Resistors in Series and Parallel

Summary:
Two resistors connected in series have a greater total resistance than either of the two individual resistors. The formula for the total resistance, R, is:

$$R = R_1 + R_2$$

Two resistors connected in parallel have a smaller total resistance that either of the two individual resistors. The formula for the total resistance, R, is:

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} \qquad \text{or} \qquad R = \frac{R_1 R_2}{R_1 + R_2}$$

1. Calculate the resistance of the following combinations:
   a) 100 Ω and 200 Ω in series
   b) 100 Ω and 200 Ω in parallel
   c) 100 Ω and 200 Ω in series and this in parallel with 200 Ω.

2. Calculate the current flowing through the following when a p.d. of 12 V is applied across the ends:
   a) a resistance of 500 Ω
   b) 500 Ω and 1000 Ω in series
   c) 500 Ω and 1000 Ω in parallel.

3. You are given one 200 Ω resistor and two 100 Ω resistors. What total resistances can you obtain by connecting some, none, or all of these resistors in various combinations?