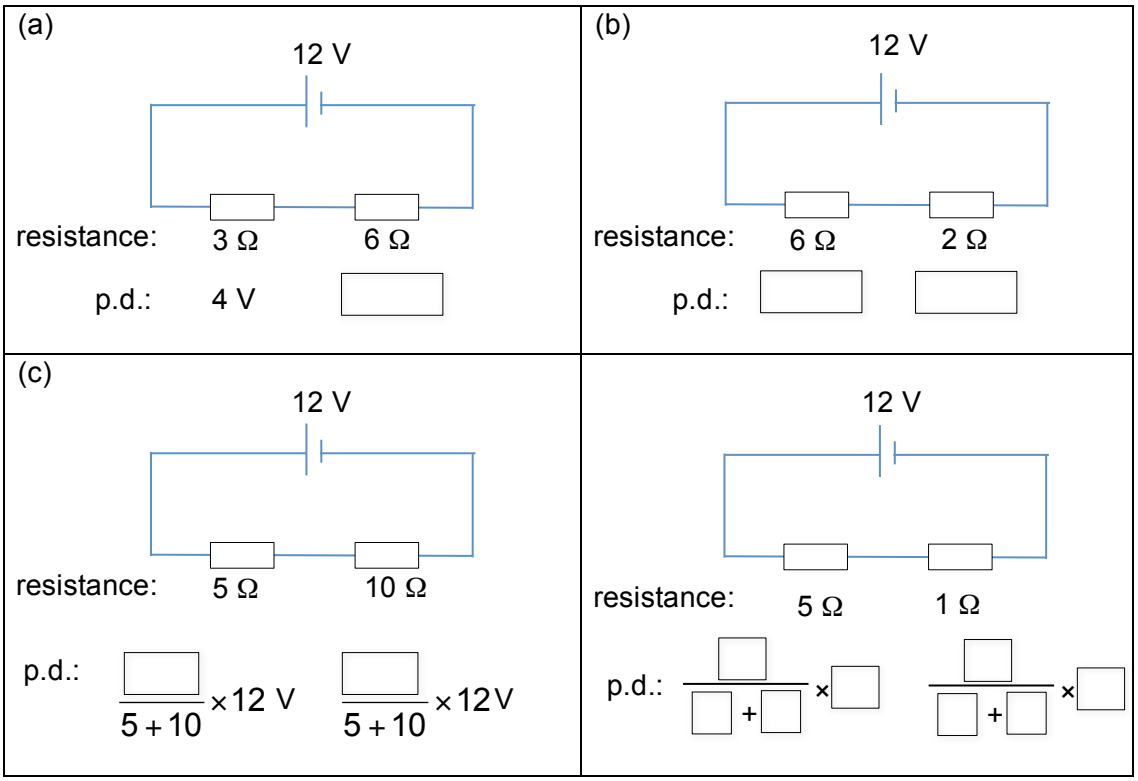
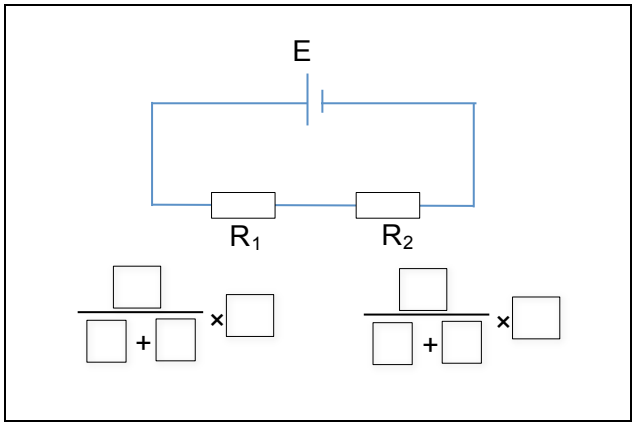
POTENTIAL DIVIDER

1. Consider the following circuit: a cell with emf 12 V connected to two resistors in series. Find the potential difference across each resistor.

   Follow these rules:
   a. For resistors in series, $E = V_1 + V_2 + V_3 + \ldots$.
   b. The ratio of p.d. is equal to the ratio of resistance.



2. Consider the following circuit: a cell with emf E connected to two resistors with resistance R_1 and R_2 in series. Express the p.d. across each resistor in terms of R_1, R_2 and E.



3. Replace one of the resistors in question 2 with a thermistor. When temperature of the thermistor rises, its resistance decreases. With help from the expressions derived in Qn 2, describe what happens to the p.d. across the thermistor and the remaining resistor.

ANSWERS TO POTENTIAL DIVIDER WORKSHEET

1 (a) 8 V

(b) 9 V ; 3 V

(c) 5 W ; 10 W

(d) $\frac{5\ \Omega}{5\ \Omega + 1\ \Omega} \times 12\ \text{V}$; $\frac{1\ \Omega}{5\ \Omega + 1\ \Omega} \times 12\ \text{V}$

2 $\frac{R_1}{R_1 + R_2} \times E$; $\frac{R_2}{R_1 + R_2} \times E$

3 When temperature rises and the resistance of the thermistor decreases, the p.d. across the thermistor decreases as well while the p.d. across the remaining resistor increases.