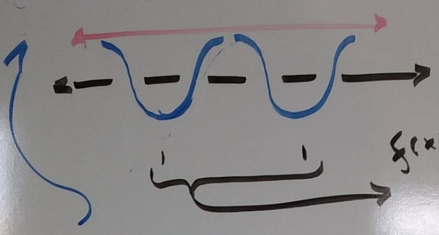
# CANCELLATION ERROR IN COMPUTATION OF PARTICULAR FUNCTIONS

3a

$f(x) = 1 + \cos x$



$f(x)$ COMPUTED NEAR $x = \pi$

MAY DROP SF's

IN COMPUTATION → $f(x) = 1.000 + \cos x$

ASSUME 4 SF's

EXAMPLE:

QUAD. FORM.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$0.2x^2 - 47.91x + 6 = 0$$

$x_1 = 239.4247$ } NUMERICAL SOLUTIONS

$x_2 = 0.1253$

$$x = \frac{47.91 \pm \sqrt{47.91^2 - 4(0.2)\cdot 6}}{2\cdot(0.2)}$$

$$= \frac{47.91 \pm \sqrt{2240}}{0.4} = \frac{47.91 \pm 47.85}{0.4}$$

$$x_1 = \frac{47.91 + 47.85}{0.4} = \frac{95.76}{0.4}$$

$= 239.4$ ALL 4 GOOD

BUT,

NOW, IF 4-DIGIT ARITHMETIC IS USED

$$x_2 = \frac{47.91 - 47.85}{0.4}$$

$$= \frac{0.06}{0.4} = 0.15 \neq 0.1253$$

ONLY 1 GOOD DIGIT