Problem 28.42

a.) Using the standard relationship for power:

for the heater:

$$P_{heater} = iV$$

$$\Rightarrow i = \frac{P}{V}$$

$$= \frac{\left(1.50\text{x}10^{3}\ \text{W}\right)}{\left(120\ \text{V}\right)}$$

$$= 12.5\ \text{A}$$

for the toaster:

$$i_{toaster} = \frac{\left(750\ \text{W}\right)}{\left(120\ \text{V}\right)}$$

$$= 6.25\ \text{A}$$

for the grill:

$$i_{grill} = \frac{\left(1000\ \text{W}\right)}{\left(120\ \text{V}\right)}$$

$$= 8.33\ \text{A}$$

b.) The total current drawn when all three are turned on is:

$$\left(12.5\ \text{A}\right)+\left(6.25\ \text{A}\right)+\left(8.33\ \text{A}\right)=27.08\ \text{A}$$

As this is more than the 25-A circuit breaker, running all three will trip the breaker.