1a. There are only two processors, will only have 2 results.

i) Size1: 20 - Should this be 19?
A,L,S,S: 3 + 3*3 = 12
J: 0
CB: 1 + 3*1 = 4
L: 1*3 = 3

CPI-A: 12*1 + 0*1 + 4*1 + 3*1 = 19
CPI = 19/19 = 1

CPI-B: 12*4 + 0*2 + 4*2 + 3*5 = 71
CPI = 71/20 = 3.55

ii) Size2: 202 - 161 R, 43 I
A,L,S,S: 2 + 24*8 = 194
J: 0
CB: 1*8 = 8
L: 0

CPI-A: 130*1 + 0*1 + 8*1 + 0*1 = 202
CPI = 202/202 = 1

CPI-B: 194*4 + 0*2 + 8*2 + 0*5 = 792
CPI = 792/202 = 3.9

1b.

If both processors are single cycle, as the hw does not specify otherwise, processor B would suck. Assuming frequency to be 1, time for execution would be as follows:

CPI-A_2 * Instr_2 = 1 * 202 = 202 seconds => $\frac{787.8}{202} = \frac{3.9}{1}$ = 3.9x diff in speed
CPI-B_2 * Instr_2 = 3.9 * 202 = 787.8 seconds

In order to break even, procB would need a 3.9x larger frequency.

2a.

i) hardfloat instr - 11578
Mul called 144 times
Multiply consists of 1 instr

With 1 CPI, Cycles = CPI*instr -
11578 Cycles total
144 for multiplication

144/11578 = .0124
1.24% of program is mult

ii) softfloat instr - 19644
Multiply called 144 times
Multiply consists of 14 instr

With 1 CPI, Cycles = CPI*instr -
19644 Cycles total
2016 for multiplication

2016 /19644 = .1026
10.26% of program is mult

2b.

The part where something is being multiplied will benefit, because that is where the multiplier would be used? (How is this supposed to be answered?)

Max speedup - 19644 cycles -> 11578 cycles: 19644 / 11578 = 1.7x

$$\text{Speedup} = \frac{1}{(1-f) + (f/a)} \qquad f = .1026,\ a = 1.7 \qquad \frac{1}{(1-.1026) + (.1026/1.7)} = 1.044x$$

2c.

With clock frequency slowed by 30%, speedup changes to 19644 * .7 / 11578 = 1.19x

$$\text{Speedup} = \frac{1}{(1-f) + (f/a)} \qquad f = .1026,\ a = 1.19 \qquad \frac{1}{(1-.1026) + (.1026/1.19)} = 1.017x$$