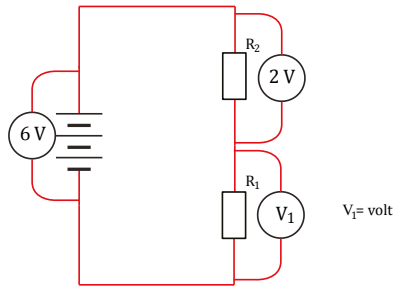


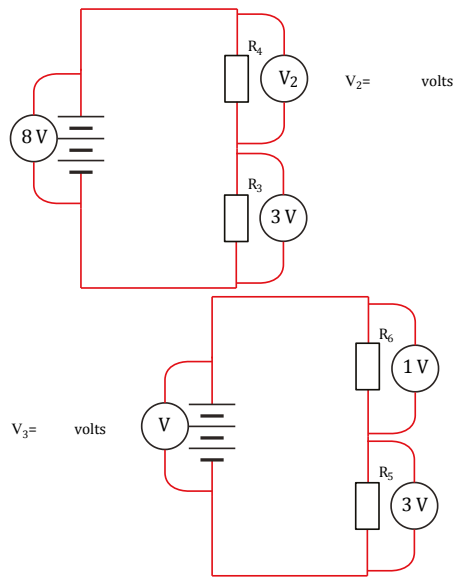
# Series connections question 1

Each of these circuits consists of a battery connected to two resistors in series. The two resistors in each circuit are different.  
 All the meters in the circuits are voltmeters. The readings on some of the voltmeters are shown.  
 Write down the reading you would expect to see on the other voltmeters.



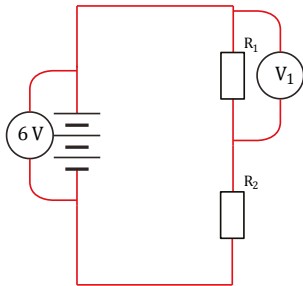
How confident are you that your answers to this question are correct?  
 Tick ONE box (✓)

- Very confident    Fairly confident    Not confident    Just guessing
- 



# Series connections question 2

In this circuit, a 6 V battery is connected to two resistors in series.  
The resistance of  $R_1$  is bigger than the resistance of  $R_2$ .



Note:  
 $R_1$  has a bigger resistance than  $R_2$ .

How confident are you that your answers to this question are correct?  
Tick ONE box (✓)

Very confident  Fairly confident  Not confident  Just guessing

(a) What is the reading on voltmeter  $V_1$ ? Tick ONE box (✓)

- 6 V
- between 6 V and 3 V
- 3 V
- between 3 V and zero

(b) How would you explain this? Tick ONE box (✓)

- The battery p.d. is shared, half across each resistor.
- The battery p.d. is shared, with the larger share across the first resistor the current comes to.
- The battery p.d. is shared, with the larger share across the smaller resistor.
- The battery p.d. is shared, with the larger share across the larger resistor.
- The p.d. across each resistor must be equal to the battery voltage.

# Series connections question 3

In each of these circuits, the resistor  $R$  has a large resistance and the resistor  $r$  has a small resistance.

For each circuit, say what you think the reading on the voltmeter will be, by writing one of the letters A-E in the box, as follows:

- A exactly 6 V
- B slightly less than 6 V
- C exactly 3 V
- D slightly above 0 V
- E exactly 0 V

Reading on voltmeter  $V_1$ :

Reading on voltmeter  $V_2$ :

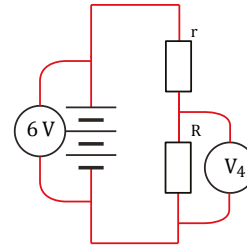
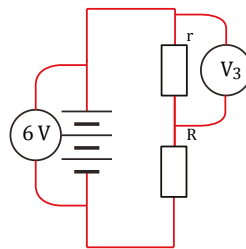
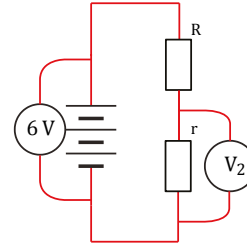
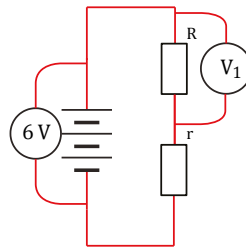
Reading on voltmeter  $V_3$ :

Reading on voltmeter  $V_4$ :

How confident are you that your answers to this question are correct?

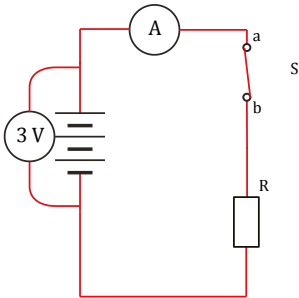
Tick ONE box (✓)

- Very confident  Fairly confident  Not confident  Just guessing



# Series connections question 4

(a) This circuit consists of a 3 V battery, connected to a resistor R and a switch S. The switch is closed. The ammeter reads 100 mA.

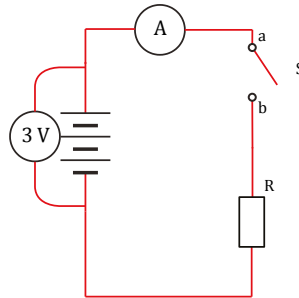


What is the voltage between a and b? \_\_\_\_\_ volt

How confident are you that your answers to this question are correct?  
Tick ONE box (✓)

Very confident  Fairly confident  Not confident  Just guessing

(b) The switch S is then opened. The voltmeter across the battery still reads 3 V.



What is the reading on the ammeter now? \_\_\_\_\_ ampere

What is the voltage between a and b now? \_\_\_\_\_ volt

# Answers to the questions

## Question 1

The battery potential difference is shared between two resistors connected in series:  $V_1$  is 4 volt;  $V_2$  is 5 volt;  $V_3$  is 4 volt.

## Question 2

The potential difference across the resistors connected in series is in proportion to their resistance (big resistance: big potential difference).  $V_1$  is between 3 volt and 6 volt: the larger share across the larger resistor.

## Question 3

Same reasoning as question 2:  $V_1$  is B;  $V_2$  is D;  $V_3$  is D;  $V_4$  is B.

## Question 4

The potential difference between a and b is zero because there is no resistance between these points, and the potential difference across R is 3 volt. With the switch open, the ammeter reads zero and the voltage between a and b is now 3 volt (The voltmeter is in effect measuring the potential difference across the supply).