

M. Johnston

THE ENTRANCE

FIFTH CLASS EDITION.

VOL. I., No. 1.]

TORONTO, MARCH 1, 1897.

[25 CENTS A YEAR

The Cretan Trouble.

Trouble has again broken out in Crete. This island, which has been the scene of many rebellions, is situated sixty miles southeast of Greece and 110 miles southwest of Asia Minor. The island is 155 miles in length, while its breadth varies from seven to thirty-five miles. The population in 1881 was 279,000, chiefly of Greek descent. Of this population the Greek Christians constitute the large majority. The Cretans are a turbulent race, bold, independent, and hard to govern. In the revolts of 1859 and 1866 the Cretans gained a measure of freedom and independence, which was acknowledged by the Berlin treaty of 1868. The island, however, is still subject to Turkey, at least in name.

The following despatch to the *New York World* from the King of Greece, through his Minister of Foreign Affairs, tells clearly the cause of the present trouble. The king says, under date of Feb. 18th: "After six months of waiting, the reforms imposed upon Turkey by the great powers are not put into execution. The Turks oppose the organization of the gendarmerie (constabulary). On February 3rd the Turkish troops began the massacres. The Christian quarters at Canea were burned. After 150,000 women and children were refugees, the Cretans, in despair, proclaimed their independence and union with Greece. The Hellenic Government sent a small army to occupy Crete, in order to restore order and peace. Five great powers occupy the four towns of Canea, Retimo, Candia, and Sitia. All the remainder of the island is in the possession of the Christians. The expressions of sympathy from the great American people and the Hellenese resident in America are a precious support to us in the work for the independence of Crete, and we thank them sincerely."

At present writing the great powers of Europe have placed a restraining hand on Greece, and it is difficult to say what the outcome of the trouble will be. The matter will be referred to again in our next issue.

The Vice-President.

On March 4th the newly-elected president of the United States will be installed in office at Washington; in other words, his inauguration will take place on that date. The day is one of considerable interest to our neighbors.

While many newspapers and magazines have had much to say about Major McKinley, the president-elect, few of these have done more than mention the name of the vice-president. True, his importance is overshadowed by that of his "running mate," and yet the vice-president may become a prominent figure before the expiration of his term of office. The vice-president of the United States, although elected at the same time as the president, is no part of the executive. His sole business is to preside over the Senate. Even here he has no vote except in case of a tie. In the event, however, of the presidency being vacated by the president's removal, death, or resignation, then the vice-president becomes an important factor in the government of his country, as he succeeds to the office of president."



GARRET A. HOBART.

CHICAGO DRAINAGE CANAL.

In our issue of February 15th we spoke of the Chicago Drainage Canal. For those who were not readers of our journal at that date we reproduce a few sentences from our former article, that they may the better understand the drawings published in this number.

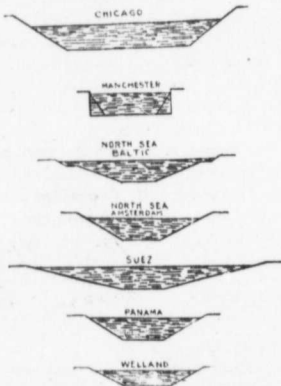
The Chicago Drainage Canal extends from the Chicago river (which empties into Lake Michigan) to the Illinois river, a distance of twenty-eight

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miles. At first it was the intention to use the canal for drainage purposes only, but there is a growing desire on the part of the promoters to have a canal which may be used for shipping purposes.

The canal is of great interest to Canada and the states on the St. Lawrence route, as it is feared that to divert such a volume of water from Lake Michigan to the Mississippi will affect the navigation of the St. Lawrence route. The volume of water required even for drainage purposes for the city is estimated at 300,000 cubic feet per minute; but if the canal is to become a channel for vessels, there will be drawn from Lake Michigan a volume of water equal to that passing through the Ohio.

