{1}{5}$ of the time, in what time can they do it working together? Ans. $3\frac{1}{3}$ days.

Solution. The man can do $\frac{1}{4}=\frac{5}{20}$ in 1 day;

and the boy " $\frac{1}{10}$ of $\frac{1}{2}=\frac{1}{20}$ " "

and they " " $\frac{6}{20}$ " "

∴ " " the whole or $\frac{20}{20}$ in $\frac{20}{6}=3\frac{1}{3}$ days.

20. If 2 men can dig a hole 6 feet long, 3 feet wide, and 8 feet deep in three days, in what time can 3 men dig a hole 5 feet long, 4 feet wide and 9 feet deep? Ans. 2½ days.

Solution.—

Time required by 2 men to dig 6 × 3 × 8 ft. = 144c. ft. = 3 days.

" " 2 men " 5 × 4 × 9 ft. $=\frac{180\text{c. ft.}\times3\text{d.}}{144}=3\frac{3}{4}$ dys.

∴ " 1 man = 2 × $3\frac{3}{4}=7\frac{1}{2}$ days.

∴ " 3 men = $7\frac{1}{2}\div3=2\frac{1}{2}$ days.