$$\begin{array}{r|llll}
x^2 & x^4 + x^3 & -5x^2 & +15x - 8 & (x^2 + 3x - 2 \\
+2x & \quad 2x^3 & \;\;6x^2 & -4x & \\
-3 & & -3x^2 & -9x + 6 & \\
\hline
 & 3x^3 & -2x^2 & 2x - 2 &
\end{array}$$

The object of this arrangement is to have all the terms obtained from the same term in the divisor in the same horizontal line. Thus the three quantities $2x^3$, $6x^2$, $-4x$ are obtained from the $2x$ in the divisor by multiplying it respectively by the three terms in the quotient, and the terms $-3x^2$, $-9x$, 6 are similarly obtained from -3 in the divisor. This arrangement is greatly facilitated by writing the divisor in a vertical column instead of horizontally, The division may then be effected as follows:—Obtain the first term in the quotient by dividing the first term of the dividend by the first term of the divisor. The remaining terms of the divisor are then multiplied by this part of the quotient and the results placed, one under x^3 and in the same horizontal line with $2x$, and the other under $-5x^2$ and in the same horizontal line with -3 Then by addition $3x^2$ is obtained, and from this we get the second term of the quotient, and then the two last terms of the divisor are multiplied by this new part of the quotient, and the results $6x^2$ and $-9x$ arranged diagonally as the former ones were, and so on.

But even yet two quantities occur which may be omitted. These are $3x^3$ and $-2x^2$ The $3x$ is used to obtain the second term of the quotient, but this may quite readily be done without writing the $3x^3$ and thus the place now occupied by it may better be filled by the term in the quotient which it produces, and so also with the $-2x^2$ We shall thus have

$$\begin{array}{r|llll}
x^2 & x^4 + x^3 - 5x^2 + 15x - 8 & & & \\
2x & \quad 2x^3 & 6x^2 & -4x & \\
-3 & & -3x^2 & -9x & 6 \\
\hline
 & x^2 + 3x - 2 & & 2x - 2 &
\end{array}$$

We have now only to omit the letters, retaining the detached coefficients, and we have Horner's method.

$$\begin{array}{r|lllll}
1 & 1 + 1 - 5 + 15 - 8 & & & & \\
2 & \quad 2 & 6 & -4 & & \\
-3 & & -3 & -9 & 6 & \\
\hline
 & 1 + 3 - 2 & & 2 - 2 & &
\end{array}$$

ANSWERS TO PROBLEMS FROM CORRESPONDENTS.

1. If $a^2 + b^2 + c^2 = ab + bc + ca$ prove that $a = b = c$

If $a^2 + b^2 + c^2 = ab + bc + ca$, then

$$2\,(a^2 + b^2 + c^2 - ab - bc - ca) = 0$$
$$\therefore (a - b)^2 + (b - c)^2 + (c - a)^2 = 0$$
$$\therefore a - b = 0,\ b - c = 0,\ c - a = 0$$

2. If n st. lines cut one another in all possible ways find the number of pts. of section.

First take two lines; these cut in one point. Next take a third line; this cuts the first two in two more points. The fourth line will cut these three in three more points, the fifth in four more, &c., till we reach the nth line, which will cut the other $n-1$ lines in $n-1$ points. Thus to find the whole number of points of section we shall have to find the sum of the series

$$1, 2, 3, \text{\&c.}\quad n-1$$

$$\text{which is } \frac{n}{2}\,(n-1).$$

Or thus:—The number of points will be the number of combinations of n things two together, and is therefore $\frac{n}{2}\,(n-1)$.

3. Shew that $(x + y)^7 - x^7 - y^7$ is divisible by $(x^2 + xy + y^2)^2$

The coefficients in the expansion of $(x + y)^7$ are 1, 7, 21, 35, 35, 21, 7, 1, and on subtracting x^7 and y^7 these become 7, 21, 35, 35, 21, 7.

Now divide by 7, (that is, $7xy$). and we get 1, 3, 5, 5, 3, 1; next divide by Horner's method and we have

$$\begin{array}{r|l}
 & 1 + 3 + 5 + 5 + 3 + 1 \\
-1 & \quad -1 - 2 - 2 - 1 \\
-1 & \qquad\quad -1 - 2 - 2 - 1 \\
\hline
 & 1 + 2 + 2 + 1 \\
-1 & \quad -1 - 1 \\
-1 & \qquad\quad -1 - 1 \\
\hline
 & 1 + 1
\end{array}$$

leaving no remainder therefore, &c. This method has the advantage of exhibiting the quotient and hence gives all the factors, $\therefore$