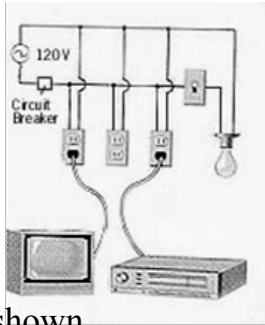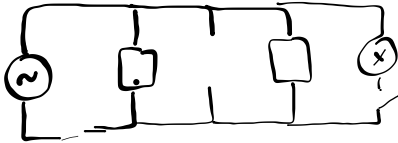# Household Wiring

1. Is most household wiring in series or in parallel? Explain.

parallel - all devices have same V

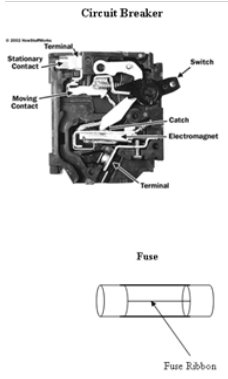2. Draw an appropriate schematic for the household circuit shown.

Household Wiring

3. What is the purpose of a fuse or a circuit breaker?

prevent too much current

How are they different?

fuses must be replaced

breakers can be reset

Household Wiring

600w

4. A 900 watt toaster, a 640 watt waffle iron, and a 5 amp food processor are to be used on the same circuit. What size circuit breaker should be used?
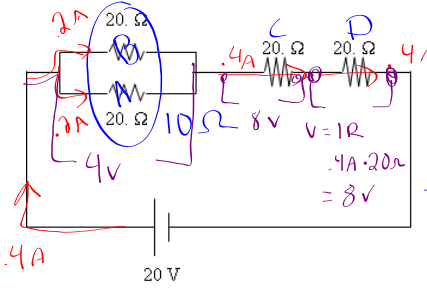
$P = IV$

$I = \dfrac{900w}{120v}$

$\dfrac{640w}{120v}$
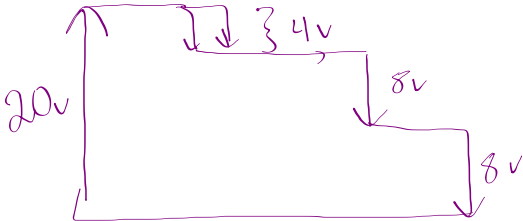
$5A$

Combination Circuits

1. In each circuit below, determine the voltage drop across each resistor and the current through each resistor.

$R_{11} = \left(\dfrac{1}{20\Omega} + \dfrac{1}{20\Omega}\right)^{-1}$

$R_{eq} = \left(\dfrac{1}{20\Omega} + \dfrac{1}{20\Omega}\right)^{-1} + 20\Omega + 20\Omega = 50\Omega$

$V = IR$

$.4A \cdot 20\Omega$
$= 8v$

$I_T = V_T/R_{eq} = \dfrac{20v}{50\Omega} = .4A$

	I	V	
A	.2A	4v	
B	.2A	4v	
C	.4A	8v	
D	.4A	8v	

.4A   20v

2.

R_1 $4\ \Omega$ R_3 $1\ \Omega$

R_2 $2\ \Omega$ B_2 $7\ V$

$3A$

$3A$

$7v$

$1\Omega = R_3$ $V = IR = 3A \cdot 1\Omega = 3v$

$I = V/R = 2A$ $I = V/\Omega = 1A$

$2\Omega \downarrow R_2$ $R_1 \downarrow 4\Omega$ $\Big\} R_{11} = \left(\frac{1}{2\Omega} + \frac{1}{4\Omega}\right)^{-1} = 1.\overline{3}\ \Omega$

$V_{11} = I_{11}R_{11} = 3A \cdot 1.\overline{3}\Omega = 4\ V$
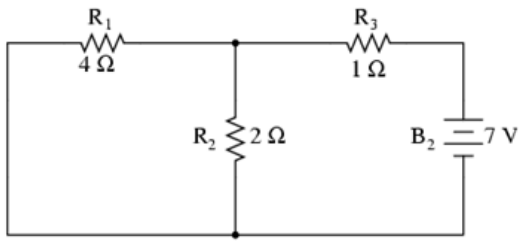
$R_{eq} = 1\Omega + 1.\overline{3}\Omega$

$= 2.33\Omega$

$I = V/R_T = 7v/2.33\Omega = 3A$

$= I_3$
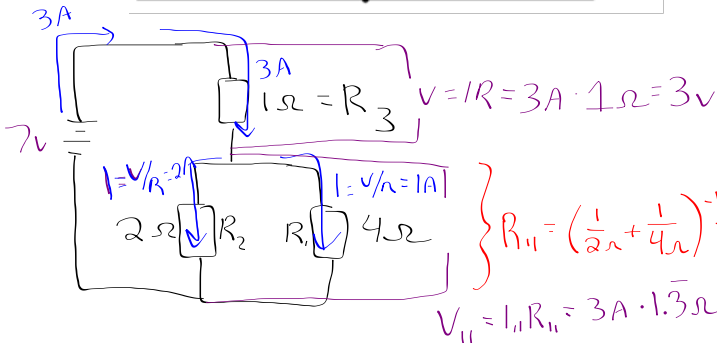
	I	V
R_1	$1A$	$4v$
R_2	$2A$	$4v$
R_3	$3A$	$3v$

Combination Circuits

3. Determine the current through and the voltage drop across each resistor.

$R_{eq} = 8\Omega$

$I_T = 3A$

$3A$ $6\ \Omega$

$1.5A$

$24\ V$

4Ω

3Ω $1.5A$

1Ω

$+24v$

$18v$

$6v$ $4.5v$

$1.5v$

$P = IV$ ✓
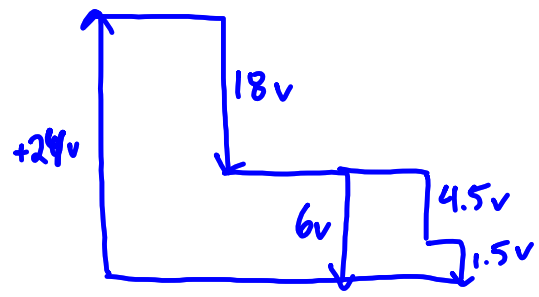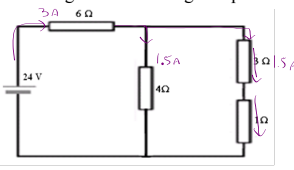
	I	V
6Ω	$3A)$	$18v)$
4Ω	$1.5A)$	$6v)$
3Ω	$1.5A)$	$4.5v)$
1Ω	$1.5A)$	$1.5v)$