That teachers and pupils may compare the Chicago Drainage Canal with other and older canals, we present the accompanying pen and ink sketch. Should the Chicago canal become a chan-



nel for shipping it will afford a waterway for boats drawing less than twenty-two feet of water. With a deepening at certain points of the Mississippi and Illinois rivers, ocean steamers may pass from the Gulf of Mexico to Lake Michigan.

It is thus quite easily seen how important the canal scheme is to the states and provinces of the east. The opposition from this source is so strong that it is within the possibilities that Congress will be called upon to decide whether the "Windy City" may thus change the course of these waters to the detriment of the commercial interests of the more easterly states.

NOTE.—In our next issue we shall resume questions on current events.

J. R. Bloor, Ingersoll, says: "My pupils show their appreciation of your History Notes by ordering six copies."



GEOGRAPHY.

GRAND TRUNK RAILWAY SYSTEM.

GEO. A. FRASER.

NOTE.—The time honored names of branches of the G.T.R. such as "Buffalo and Lake Huron," "Wellington, Grey, and Bruce," etc., are no longer recognized in the official time-tables.

MAIN LINE.

1. *Detroit*, Port Huron, Sarnia, St. Marys, Stratford, Berlin, Guelph, Georgetown, Brampton, Toronto, Whitby, Oshawa, Bowmanville, Por Hope, Cobourg, Trenton, Belleville, Napanee, Kingston, Gananoque, Brockville, Prescott, Cornwall, Montreal, St. Hyacinthe, Richmond, Sherbrooke, *Portland*.
2. *Detroit*, Windsor, Chatham, Glencoe, London, Ingersoll, Woodstock, Paris, Harrisburg, Dundas, Hamilton, St. Catharines, *Niagara Falls*.

BRANCHES.

1. London to Sarnia:—London, Strathroy, Kingscourt Junction, Sarnia (with a short branch to Petrolia).
2. Hamilton to Toronto:—Hamilton, Oakville, Toronto.
3. Goderich to Buffalo:—Goderich, Clinton, Seaforth, Mitchell, Stratford, Paris, Brantford, Caledonia, Dunnville, Port Colborne, Fort Erie, Buffalo.
4. Port Dover to Owen Sound:—Port Dover, Simcoe, Woodstock, Stratford, Listowel, Palmerston, Harriston, Owen Sound (with a short branch to Warton).
5. London to Wingham:—London, Lucan, Exeter, Clinton, Wingham.
6. Harrisburg to Southampton:—Harrisburg, Galt, Guelph, Elora, Fergus, Palmerston, Harriston, Walkerton, Port Elgin, Southampton.
7. Palmerston to Kincardine:—Palmerston, Listowel, Wingham, Kincardine.
8. Palmerston to Durham:—Palmerston, Mount Forest, Durham.
9. Buffalo to Kingscourt Junction:—Buffalo, Fort Erie, Welland, Cayuga, Simcoe, Tilsonburg, Aylmer, St. Thomas, Glencoe, Kingscourt Junction.
10. Tilsonburg to Harrisburg:—Tilsonburg, Brantford, Harrisburg.
11. London to St. Marys.
12. Elmira to Galt:—Elmira, Waterloo, Berlin, Galt.
13. Port Colborne to Port Dalhousie:—Port Colborne, Welland, Thorold, Merriton, St. Catharines, Port Dalhousie.
14. Toronto to North Bay:—Toronto, Newmarket, Barrie, Orillia, Gravenhurst, Bracebridge, Scotia Junction, North Bay.

