RESEARCH CORNER

Judging from the lack of response to the "Sums of Squares" last time, most readers must have had some trouble with it. Barry Quinn of St Joseph's College, Hunter's Hill has suggested that numbers of the form 4" (8k+2) can be written as the sum of two squares but he has found cases where this does not work.

To give you a start, here is a list of the first 30 numbers (except the squares) written as sums of squares.

Two squares: 2 = 1 + 1, 5 = 4 + 1, 8 = 4 + 4, 10 = 9 + 1, 13 = 9 + 4, 17 = 16 + 1, 18 = 9 + 9, 20 = 16 + 4, 26 = 25 + 1, 29 = 25 + 4.

Three squares: 3 = 1 + 1 + 1, 6 = 4 + 1 + 1, 11 = 9 + 1 + 1, 12 = 4 + 4 + 4, 14 = 9 + 4 + 1, 19 = 9 + 9 + 1, 21 = 16 + 4 + 1, 22 = 9 + 9 + 4, 24 = 16 + 4 + 4, 27 = 25 + 1 + 1 = 9 + 9 + 9, 30 = 25 + 4 + 1.

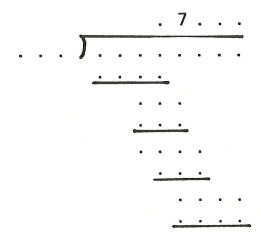
Four squares: 7 = 4 + 1 + 1 + 1, 15 = 9 + 4 + 1 + 1, 23 = 9 + 9 + 4 + 1, 28 = 16 + 4 + 4 + 4 = 25 + 1 + 1 + 1 = 9 + 9 + 9 + 1.

See if you can work out which *prime* numbers can be written as the sum of two squares; also which numbers cannot be written as the sum of 1, 2 or 3 squares. (Hint: Look at Barry Quinn's suggestion.)



"Seven"

Can you finish this long division:



(Answer on page 36)