

Now find the terms whose product is  $-20$ , the sum of whose diagonal products with  $y$  will give  $41y$ , and the sum of whose diagonal products with  $x$  will give  $8x$ ; these conditions are satisfied by  $-4$  with the first pair already found, and  $-5$  with the second pair. It may be remarked that in general if the condition with respect to the  $y$ -products is satisfied, that with respect to the  $x$ -products will be satisfied, and conversely.

But the above principle may be extended so as to lead with absolute certainty to the factors of the polynome. Take for example  $x^3 + xy - 2y^2 + 2xz + 7yz - 8z^2$ . Proceed thus :

Reject 1° the terms involving  $z$ .

" 2° " " "  $y$ .

" 3° " " "  $z$ .

and factor the expression that remains in each case.

Then we have

$$1^\circ. x^2 + xy - 2y^2 = (x-y)(x+2y).$$

$$2^\circ. x^2 + 2xz - 8z^2 = (x+3z)(x-2z).$$

$$3^\circ. -2y^2 + 7yz - 8z^2 = (-y+3z)(2y-z).$$

Now arrange these three pair of factors in two sets of three factors each, by so selecting one factor from each pair that two of each set of three may have the same coefficient of  $x$ , two the same coefficient of  $y$ , and two the same coefficient of  $z$ , coefficient of course including sign. In this example there are

$$x-y, x+3z, -y+3z, \text{ and}$$

$$x+2y, x-2z, 2y-z:$$

From the first set select the common terms (including signs), and form therewith the trinomial  $x-y+3z$ ; similarly from the second set form the trinomial  $x+2y-z$ : hence the factors are

$$x-y+3z, \text{ and}$$

$$x+2y-z.$$

The first method above explained will enable us to factor very easily most expressions that occur. But in cases of difficulty, the method last described leads with certainty to the factors required.

We had intended to give illustrations of other important methods of factoring, and especially to show the application of the theory of divisors to the resolution of various algebraic forms. But want of space compels the omission of these for the present.

## MISTAKES IN SCHOOL MANAGEMENT.

BY JAMES HUGHES, INSPECTOR PUBLIC SCHOOLS, TORONTO.

### II.

IT IS A MISTAKE TO CONFOUND "SECURING ORDER" WITH "MAINTAINING ORDER." Many teachers forget, when taking charge of a new class, that they are dealing with strangers, on whose sympathy and affection they have no claim. They often lose control of their pupils on the first day by practising the very principles which are of highest service in securing the best discipline. They appeal to instincts which are slumbering, and to motives which, so far as they are concerned, have no existence. Pupils are at school on the opening day to study the "new teacher," not their lessons, and the more incomprehensible and non-committal he is the more they will respect him. Like their seniors, they will regard mysterious silence as profundity, and a self-contained manner as indicative of great reserve power. No rational teacher should expect to win the love of his pupils at first sight. During the first few days his great aim should be to show them by his actions and manner, not by words, that he understands himself, his pupils, and their relations to each other. To baffle their curiosity in regard to himself is the first step towards securing their respect. Beyond this only three things are absolutely necessary during the first week:—

1. He must show that he can see everybody at all times, and that it is impossible to do wrong without being detected.

2. He must be decided in awarding punishment for an intentional offence. A severe whipping promptly and coolly given on the first day may assist materially in doing away with corporal punishment.

3. He must prove that he is master of the subjects he has to teach.

A lady once subdued a rebellious pupil by offering him her cane with the request that he would whip her. She had previously shown him and the whole class in a clear and feeling manner that he was guilty of a serious offence for which some one must be punished. At the right moment she surprised him with her strange request, and completely overpowered him. This was natural, because her pupils were young, and she had gained their affection by a long course of kindness. The story got into the papers, and an ardent youth, about to take charge of a class of grown-up boys, determined to adopt the young lady's plan. He opened school on the first morning with a fervid address, full of what boys call "taffy," and calmly waited for the hour to arrive when by a single exhibition of his generosity he would gain permanent sway over their grateful hearts. He was confident that his address must have made an impression, and that the noble boys would appreciate his self-sacrificing spirit. The hour at length arrived, and with due ceremony he called the culprit before him, spoke to him in most feeling terms, showed the necessity of punishment for the offence, stated that rather than punish a "dear pupil" he would submit to be punished himself, and finally presented the delinquent with a bundle of rods with the request that he would select therefrom the largest and whip his "dear teacher." He turned his back expecting to hear cries of penitence, but instead he was astounded by shouts of encouragement to the obedient pupil, who had faithfully carried out instructions, and was now wielding the largest rod with judgment and power, in which invigorating exercise he was quickly joined by as many pupils as could get rods from the bundle. Those who could not be so accommodated pelted him with every available missile, and finally threw him out after emptying the ink bottles on his head.

Kindness and affection are the strongest elements of a teacher's power, but they need a stable foundation to rest upon.

IT IS A MISTAKE TO MAKE TOO MANY RULES. Some teachers make so many rules that they cannot remember them themselves. Their pupils forget them too, and violate them without intending any wrong. If a great many rules are made, some of them must be of minor importance, and the pupils and parents too will lose respect for the more important, through their contempt for the trivial. Law loses its influence when it becomes whimsical.

The breaking of a law should be a most serious offence. Children will not be very good citizens, if they regard the violation of laws as a trifling matter. They cannot avoid coming to this conclusion if a teacher has so many rules that he forgets to punish for neglecting them; or if they are of so unimportant a character as not to command the respect of the pupils.

There should be few cast-iron rules beginning with "Thou shalt," or "Thou shalt not." The rules should state general principles, and each one should cover a whole class of specific acts.

Rules in detail should not be formulated in a code either written or printed.

No rule should be issued until some wrongdoing makes it necessary. The very prohibition may suggest the wrong course to the pupils.

Pupils should learn rules, as they should learn everything else, by