**Parallel Circuits**

**6.2 PARALLEL ELEMENTS**

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| ***Two elements, branches, or networks are in* parallel *if they have two points in common.*** |  |



All elements are in parallel

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| elements 1 and 2 are in parallel  The parallel combination of 1 and 2 is then in series with element 3 |  |

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| elements 1 and 2 are in series (common point a )  The series combination of 1 and 2 is then in parallel with element 3 |  |

**6.3 TOTAL CONDUCTANCE AND RESISTANCE**

***For parallel elements, the total conductance is the sum of the individual conductances.***

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| Conductance is the inverse of resistance: |  |

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***The total resistance of parallel resistors is always less than the value of the smallest resistor.***

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| For *N* equal resistors in parallel |  |

For two resistors in parallel: For three resistors in parallel:

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***Parallel elements can be interchanged without changing the total resistance or input current.***

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***For parallel resistors, the total resistance will always decrease as additional elements are added in parallel.***

***For series resistors, the total resistance will always increase as additional elements are added in series.***