

ELECTRIC POWER

$$P = IV$$

Phone charger: $P = (5V)(1A)$
 $= 5W$

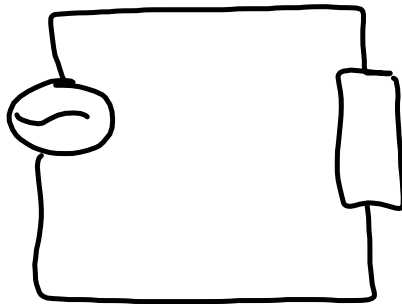
$$V = IR$$

$$P = \frac{V^2}{R} = I^2 R$$

POWER CHALLENGE:

1) a.

120V
from wall
plug



40 W

100 Bulb strand
of lights

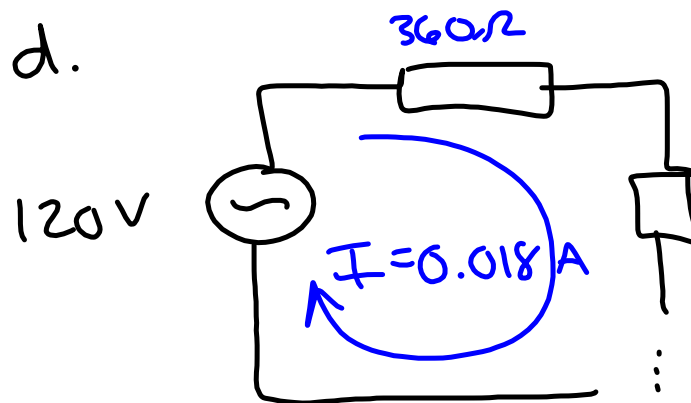
b. $P = \frac{V^2}{R}$

$$R_{\text{total}} = \frac{V^2}{P} = \frac{(120V)^2}{40W} = 360 \Omega$$

$$R_{\text{individual}} = \frac{360 \Omega}{100} = 3.6 \Omega$$

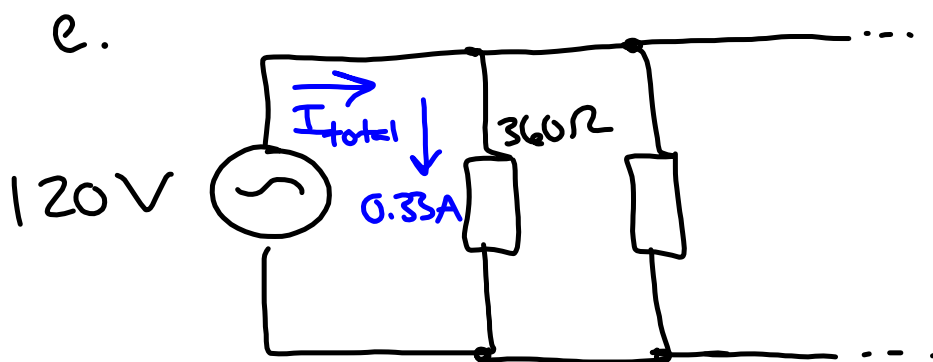
c. $V = IR_{\text{total}}$

$$I = \frac{120V}{360 \Omega} = 0.3 A$$



$$R_{eq} = \frac{V_{total}}{I} = \frac{120V}{0.018A} = 6666\Omega$$

$$\# \text{ strands} = \frac{6666\Omega}{360\Omega} = 18.5$$



$$I_{total} \geq 15A$$

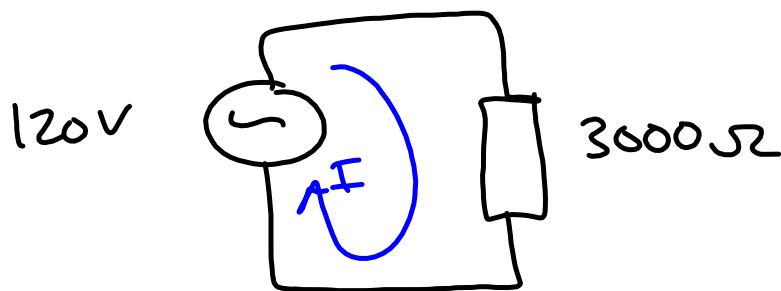
$$\# \text{ Strands} = \frac{I_{total}}{I_{individual}} = \frac{15A}{0.33A} = 45 \text{ strands}$$

$$f. \quad P_{\text{total}} = 4.8 \text{ W}$$

$$V_{\text{total}} = 120 \text{ V}$$

$$P = \frac{V^2}{R}$$

$$R = \frac{V^2}{P} = 3000 \, \Omega$$



$$I = \frac{V}{R} = \frac{120 \text{ V}}{3000 \, \Omega} = 0.04 \text{ A}$$

$$\# \text{ strands} = \frac{I_{\text{total}}}{I_{\text{individual}}} = \frac{1.5 \text{ A}}{0.04 \text{ A}} = 375 \text{ strands}$$