202: Principles of electrical science  
**Handout 6: Power**

**Learning outcome**

The learner will:

1. Understand the relationship between resistance, resistivity, voltage, current and power.

**Assessment criteria**

The learner can:

4.6 calculate values of power in parallel and series D.C. circuits.

**Power**

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| * Electrical power is the **rate of doing electrical work** or of **expenditure of electrical energy**. * The formula for Power is obtained by using the power triangle, as shown on the right. * From the triangle, it can be seen that: | power triangle.png |

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| or  (d.c. only) |

Using Ohm’s law and substituting for either voltage or current in the power equation, as shown below, you can find other formulae for power.

Since Ohm’s law is:

substituting I x R for V in the power equation we get:

giving:

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| (a.c. or d.c.) |

By substituting for I in the power equation, we get:

This gives:

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| (a.c. or d.c.) |

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| **Example 1** | | | | | | power 01.png | | |
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| Power dissipated by R1 = P1: | | | | | |
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| Power dissipated by R2 = P2: | | | | | | | | |
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| Alternatively, since: | | | | | | | | |
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| then voltage across R1 is V1: | | | | | | | | |
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|  |  |  | or | |  | |  |  |
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| Voltage across R2 is V2: | | | | | | | |
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|  |  |  | or | |  |  |  |
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Although the example shows how to calculate power in a series circuit the same method can be used for resistors in parallel provided you know two of the three values (resistance, current, voltage) of the individual resistance.