1) a) $R_{eq} = 133 \| (65 + 160 \| (240+400) + 35)\ \Omega$

b) $R_{eq} = 133 \| (100 + 160 \| 640) = 133 \| (100 + 128) = 133 \| 228 = \underline{84\ \Omega}$

2) a) $V_R = (20\Omega)(2A) = \underline{40\,V}$, b) $P_V = (2A)(50V) = \underline{100\,W}$

c) Voltage across current source is $50V + V_R = 90V = V_i$.

$\Rightarrow P_i = -(90V)(2A) = \underline{-180\,W}$

d) <u>Stay the same</u> because $P_V = (2A)(50V)$ independent of R.

e) <u>Decrease</u> because $P_i = -(50 + 2R)(2A)$.

3) a) <u>True</u> $V_1 = V_2 + V_3 \Rightarrow V_1 > V_2$

b) <u>False</u> $i_2 = i_3$

c) <u>False</u> $R_1 < R_2 + R_3$ so more current goes through R_1.

d) <u>False</u> $V_2 = i_2 R_2 = i_3 R_2 < i_3 R_3 = V_3$.

e) <u>False</u> $P_i = -(1A)^2 (R_1 \| R_2)$

f) <u>True</u> No current through R_2 or $R_3 \Rightarrow P_i = -(1A)^2 R_1$

4) a) $-V_S + V_1 + V_2 = 0 \Rightarrow \underline{V_S = i_1 R_1 + i_2 R_2}$

b) $\underline{i_1 + i_S = i_2}$

c) $V_a = V_2 = \underline{i_2 R_2 = V_a}$

d) $V_1 = V_S - V_a = i_1 R_1 \Rightarrow \underline{V_a = V_S - i_1 R_1}$

5) a) $V_\Delta = \frac{5}{10+5}(45V) = \underline{15V}$

b) $0.2\,V_\Delta = 3A$, $R_{eq} = 12 \| 60 = 10\Omega$, $i_2 = \frac{10\Omega}{60\Omega} 3A = \underline{0.5A}$

c) $V_a = (3A) R_{eq} = (3A)(10\Omega) = \underline{30\,V}$

d) $R_{eq} = 90 \| (10+5) = \frac{90 \cdot 15}{90+15} = \frac{18 \cdot 15}{18+3} = \frac{270}{21} = 12.857\Omega$

$$P = -\frac{V^2}{R_{eq}} = -\frac{(45)^2}{(270/21)} = \underline{-157.5\,W}$$