1a)

$8kb = 2^{13}$ $2^{32}/2^{13} = 2^{9}$ $4 \cdot 2^{9} = 2^{11} = 2048kb = 2mb$

1b) $1mb = 2^{20}$ bytes $2^{28}/2^{20} = 2^{8} = 256mb$

1c) $2^{28}/8kb = 2^{28}/2^{13} = 2^{15}$ pages

2) 1 2 3 4 2 1 5 2 1 2 3

frame = 3

a) LRU

+1 +1 +1 +1 +1 +1 +1 = 7 page faults

X 2 3 4 2 1 5 2 1 2 3

Fifo

+1 +1 +1 +1 +1 +1 +1 +1 = 8 page faults

X X 3 4 2 X 5 2 X 2 3

Optimal

+1 +1 +1 +1 +1 +1 = 6 page faults

X X 3 4 2 1 5 2 1 2 3

b) LRU frame = 4

+1 +1 +1 +1 +1 +1 +1 = 6 page faults

X 2 3 4 2 X 5 2 1 2 3

Fifo

+1 +1 +1 +1 +1 +1 +1 +1 +1 = 8 page faults

X 2 3 4 2 X 5 2 1 2 3

optimal

+1 +1 +1 +1 +1 = 5 page faults

X 2 3 4 2 X 5 2 X 2 3

3a)
P_1 working set = {4, 1, 2, 3, 7} size = 5
P_2 working set = {3, 4, 5, 6} size = 4
P_3 working set = {2, 9, 8, 7, 1} size = 5

3b)
When $\Delta = 7$ at time = 9, there are 14 resources used. As total frames is 10, trashing will occur

3c)
P_1 working set = {5, 7, 4, 1, 2, 3} size = 6
P_2 working set = {1, 3, 4} size = 3
P_3 working set = {9, 3, 2, 8, 7} size = 5
total required frames = 14

4) 1) inode for file1.txt = 50 61 71 25
inode for file2.txt = 50 61 71 25
> they are same

2) After changing content of file2.txt, content of file1.txt has changed as well

3) After removing file1.txt, file2.txt remains

4) unlink()

5) inode for file3.txt = 50 61 71 23
inode for file4.txt = 50 61 85 3f
> they are different

6) contents of file 3 has changed

7) the file4.txt remains but contents are removed when accessed from shell by using vim. when I tried from UI, it says the original item for file4.txt can't be found.