- 15. Barrie to Meaford:—Barrie, Collingwood, Meaford.
- 16. Hamilton to Port Dover:—Hamilton, Caledonia, Port Dover.
- 17. Hamilton to Barrie:—Hamilton, Milton, Georgetown, Beeton, Barrie.
- 18. Beeton to Collingwood.
- 19. Barrie to Penetang.
- 20. Toronto to Port Hope:—Toronto, Blackwater, Lindsay, Peterboro, Port Hope.
- 21. Blackwater to Midland:—Blackwater, Orillia, Midland.
- 22. Peterboro to Belleville:—Peterboro, Hastings, Campbellford, Belleville (with a short branch to Madoc).
- 23. Lindsay to Haliburton:—Lindsay, Fenelon Falls, Haliburton.
- 24. Lindsay to Cobouonk:—Lindsay, Lorneville, Cobouonk.
- 25. Whitby to Manilla Junction, near Lindsay.
- 26. Stouffville to Sutton, on Lake Simcoe.
- 27. Richmond, Que., to Levis.

NOTE—The above may be made use of for the third, fourth, and fifth classes. In taking up the study of these roads, the main line and two or three leading branches should be sufficient for the third class; for the fourth, several other branches may be added; for the fifth, we think nearly all lines should be studied.—EDITOR.

Drawing.

BY A. C. CASSELMAN (NORMAL SCHOOL, TORONTO).

There are many objects that are similar to the cube, and the principles of representing them are the same. Such objects are boxes, books, tables, chairs, benches, houses, and yards. These objects will be shown in future issues in examination papers.

This issue the pyramid and triangular prism are shown.

The most important pyramid is the right square pyramid, shown in Fig. 1 in two positions. The base is a square. The apex is in the axis, which is

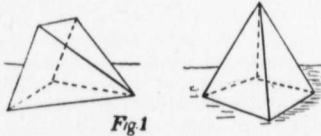


Fig 1

drawn at right angles to the base from its centre. Draw the square base first. Locate its centre; draw the axis; and join the apex to the angles of the base.

The triangular prism, Fig. 2, is easily drawn. Draw the base first, then the vertical dotted lines from a point on each end a little beyond the apparent middle of the ends. Why? Draw the top edge so that it will converge at the same point as

the sides of the base. Add the remaining lines. Draw from the object the pyramid, the frustum of the pyramid, and the triangular prism in many

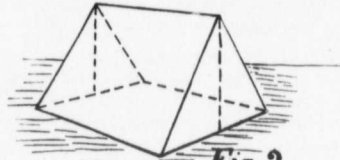


Fig. 2.

positions. The roof of a house is drawn precisely as the prism. A fruit basket and many other objects are like the frustum of a pyramid.

Make a pattern of (or develop the surface of) the pyramid and the triangular prism. Fold these up to form the objects, and use them as models.

QUESTIONS.

Answers in next issue.

1. What is (a) constructive drawing? (b) representative drawing? (c) decorative drawing?
2. Make a working drawing (constructive drawing), any scale, of a right-angled triangular prism placed vertically with the broad face towards the observer. (Three views.)
3. (a) Represent an oblong tablet placed horizontally from left to right below the level of the eye and at the left. (b) Repeat the drawing in (a) and add lines to develop an envelope.
4. Of what class of forms may the cube be regarded as the basis?

A useful book for teachers at this time of the year is "The Questions and Answers in Drawing given at the Uniform Examinations of the State of New York since June, 1892."

The questions in this little book are on the type solids in the two branches of drawing, constructive and representative. Decorative drawing is also treated of, and many questions on color study are found.

The book is published by C. W. Bardeen, Syracuse, N. Y.

The Entrance, Fourth or Fifth Class edition, will be sent, until September 1st, 1897, for 10 cents.

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P. S. Leaving Literature.

THE LORD OF BURLEIGH.

ANSWERED IN OUR NEXT ISSUE.

1. What is the subject of this poem?
2. What qualities of the author's style are exemplified in the poem. Give examples.
3. Classify the poem, giving reason for your answer.
4. What was the author's purpose in writing the poem?
5. Why is the conversational element introduced into the poem?

EXPLANATORY NOTES.

"In her ear he whispers gayly." Notice the abruptness of the opening of the story; this is one characteristic of the old ballad style. You will also notice the spelling of "gayly," this is preferable here because not so common as "gaily," and therefore more "poetic."

"In accents fainter." Denoting the greater modesty of the maiden.

