NORMAL SCHOOL FOR UPPER CANADA.

TWENTY-FIFTH SESSION.—JUNE, 1861.

Examiners in Mathematics, Chemistry and Natural Philosophy:
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ALGEBRA.—JUNIOR DIVISION.
Time—Three Hours.

1. What is the coefficient of x^6 in the expansion of $(x-2y)^9$?

2. Reduce $\dfrac{6ac+10bc+9ax+15bx}{6c^2+9cx-2c-3x}$ to its lowest terms.

3. If two fractions are together equal to 1, shew that their difference is the same as the difference of their squares.

4. Find the cube root $21x^2+56x^3+6x+1+111x^4+64x^9+144x^8+204x^7+174x^5+219x^6$.

5. Find the coefficient of a^9 and of a^{10} in the expansion of $(1+\frac{1}{2}a-a^2+\frac{1}{3}a^3-a^5+a^6+2a^7+3a^8+a^9)^2$

6. Two fractions are together equal to $\dfrac{a}{b}$, and one exceeds the other by $\dfrac{c}{d}$: What are the fractions ?

7. Divide $(2\,x-y)^2a^4-(x+y)^2a^2x^2+(x+y)^2ax^4-x^6$ by $4\,a^2x^2-4\,a^2xy+a^2y^2-ax^2-axy+x^3$.

8. Simplify $(2a-3y)\,(3y+2a)-3\,(2a-y)^2+3\,(a+y)\,(2a-y)+4ay\,(1-x)\,(x+1)-3\,(y+a).^2$

9. Given $\frac{1}{4}\,(4+\frac{3}{4}x)-\frac{1}{7}\,(2\,x-\frac{1}{3})=\frac{21}{28}$ to find the value of x.

10. Given $\left.\begin{array}{l} \dfrac{z}{x}+\dfrac{b}{y}=n \\[2mm] \dfrac{b}{x}+\dfrac{a}{y}=m \end{array}\right\}$ to find the values of x and y.

11. Given $\left.\begin{array}{l} 5x-11\sqrt{y}+13z^{\frac{1}{3}}=22 \\[1mm] 4x+\ 6\sqrt{y}+\ 5z^{\frac{1}{3}}=31 \\[1mm] x-\ \ y^{\frac{1}{2}}+\ \ z^{\frac{1}{3}}=\ 2 \end{array}\right\}$ to find the value of x, y, and z.

12. Simplify $a-(b-c)-.\Big\{a-(b+a)\Big\}-\Big\{-\big(-\big\{-\big(-\big\{-(-a+b)-c\big\}\big)\big\}\big)\Big\}$

13. Find a number such that whether it be divided into two or into three equal parts the continued product of the parts shall be the same.

15. Divide the number 90 into two such parts that if half the greater be added to double the smaller, the result is the original number 90.

15. Of two brothers, whose ages differ by 20 years, one is as much above 25 as the other is below it. What is the age of each ?