Write at top of first page of answer paper (a) name of school where you have studied, (b) number of weeks and recitations a week in elementary algebra.

The minimum time requirement is five recitations a week for a school year.

Answer the first six questions and two of the others. Credit will not be granted unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Each answer should be reduced to its simplest form.

1 Find the prime factors of \( x^2 - x - 30; 16 - 2m^3; 1 - x^4; 2ab - cax + 2a - abx \)

2 Subtract \(-5x - 2(6y - 2x)\) from \(8x - x + 2y\) and add the result to \(6x - (3y - 4x)\). [No partial credit will be granted on the answer to this question.]

3 Simplify \(\left(\frac{2}{x + y}\right) \left(\frac{2x^2}{x^2 - y^2} + \frac{x + y}{2(x - y)} - \frac{x - y}{2(x + y)}\right)\)

4 Solve for \(a\) and \(b\) \(\begin{cases} a - \frac{3b}{2} = \frac{1}{2} \\ 3a + 7b = 13 \end{cases}\)

5 Solve \((x - 6)^2 - (2x - 5)^2 = 16\)

6 One number is twice another number; when the smaller is subtracted from 32 the remainder is 11 less than the remainder when the larger is subtracted from 50. Find the numbers.

7 Solve and test \(3(x + 1)(x - 3) - (3 - x)^2 = 8(2x - 3) + 2x^2 - 26\)

8 a Reduce to radicals of the same degree \(\sqrt{2}, \sqrt{3}, \sqrt{2}\)

b Perform the indicated operations \((2 - \sqrt{5})^2(1 - 2\sqrt{5})\); \(2\sqrt{6} + \sqrt{3}\)

9 The length of a rectangle is 15 ft greater than its width; if each dimension is decreased 2 ft, the area will be decreased 106 sq. ft. Find the dimensions.

10 a The dividend is \(m\), the divisor is \(n\), the remainder is \(r\); what is the quotient?

b A house cost \(a\) dollars and rents for \(n\) dollars a month; what per cent per annum is the income of the investment?