EXAMPLE 1: Calculate the root of $x^2 - 50x + 1 = 0$ which nearest 0 using

(i) Real arithmetic, and

(ii) Machine arithmetic having word length $n = 5$ with chopping

SOLUTION: The root in question is

$$x = \frac{50 - \sqrt{(50)^2 - 4}}{2}$$

$$= \frac{50 - \sqrt{2500 - 4}}{2}$$

IN BOTH REAL AND MACHINE ARITHMETIC

$$= \frac{50 - \sqrt{2496}}{2}$$

IN BOTH REAL AND MACHINE

REAL ARITHMETIC

MACHINE ARITHMETIC

REAL ARITHMETIC	MACHINE ARITHMETIC
$=$	
$\frac{50 - 49.9599839872\ldots}{2}$	$\frac{(0.50 - 0.49959) \times 10^{2}}{2}$
$=$	$=$
$\frac{0.0400160128\ldots}{2}$	$\frac{(0.00041) \times 10^{2}}{2}$
$=$	$=$
$0.0200080064\ldots$	$\frac{(0.41) \times 10^{-1}}{2}$
	$=$
	$(0.205) \times 10^{-1}$

note, this number is 0.0205

so there is a large ERROR COMPARED TO