

1. M2 is 100% faster than M1 on program 1.
M1 is 33% faster than M2 on program 2.

2.

$$\text{MIPS}_{\text{M1}} = \frac{200}{10} = 20$$

$$\text{MIPS}_{\text{M2}} = \frac{160}{5} = 32$$

3.

$$\text{Time} = \text{CPI} * \text{Instructions} * \frac{1}{\text{Clock Rate}}$$

$$10 = \text{CPI}_{\text{M1}} * 200 * 10^6 * \frac{1}{200 * 10^6}$$

$$\text{CPI}_{\text{M1}} = 10$$

$$5 = \text{CPI}_{\text{M2}} * 160 * 10^6 * \frac{1}{300 * 10^6}$$

$$9.375 = \text{CPI}_{\text{M2}}$$

4.

$$\text{Time} = \text{CPI} * \text{Instructions} * \frac{1}{\text{Clock Rate}}$$

$$3 = 10 * \text{Instructions}_{\text{M1}} * \frac{1}{200 * 10^6}$$

$$60 * 10^6 = \text{Instructions}_{\text{M1}}$$

$$4 = 9.375 * \text{Instructions}_{\text{M2}} * \frac{1}{300 * 10^6}$$

$$128 * 10^6 = \text{Instructions}_{\text{M2}}$$