"He to lips that fondly falter." Notice the melody of this line caused by the "alliteration" and by the broad sounds of the vowels.

"Lodges." In England the gate-keeper lived in a small house (lodge) built at the park gates.

"Summer woods, about them blowing,
Made a murmur in the land."

Draw attention to the onomatopœia, (on-o-mat-o-pe'ya); this is the harmonizing of the sound of the line with the sound of the object spoken about. This is "harmony," not "melody." Refer again to line 9 for melody.

"From deep thought." The Lord of Burleigh finds now that "deception is dangerous," and ponders how to undeceive his wife.

"Ordered gardens." Gardens arranged and kept in an orderly way.

"All he shows her makes him dearer." By contrast she loves her simple landscape-painter more than all the grandeur she sees. This makes the coming disillusion far more pathetic.

"Armorial bearings." The coat of arms or escutcheon carved on the keystone of the gateway.

"Speak in gentle murmur." Notice the onomatopœia again. How beautifully the long-drawn liquids, the broad vowels, and rolling r's harmonize with the tone of deference with which the English servant speaks to his master.

"Her spirit changed within." All her dreams of a happy life in her cottage home are dispelled at a stroke.

"A trouble weighed upon her." The duties which she was neither by education nor by birth fitted to perform.

"Bring the dress, and put it on her,
That she wore when she was wed."

Here the tender pathos of the poem reaches its height. The husband's remorseful memory of the past, calling up to him his plan of overwhelming the woman he so truly loved with the rapture of a delightful disappointment—a plan which has, in a few years, resulted in crushing her into an early grave—suggests to him the fittingness of clothing her when dead in the dress in which she had been so happy while alive. We scarcely know whether to sympathize more deeply with the modest wife or the mistaken husband.

These last lines are worthy of Tennyson at his best, and give us an excellent copy of the spirit of our best ballads.

DEAR HARP OF MY COUNTRY.

ANSWERS TO QUESTIONS IN OUR LAST ISSUE.

1. The theme of the poem is the revival of the Irish melodies by the poet.
2. The poem is in the form of an address by a harper to his harp. This figure of speech is called an "apostrophe," that is, an address to a thing which would not be spoken to in ordinary composition.
3. The subject of each stanza is as follows:
 - (a) The Irish people had forgotten their ancient melodies until revived by the poet.
 - (b) The poet here speaks of the kinds of Irish melodies, songs of love and songs of gladness.
 - (c) The poet here states that this is the last of his "Irish Melodies," but expresses the hope that a greater poet may succeed him.
 - (d) The poet modestly disclaims that the popularity of his poems rests on any merit of his own, but asserts that the Irish people received them so kindly because of their native patriotism and lofty sentiments.
4. The circumstance of time is not revealed in the poem, except it is thought that evening would be the most suitable time for playing on the harp, which is supposed to be addressed. The place is clearly shown, as the poet must have been standing over the harp when addressing it, and his mood was plainly one of lofty patriotism.
5. The poem reveals to us that the author was an Irish patriot. "Dear Harp of my Country." That is, my country is Ireland. Also, "My

own Island Harp." We see he is a patriot from the deep spirit of love for the "harp" which pervades the poem.

4. Force and beauty have been given to the poem by :

(a) *Its deep spirit of lofty patriotism.*

"High seriousness is characteristic of all true poetry."

(b) *Its figurativeness.*

Notice, "Sweet wreath of song," "Sunshine of fame." "I was but as the wind."

(c) *Its concreteness.*

How much stronger the particular "Harp of my country" than the general "Melodies of Ireland." Notice, also, the greater force of "patriot, soldier, and lover," than any general statement meaning the same.

(d) *Its rhythm.*

Carlyle says poetry is "musical thought." Quackenbos says, "Poetry, then, does not really become such until it finds expression in rhythmical language, in musical words."

You will notice here how the graceful, buoyant anapaestic foot has given life and spirit to the poem, while monotony has been avoided and dignity secured by the occasional intermixture of iambs and hypercatalectic syllables.

