Problem 2

Suppose a and b have the same sign. (ii) would be preferable since the result is guaranteed to lie in the interval [a; b], and no overflow would happen. The rounding process will do no harm to the problem, too.

For example,

a) $\beta = 10,\ t = 2,\ [L, U] = [-2,\ 2]$

b) $a = 5.7 \times 10^{-1}\ ,\ b = 5.9 \times 10^{-1}$

c) The intermediate results for i and ii are as follows

i) $(a + b) \approx 1.2 \times 10^{-1}$ (i1)

$1.2 \times 10^{-1}/2.0 = 0.6 \times 10^{-1}$ (i2)

ii) $(b - a) = 0.2 \times 10^{-1}$ (ii1)

$(b - a)/2 = 0.1 \times 10^{-1}$ (ii2)

$a + 0.1 \times 10^{-1} = 5.8 \times 10^{-1}$ (ii3)

d) At step (i1) , according to the marks above, the problem will occur due to rounding.