1.15 a. old execution time = 0.5 new + 0.5 × 10 new = 5.5 new

b. In the original code, the unenhanced part is equal in time to the enhanced part sped up by 10, therefore:

$(1 - x) = x/10$

$10 - 10x = x$

$10 = 11x$

$10/11 = x = 0.91$

1.16 a. $1/(0.8 + 0.20/2) = 1.11$

b. $1/(0.7 + 0.20/2 + 0.10 \times 3/2) = 1.05$

c. fp ops: 0.1/0.95 = 10.5%, cache: 0.15/0.95 = 15.8%

1.17 a. $1/(0.6 + 0.4/2) = 1.25$

b. $1/(0.01 + 0.99/2) = 1.98$

c. $1/(0.2 + 0.8 \times 0.6 + 0.8 \times 0.4/2) = 1/(.2 + .48 + .16) = 1.19$

d. $1/(0.8 + 0.2 \times .01 + 0.2 \times 0.99/2) = 1/(0.8 + 0.002 + 0.099) = 1.11$

1.18 a. $1/(.2 + .8/N)$

b. $1/(.2 + 8 \times 0.005 + 0.8/8) = 2.94$

c. $1/(.2 + 3 \times 0.005 + 0.8/8) = 3.17$

d. $1/(.2 + \log N \times 0.005 + 0.8/N)$

e. $d/dN(1/((1 - P) + \log N \times 0.005 + P/N)) = 0$