"Dear harp | of my coun | try! in dark | ness I
found | thee,
The cold | chain of si | lence had hung | o'er thee
long,
When proud | ly, my own | island harp, | I un-
bound | thee,
And gave | all thy chords | to light, free | dom, and
song."

Notice how the trochee in line 1 is balanced by the trochee in line 3; similarly the iambs in lines 2 and 4. Notice also the hypercatalectic syllable at the end of lines 1 and 3. The flow of the verse is, as you see, perfect.

(e) *Its melody.*

The poem is full of words chosen for the beauty of their sound. Notice particularly, "Sigh of sadness," "Steal from thee still."

STANZA I.

"Dear harp of my country." The ancient melodies of Ireland.

"In darkness I found thee." The ancient melodies of Ireland were not known and appreciated by the people.

"Cold chain of silence." This is a metaphor. It is a very strong metaphor, that is, the compari-

son between the neglect of the ancient melodies and a "chain" composed of silence is very forced. Moore, however, in a footnote, explains that "chain of silence" was a common metaphor among the ancient Irish, and is, therefore, used by him.

"When proudly." "Proudly" because he is a patriotic Irishman.

"I unbound thee." Brought about a revival of these ancient melodies.

"All thy chords." The different moods expressed by the Irish airs, as "lays of love," "notes of gladness."

"Light, freedom, and song." These words were chosen to agree with "darkness," "chain," and "silence," used in the preceding lines. It is a repetition of the thought in "I unbound thee," that is, revived the old melodies of Ireland.

STANZA II.

"The warm lay of love." The love song, full of passion.

"The light note of gladness." The spirited song, full of expressions of happiness.

The most forcible and beautiful words are "warm" and "light." Read the line aloud, omitting these words, and note the effect, all the vividness, "picturesqueness," has gone. These are "ornamental epithets."

Line 2 gives the effects of "The lay of love," as "Wakened thy fondest thrill," that is, aroused the most tender emotions; and also the effect of "The light note of gladness," as "Wakened thy liveliest thrill," that is, aroused thy most spirited feelings.

"The deep sigh of sadness." The Irish melodies, we are told, were largely written in a minor key—the key of sadness.

Lines 3 and 4 suggest that, "The Irish people having been for so long in an unhappy political condition, and having experienced so much sorrow, mingle 'sighs of sadness'—strains expressive of sorrow—even with their gayest melodies."

"Echoed." You will now see that the force of this word is to show us that in Ireland's gayest melody there was a trace, an echo, of her great national sorrow.

STANZA III.

"Farewell to thy numbers." Numbers is applied to poetry. Poetry is called numbers because of the *measured* flow of the accented syllables.

"This sweet wreath of song." This is a beautiful metaphor. As beautiful flowers are twined about the brow of a loved one, so the poet has woven this exquisite poem about the memory of

Irish melody. He says it is the last he "shall twine" because this poem is one of the last of Moore's "Irish Melodies."

The poetic artifice is alliteration, "sleep," "sunshine," "slumbers."

"Sunshine of fame." Glory of fame.

In the last line the poet expresses the wish that some poet more able than he may succeed him.

STANZA IV.

"Pulse of the patriot." The throb of patriotism.

The "patriot," "soldier," and "lover" are introduced as suggesting the various themes of Moore's songs, patriotism, war, and love.

"Throbb'd to our lay." Responded to our song or poem.

"'Tis thy glory alone." The poet here modestly denies that any merit of his own has made the "Irish Melodies" popular, and at the same time adroitly insinuates that the justice of Ireland's cause is sufficient to appeal to the "soldier," "patriot," and "lover."

"In the last two lines the poet compares himself to the wind passing over the "harp" and arousing its sweet strains.

The word "heedlessly" enhances the beauty of the figure of the "wind" by showing the utter carelessness and abandonment of the breeze as it blew over the harp. The word "wild" brings up to our mind the peculiar, weird music of the Æolian harp as played on by the "fingers of the wind."

