war niemals in den Fehden seiner Nachbarn verwickelt, auch sah man ihn nur selten auszerhalb den Ringmauern seines kleinen Schlosses. Nur selten wurde Eckbert von Gästen besucht, und wenn es auch geschah, so wurde ihretwegen fast nichts in dem gewöhnlichen Gange des Lebens geändert, die Maszigkeit wohnte dort, und die Sparsamkeit selbst schien alles anzuordnen. Eckbert war alsdann heiter und auf geräumt; nur wenn er allein war, bemerkte man an ihm eine gewisse Verschlossenheit, eine stille zurückhaltende Melancholie.

2. State the genitive and plural of *der Schwan, das Schaf, der Haken, der Pudel, das Lamm, die Nadel, die Maus, der Staat.*

3. Give the genitive singular and nominative plural of the following substantives: *Der Stern, der Bürger, die Feder, das Segel, der Hase.*

4. What is, in German, "the young bird," and "the young birds"?

5. State the gender of *Stufe, Zahn, Ton, Strom, Dinte, Gabel, Freiheit, Liebe, Malerei.*

6. Translate into German—

A young man who had paid great attention to his studies, and consequently had made rapid progress, was once taken by his father to dine with a company of learned men. After dinner the conversation turned naturally upon literature and the classics. The young man listened to it with great attention, but did not say anything. On their return home his father asked him why he had remained silent when he had so good an opportunity of showing his knowledge. "I was afraid, my dear father," said he, "that if I began to talk of what I did know I should be interrogated upon what I do not know." "You are right, my dear boy," replied the father: "there is often more danger in speaking than in holding one's tongue."

*** The above translation must be written in German characters.

## TRIGONOMETRY.

1. In any plane triangle show that the sides are proportional to the sines of the opposite angles.

2. Prove that—

$$\text{Sin}(A+B)=\text{Sin}A\ \text{Cos}B+\text{Cos}A\ \text{Sin}B.$$
$$\text{Sin}(A-B)=\text{Sin}A\ \text{Cos}B-\text{Cos}A\ \text{Sin}B.$$
$$\text{Cos}(A+B)=\text{Cos}A\ \text{Cos}B-\text{Sin}A\ \text{Sin}B.$$
$$\text{Cos}(A-B)=\text{Cos}A\ \text{Cos}B+\text{Sin}A\ \text{Sin}B.$$

3. Prove that—

$$\text{Sin}\tfrac{1}{2}A=\sqrt{\frac{(s-b)(s-c)}{bc}}.$$
$$\text{Cos}\tfrac{1}{2}A=\sqrt{\frac{s(s-a)}{bc}}.$$
$$\text{Tan}\tfrac{1}{2}A=\sqrt{\frac{(s-b)(s-c)}{s(s-a)}}.$$
$$\text{Area of triangle}=\sqrt{s(s-a)(s-b)(s-c)}.$$
$$\text{Radius of inscribed circle}=\sqrt{\frac{(s-a)(s-b)(s-c)}{s}}.$$

4. Express the limits of the numerical values, also the signs of the sine, cosine, tangent, cotangent, secant, and cosecant, of all angles from 0° to 360° in the first, second, third, and fourth quadrants.

5. Show that—

$$\text{Sin}\,22\tfrac{1}{2}^\circ=\frac{\sqrt{(2-\sqrt{2})}}{2};\quad \text{Cos}\,22\tfrac{1}{2}^\circ=\frac{\sqrt{(2+\sqrt{2})}}{2};$$
$$\text{Tan}\,22\tfrac{1}{2}^\circ=\sqrt{2}-1.$$

6. A circular pond covers an area of 4,840 square yards (one acre): what is the breadth, in yards, of a belt of plantation of uniform width surrounding it, and also containing one acre?

7. What is the area of a triangle of which the three sides are respectively 700, 899, and 1,068 links?

8. The hypotenuse of a right-angled triangle is 420, and the angle opposite to the perpendicular 33° 45′ 19″: what are the base and perpendicular?

9. In the triangle ABC, let AB=345 feet, BC=232 feet, and the angle A=37° 20′: what are the other angles and the third side?

10. In the triangle DEF, let DF=1,580 links, EF=1,228 links, and the angle F= 98° 40′: what are the angles D and E and the third side DE?

## ALGEBRA.

1. Find the value of $\frac{x^5+a^5}{x-a}$, and prove your answer.

2. Find the G.C.M. of $2x^2-xy-6y^2$ and $3x^2-8xy+4y^2$, and the L.C.M. of $x^2-1$ and $x^3-1$.

3. What is the value of $\left(\frac{a^2+ab+b^2}{c-d}\right)\left(-\frac{c^2-d^2}{a+b}\right)\left(-\frac{a^3-b^3}{c+d}\right)$?

4. From $\frac{3}{4}a+6c-\frac{5}{6}b$ take $9c+\frac{2}{3}a-\frac{3}{10}b$.

5. Square $\frac{x}{2}-\frac{y}{3}$, and find square root of $\frac{4m^2}{n^2}-\frac{12mn}{mn}+\frac{9n^2}{m^2}$.

6. Simplify $\dfrac{\sqrt{(1-x)}+\dfrac{1}{\sqrt{(1+x)}}}{1+\dfrac{1}{\sqrt{(1-x^2)}}}$.

7. Resolve $\frac{c+x}{c+y}$ into an infinite series.