should be made as simple as possible; should be mere exercises to imitate while learning position, penholding and movement.

The time devoted to each exercise should be about twenty minutes; this is probably as long as the interest can be kept up without wearying young pupils. The pencils should be of sufficient length to be held like pens, and the manner of holding them should be very carefully taught.

On account of the liability of the pencils in common use to break it is a matter of economy and convenience to use those covered with wood, as they are both cheap and durable. The new patent pencil-holder lately introduced into our schools is admirably adapted to young pupils learning to write.



POSITION AT DESK.

The three positions chiefly used by writers are the "Rightside," "Front" and "Left-side" positions. The "Right" position is most convenient and decidedly preferable in the school room with modern desks.

In accordance with cut, sit with the right side near to the desk, but not in contact with it, the body slightly inclined for ward; place the left foot half the length forward of the right, and both firmly on the floor. Place the right arm parallel to the edge of the desk resting on the muscles front of the elbow, and

rest the hand on the nails of the third and fourth fingers, not permitting the wrist to touch the paper. Let the left hand be at right angles to the right and rest on the book, keeping the book parallel to the edge of the desk.

Mathematical Department.

Communications intended for this part of the Journal should be on separate sheets, written on only one side, and properly paged to prevent mistakes.

ALFRED BAKER, B.A., Editor.

The Examination questions, of which the following are solutions, will be found in another part of this JOURNAL.

ENTRANCE.

- 1. Five millions divided by 7019 gives rem. 2472; then 7019 -2472=4547.
- 2. The expression in brackets = $\frac{473}{12} \times \frac{2}{33} \times \frac{3}{43} \times \frac{4}{49} \times \frac{7}{37} \times \frac{37}{5}$
- $=\frac{1}{165} \cdot \frac{20}{21} \frac{1}{105} = \frac{14}{15}.$ 3. The expression = £\frac{603}{48} \times \frac{30}{209} \times \frac{253}{253} \times \frac{480}{259}\$, where it will be observed that 37 is a divisor of 259 and 603, and 19 a divisor of 209, &c.: result £41 $\frac{1}{14}$.
- 4. 20 cwt. for \$15 = 1 cwt. for $\$\frac{15}{20}$ = 75c. \therefore 85 75 = 10 gain on 1 cwt. $\therefore 2225 \div 10 = 222\frac{1}{2}$ cwts. = $11\frac{1}{8}$ tons.
- 5. 1 yd. costs \$12\frac{1}{2} \div 3\frac{1}{16}\$, and $23\frac{7}{16}$ yds. cost $\frac{25}{7} \times \frac{8}{25} \times \frac{375}{16} =$ \$93.75
- 6. \$1400 \$625.50 = \$774.50 = twice his savings : savings =\$387.50, and expenditure = \$1400 - \$387.50 = \$1012.50, which, divided by $365 = \$2.77\frac{29}{73}$ daily expenditure.
- 7. $\frac{3}{10}$ spent in flannel, $\frac{3}{5}$ of $\frac{7}{10} = \frac{21}{50}$ in calico: then 1 $(\frac{3}{60} + \frac{21}{50}) = \frac{7}{25}$ left, which buys $10\frac{1}{2}$ yds. .. the whole sum would buy $10\frac{1}{2} \times \frac{25}{7} = 37\frac{1}{2}$ yds.
- 8. Area = $6 \times 5 = 80$ yds.; a yard longer and a yard wider would give area $7 \times 6 = 42$ yds. .. cost of latter $= \frac{42}{30} = \frac{7}{5}$ of former = $\frac{7}{5}$ of 25 = \$35.
- 9. The av. = $18\frac{35}{297}$... sum of the four numbers = 4 times the number = $72\frac{140}{297}$; and the sum of three of the numbers = $26\frac{41}{198}$

 $+3\frac{16}{27}+38\frac{1}{15}=67\frac{25}{29}\frac{73}{70}$ \therefore $72\frac{140}{297}-67\frac{2573}{2970}=4\frac{1797}{2970}$, the fourth

10. \$1039.84 is discharged with \$357.441,

 $857.44\frac{1}{2} \div 1039.84$ $857.44\frac{1}{2} \times 612.80 = $213.01 \div$ And 612.80

II.

THIRD CLASS.

1. $\frac{9}{10} \times 41$ oz. fine = 69 thalers \therefore 1 oz. = $\frac{69 \times 10}{9 \times 41}$ th. And $\frac{37}{40}$ oz. fine = $5\frac{1}{6}s$. \therefore 1 oz. = $\frac{205}{9 \times 41}$ th. \therefore 1 thaler = $\frac{205 \times 9 \times 41}{37 \times 69 \times 10}s$. = 2s. $11\frac{946}{6702}d$. 2. The 1st frac. reduces to 6 \times 2 = 12, the second to 4 \therefore 12-4

= 8 is time for A and C; $\therefore \frac{1}{2} - \frac{1}{8} = \frac{3}{8}$, B's. work per day; \therefore B in 23 days.