Grammar.

The following questions will be fully answered in our next :

"While men pay reverence to mighty things,
They must revere thee, thou blue-cinctured isle
Of England—not to-day, but this long while
In the front of nations, mother of great kings,
Soldiers and poets. Round thee the sea flings
His steel-bright arm, and shields thee from the guile
And hurt of France. Secure, with august smile
Thou sittest, and the East its tribute brings.
Some say thy old-time power is on the wane,
Thy moon of grandeur filled, contracts at length;
They see it darkening down from less to less.
Let but a hostile hand make threat again,
And they shall see thee in thy ancient strength.
Each iron sinew quivering, lioness."

1. Select all the dependent clauses in the fore-

going, telling clearly their relation ; hence infer their kind.

2. Parse fully the italicized words.

3. Adjectives are used to express three relations. Name these, and from the extract illustrate as many as you can, supplying your own examples for what you do not find illustrated above.

4. State clearly the grammatical relation of : "of England," line 3 ; "in the front of nations," line 4 ; "with august smile," line 7 ; "on the wane," line 9 ; "from less to less," line 11 ; "each iron sinew quivering," line 14.

SEQUENCE OF TENSES.

Many teachers, we are sure, have had difficulty in mastering the rule for the sequence of tenses.

We believe the following statement will make it plain :

1. A *present* or *future* tense in a principal clause must be followed by a *present* or *future indicative* or a *present subjunctive* tense in the following subordinate clause.

2. A *past* tense in a principal clause must be followed by a *past* tense in the following subordinate clause.

EXAMPLE I.

He says that he *is* working hard. *Present followed by present.*

He says that he *will* work hard. *Present followed by future.*

He works hard so that he *may* pass. *Present followed by present subjunctive.*

EXAMPLE II.

He said that he *was* working hard. *Past followed by past.*

EXERCISES.

Correct the errors of sequence of tenses in the following :

1. He said he won't give me any.
2. I said that I will try again.
3. She told you and me that she will come.
4. As soon as he has gone away he wrote and told you and me to come directly.
5. I intended to have bought a moderate sized microscope, but was told that these minute organisms can be seen only under the best instruments.
6. I was going to have written him a letter.
7. When I wrote you I expected to have met him that day.
8. No writer would write a book unless he thinks it will be read.
9. He said that he is going to-morrow.
10. He has worked hard so that he would pass.

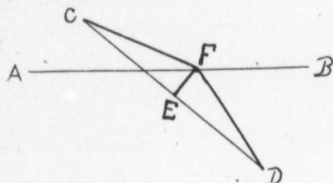
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Euclid.

Deductions will be found to run in types. Below we give an interesting family of deductions fully solved. If you try to arrange deductions in this way for your class, you will find a great deal more interest will be secured.

I.

To find a point in a given straight line which is equally distant from two given points. Is this always possible?



Let AB be the given straight line, C and D the given points.

It is required to find in AB a point equally distant from C and D.

Join CD. Post. I.
 Bisect CD in E. Prop. X.
 From E draw EF perpendicular to CD, and meeting AB in F. Prop. XI.
 Then F shall be the point required.

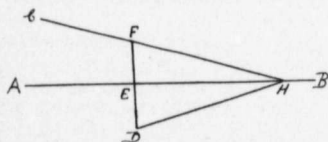
Join CF and DF. Post. I.
 Then in the triangles $\left\{ \begin{array}{l} EC = ED. \\ EF = EF. \\ \angle CEF = \angle DEF. \end{array} \right.$ Cons. Def. X.

\therefore the base CF = base DF. Prop. IV.
 Wherefore a point F in the straight line AB has been found equally distant from C and D.

NOTE.—This is impossible if CD is perpendicular to AB, for then EF would be parallel to AB and would, therefore, never cut it.

II.

Two points are situated on opposite sides of a given straight line. Find a point in the straight line such that the straight lines joining it to the two given points may make equal angles with the given straight line. Is this always possible?



