Reciprocal Square Root Approximation Sequence

$R_1 = (3A/2) - (A^3/2)\ B$

where: B = The operand that you want to find the reciprocal square root approximation of.

3A/2 = A 13-bit value from the look-up table.

$-A^3/2$ = A 26-bit value from the look-up table.

R_1 = The approximate reciprocal square root of B.

example: Find the approximate reciprocal square root of 16. The answer should be 1/4 or .25. Let's assume the guess A = .2487.

$R_1 = (3A/2) - (A^3/2)\ B$

B = 16
3A/2 = .37305
$-A^3/2$ = -.0076913

R_1 = .37305 - (.0076913)(16) = .2499899

Approximate Reciprocal Square Root of 16 = .2499899

To complete the square root process you can now multiply the original operand by the result of the reciprocal square root approximation process. You can use the multiply instruction to do this.

$R_2 = R_1B$

where B = The operand that you want to find the square root of.

R_1 = The approximate reciprocal square root of B.

$R_2 = R_1B$

B = 16
R1 = .2499899

R_2 = (16)(.2499899) = 3.9998384

Approximate Square Root of 16 = 3.9998384

Reciprocal Square Root Instruction Summary

133ij- Enter Si with reciprocal square root approximation Sj

167i-k Enter Vi with reciprocal square root approximation Vk