8. $2\frac{9}{7}\% = \frac{1}{35}$ wasted; $\therefore \frac{34}{35}$ of original quantity = 170 lbs., and original q. = 175. $\therefore \frac{33}{112}$ of 175, $\frac{55}{112}$ of 175, and $\frac{24}{112}$ of 175 =

 $51\frac{9}{16}$, $85\frac{1}{16}$, and $87\frac{1}{2}$ 4. £9 - 40 × 1.09\frac{3}{4}; ... 1 = 40 × 1.09\frac{3}{4} ÷ 10, and $18\frac{1}{4}$ = $\frac{40 \times 1.09\frac{3}{4}}{100} \times 18\frac{1}{6} = \$89\frac{7}{360}.$

5. To insure $96\frac{3}{5}$ costs $3\frac{1}{3}$; ... 1 costs $3\frac{1}{3} \div 96\frac{2}{3}$ ($= \frac{1}{29}$), and this multiplied by $48628\frac{1}{6}$ gives $$1676\frac{5}{6}$.

6. The num. = denom. $+\frac{1}{2}$ of denom.; ... $2\frac{1}{3}$ denom. = 352

and denom. = 160, num. 192.

7. No. sq. yds. paper required = $178\frac{2}{7} \times \frac{21}{36} = 104$. Let the width be unit, then $4\frac{1}{3} \times 4 = 17\frac{1}{3}$ width = 104. ... width = 6 yds., length = 7. ... $7 \times 6 \times \frac{4}{3} \times \frac{7}{4} = \frac{498}{3}$, cost of carpet.

8. If a and b be two Nos., i their L. C. M., and g their G. C. M. then $l = \frac{a}{a} \times b$; $\therefore a = \frac{b}{b} \times g$: hence 634938944494 \div 85044059, and multiplied by 9187 = 68590142.

9. Int. on 100 for time and rate = 14, $\therefore \frac{14}{100} = \frac{7}{50}$ is fraction of principal wh. = int., and disct. = $\frac{7}{57}$; $\therefore (\frac{7}{50} - \frac{7}{57})$ of principal = \$9.80 or $\frac{49}{2850} = 980 \therefore principal = \$570.

10. Square of breadth = $6 \times 4840 + 600 = 9980$ yds. $\sqrt{9980}$ 12:12 85 50 = 96.89 + 1000, length 299.69 + 1000

III.

SECOND CLASS AND INTERMEDIATE

- 1. The first expression = $\frac{299}{1800} \times \frac{901}{246}$; $2.662601 = \frac{655}{246}$ fraction = $\frac{299 \times 901 \times 246}{1800 \times 246 \times 655}$
- 2. L. C. M. of 483, 4721, 2581 = L. C. M. of numerators divided by G. C. M. of denominators = 21375 bushels.
- 3. $$480 \div 32c = 1500 \text{ yds.}$ He gains $\frac{220}{1500} = \frac{11}{75}$ of selling price, $\frac{64}{75}$ of selling price = buying price = 32c., and selling price = $37\frac{1}{2}c$; $\therefore 5\frac{1}{2}$ gained on $32 = 17\frac{3}{16}\%$.
- 4. The 1st gaining 10' and 2nd losing 10' in 12 hrs. ... the three will be first together when one has gained and the other lost 60': 1st gains and 2nd loses 10' in 12 hrs. ... 60' in 72 hours.
- 5. 12 oz. silver = \$66, \therefore 112 oz. = 616s. Also 1869 × 20 (s.) gold = 40×12 oz. and 1s. = $\frac{40 \times 12}{1869 \times 20}$ oz.; \therefore 616s. = $\frac{40 \times 12 \times 616}{1869 \times 20}$
 - 6. Int. = disct. + int. on disct., i.e., disct. + $\frac{1}{n}$ disct. = $\frac{1}{n}$ $\therefore / \text{disct.} = \frac{1}{n} \div \left(1 + \frac{1}{n}\right) = \frac{1}{n+1}. \text{ Or amt.} = 1 + \frac{1}{n} = \frac{n+1}{n}$ $\therefore \frac{n+1}{n} \text{ gives disct. } \frac{1}{n}, \text{ and}$ $\therefore 1 \quad \text{``} \quad \frac{1}{n} \div \frac{n+1}{n} = \frac{1}{n+1}.$

7. At 5 % for 1 yr. int. $=\frac{1}{20}$ of principal, and disct. $=\frac{1}{21}$ (last ques.) ... principal $=20\times44.52=\$890.40$, and this divided by 21 \$42.40 disct. ... \$890.40 - \$42.40 = \$848.

8. Inc. from B. C. investment $=\frac{1}{30}$; $\therefore \frac{13}{20}$ invested in D. B. giving $\frac{13}{20} \times \frac{10}{13} \times \frac{9}{200} = \frac{9}{400}$ income. \therefore new income $=\frac{7}{20} \times \frac{1}{30} + \frac{9}{400} = \frac{12}{1200} \cdot \therefore \frac{141}{200} - \frac{1}{30} = \frac{12}{1200} = \5 . \therefore value of investment =\$6000, or \$5000 stock.