Let AB be the given straight line and C and D the given points. It is required to find in AB a

point such that the straight lines joining it to the two given points may make equal angles with the given straight line.

From D draw DE perpendicular to AB.

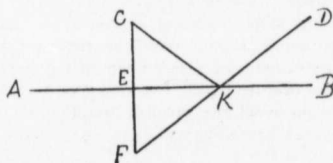
Produce DE to F. Prop. XII.
 Cut off EF = DE. Post. II.
 Join CF. Prop. III.
 Produce CF to meet AB in H. Post. I.
 Then H shall be the point required. Post. II.
 Join DH. Post. I.

Then in the triangles $\left\{ \begin{array}{l} EF = ED. \\ EH = EH. \\ \angle FEH = \angle DEH. \end{array} \right.$ Cons. Def. X.
 \therefore The angle FHE = angle DHE. Prop. IV.
 Wherefore H is required point.

NOTE.—This would be impossible if C and D were equally distant from AB, for then CF would be parallel to AB, and would, therefore, never cut it.

III.

From two given points on the same side of a given straight line, show how to draw two straight lines which shall meet at a point in the given straight line and make equal angles with it.



Let AB be the given straight line and C and D the given points.

It is required to find a point in AB such that the two straight lines drawn from C and D to this point will make equal angles with AB.

Drop CE perpendicular to AB. Prop. XII.
 Produce CE to F. Post. II.
 Cut off EF = to EC. Prop. III.
 Join FD cutting AB in K. Post. I.
 Then K shall be the point required.

Join CK. Post. I.
 Then in the triangles $\left\{ \begin{array}{l} EC = EF. \\ EK = EK. \\ \angle CEK = \angle FEK. \end{array} \right.$ Cons. Def. 10.

\therefore the angle CKE = the angle FKE. Prop. IV.
 But the angle FKE = the angle DKB. Prop. XV.
 \therefore the angle CKE = the angle DKB. Ax. I.

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Algebra.

EXERCISE I.

Factoring is the most important section of the algebra for a P.S.L. pupil to understand. We shall in this column endeavor to give some help to our readers in this part of the work. (Answers in THE CANADIAN TEACHER.)

FACTORIZING BY PARTS.

Suppose we have $a^2+ab+ac+bc$ to factor. We at once see that a will come out of 1 and 3, leaving $a(a+c)$ and b will come out of 2 and 4, leaving $b(a+c)$. So that $a^2+ab+ac+bc=a(a+c)+b(a+c)$. Now, we have reduced the expression to one of two terms, each of which is divisible by $a+c$. Therefore $a(a+c)+b(a+c)=(a+c)(a+b)$, or the factors of $a^2+ab+ac+bc$ are $(a+c)(a+b)$.

The following problems may be factored by this method:

EXERCISES.

- $a^2c^2+acd+abc+bd$.
- $2x+cx+2c+c^2$.
- $5a+ab+5b+b^2$.
- $a^2-ac+ab-bc$.
- $a^2+3a+ac+3c$.
- $x^2-ax+5x-5a$.
- $ab-by-ay+y^2$.
- $ax-bx-az+bz$.
- $pr+qr-ps-qs$.
- $mx-my-nx+ny$.
- $mx-ma+nx-na$.
- $2ax+ay+2bx+by$.
- $3ax-bx-3ay+by$.
- $6x^2+3xy-2ax-ay$.
- $mx-2my-nx+2ny$.
- $ax^2-3bxy-axy+3by^2$.
- $x^2+mx+xy-4xy-4my^2$.
- $ax^2+bx^2+2a+2b$.
- $x^2-3x-xy+3y$.
- $2x^4-x^3+4x-2$.
- $3x^3+5x^2+3x+5$.
- x^4+x^3+2x+2 .
- y^3-y^2+y-1 .
- $axy+bcxy-az-bcz$.
- $f^2x^2+g^2x^2-ag^2-af^2$.
- $2ax^2+3axy-2bxy-3by^2$.
- $amx^2+bmxy-anxy-bny^2$.
- $ax-bx+by+cy-cx-ay$.
- $a^2x+abx+ac+aby+b^2y+bc$.

EXERCISE II.

Below we give two special methods in factoring and fourteen exercises on them.

I.

By a slight modification some expressions admit of being written in the form of the difference of two squares, and may then be resolved into factors:

- Resolve into factors $x^4+x^2y^2+y^4$.
 $x^4+x^2y^2+y^4=(x^2+2x^2y^2+y^4)-x^2y^2$
 $=(x^2+y^2)^2-(xy)^2$
 $=(x^2+xy+y^2)(x^2-xy+y^2)$.
- Resolve into factors $x^4-15x^2y^2+9y^4$.
 $x^4-15x^2y^2+9y^4=(x^4-6x^2y^2+9y^4)-9x^2y^2$
 $=(x^2-3y^2)^2-(3xy)^2$
 $=(x^2-3y^2+3xy)(x^2-3y^2-3xy)$.

II.

The quotient of $a^3+b^3+c^3-3abc$ by $a+b+c$ is $a^2+b^2+c^2-bc-ca-ab$.

This result is important, and should be carefully remembered. We may note that the expression on the left consists of the sum of the cubes of three quantities, a, b, c, diminished by three times the product abc. Whenever an expression admits of a similar arrangement, the above formula will enable us to resolve it into factors.

$$\begin{aligned} 3. \text{ Resolve into factors } a^3-b^3+c^3+3abc. \\ a^3-b^3+c^3-3abc=a^3+(-b)^3+c^3-3a(-b)c. \\ = (a-b+c)(a^2+b^2+c^2+bc-ca+ab) \end{aligned}$$

An additional method of factoring these will be found in H.S.A., page 62, section 105.

EXERCISES.

- x^4+16x^2+256 .
- $81a^4+9a^2b^2+b^4$.
- $x^4+y^4-7x^2y^2$.
- $9x^4+4y^4+11x^2y^2$.
- $x^4-19x^2y^2+25y^4$.
- $16a^4+b^4-28a^2b^2$.
- $x^2y+3xy^2-3x^3-y^3$.
- $4mn^2-20n^3+45nm^2$.
- $a^3+(a+b)ax+bx^2$.
- $(2x^2-3a^2)y+(2a^2-3y^2)x$.
- $b^3+c^3-1+3bc$.
- $8a^3+27b^3+c^3-18abc$.
- $x^7+x^4-16x^3-16$.
- $16x^7-81x^3-16x^4+81$.

Bookkeeping.

Below we give the Public School Leaving bookkeeping paper for 1895. In our next issue it will be fully solved.

Work out the following set in single entry using Daybook, Cashbook and Ledger:

Toronto, May 1, 1895, rented a store from J. Shield at \$20 per month, and began business. At time of commencement I owed Turcotte & Co. \$21 and had \$250 in cash, merchandise worth \$345, a note at 60 days for \$73, dated Jan. 15th 1895, against J. Bell, and Tarbutt & Son owe me \$16 25 on contra account.

May 2. Sold J. Larneek, on account, 37 yards velveteen at \$2.25 per yard.

May 3. Paid Turcotte & Co., on account, \$12.75.

May 6. Tarbutt & Son gave me an order on W. Williams to pay their account in full.

May 7. Gave away \$5, lost \$5.

May 8. Bought merchandise (invoice \$237.84) from J. Macdonald & Co., paid cash \$100, and gave my note for balance. Spent \$1.35 on repairs.

May 10. Sold Turcotte & Co. 100 barrels apples at \$4 and groceries amounting to \$21.40.

May 11. Paid for putting up shelves in store \$12.40, postage, etc., \$3.

May 13. W. Williams paid by cheque on bank the order of May 6th.

NOTE.—No inventory being given we may take for granted that all the merchandise has been sold.