Task Title: Calculating Electrical Service Size

OALCF Cover Sheet – Practitioner Copy

Learner Name:_____

Date Started (m/d/yyyy):_____

Date Completed (m/d/yyyy): _____

Successful Completion: Yes ☐ No ☐

Goal Path:		Employment	☐	Apprenticeship	■
Secondary School	☐	Post Secondary	☐	Independence	☐

Task Description: Read to answer questions about electrical service, and calculate the electrical service size for homes and other buildings.

Main Competency/Task Group/Level Indicator:

- Find and Use Information/Read continuous text/A1.2
- Find and Use Information/Interpret documents/A2.1
- Understand and Use Numbers/Use measures/C3.2

Performance Descriptors: See chart on last page

Materials Required:

- Pencil/paper and/or digital device
- Calculator

Learner Information

Electricians calculate the electrical service size for homes. Service size is the amount of electricity (measured in amperes (amps)) that a house requires. The electricity enters the house through a fuse or breaker panel; the panel is rated for the service size calculated (e.g. 60, 100, 120, 150, 200 amps).

Electricians take into consideration the size of the home, the number of plugs, lights and appliances requiring electricity and the minimum legal service size. They also read the Canadian Electrical Code to determine maximum items/load on a circuit.

Service size is based on 2 factors: calculated load and minimum service size.

The calculated load is the sum of all the loads. A load is anything (a resistor) powered by electricity such as plugs, lights, stoves, dryers and furnaces; light switches are not included in the calculation. Minimum lights, switches and plugs are listed in the Canadian Electrical Code and are based on the room type and size as well as the square meters of the house. The basic load for a house (up to 90 m2) is 5,000 watts; other resistors (such as a stove) are added to this to determine the total wattage.

The minimum service size is based on the square meters of the house. It is legal (and sometimes preferred) to have a larger service size than required (so more items requiring electricity can be added later) but it is illegal to install a smaller service size than required.

Work Sheet

Task 1: What is service size, and what is it measured in?

Answer:

_____

Task 2: List four examples of a load.

Answer:

_____

Task 3: What is the basic load for a house measuring 90 m^2 or smaller?

Answer:

_____

Task 4: If Amperes (amps) = Total Watts/Volts, calculate the total amps required for the following service:

- **Basic load = 5,000 watts**
- **Range (stove) = 6,000 watts**
- **Dryer = 1,000 watts**
- **Service = 240 volts**

Answer:

_____

Task 5: Use the Service Size table (partial) below to determine the minimum legal service size for a house that is 84 m^2. Write your answer in a full sentence below.

Sq. Meters	Minimum Service Size (amps)	Include basement dimensions in calculation
Less than 80	60	No
80 - 90	100	No
90 - 180	120	Yes (75%)

Answer:

_____

Scan the Electrical Rules below.

- Rule 12–4,000: A maximum of 12 outlets may be connected to a circuit. These may be plugs (excluding special ones in the kitchen or for appliances such as a refrigerator) or lights or any combination. It is better to have a circuit contain both lights and plugs. Light switches do not count as part of the 12. It is encouraged that 10 (or even 8) plugs or lights be on any circuit but 12 is the legal maximum.
  Count a single or duplex receptacle (plug) as one outlet.
- Rule 2-316 and 30-502: The Electrical Code requires at least one light, controlled by a switch for the dining room, den and living room.
- Rule 26-712(a)(c) requires that a receptacle (plug) be no further than 1.8 m from an appliance (e.g. lamp, television).

Task 6: A house has a living room, a dining room and a den. Both the living room and the den have 4 receptacles, and the dining room has 3 receptacles.

a) Using the information provided in the "Electrical Rules", calculate the number of lights, plugs and switches required for the three rooms.

Answer:

_____

b) Can the three rooms be put on one circuit? Explain your answer.

Answer:

_____

Answers

Task 1: What is service size, and what is it measured in?

Answer: Service size is the amount of electricity that a house requires. It is measured in amperes (amps).

Task 2: List four examples of a load.

Answer: Any four of the following: plugs, lights, stoves, dryers and furnaces

Task 3: What is the basic load for a house measuring 90 m^2 or smaller?

Answer:5,000 watts

Task 4: If Amperes (amps) = Total Watts/Volts, calculate the total amps required for the following service:

- **Basic load = 5,000 watts**
- **Range (stove) = 6,000 watts**
- **Dryer = 1,000 watts**
- **Service = 240 volts**

Answer: Total watts = 5,000 + 6,000 + 1,000 = 12,000 watts
Amps = Total Watts/Volts
Amps = 12,000/240
Total Amps = 50

Task 5: Use the Service Size table (partial) below to determine the minimum legal service size for a house that is 84 m^2. Write your answer in a full sentence below.

Sq. Meters	Minimum Service Size (amps)	Include basement dimensions in calculation
Less than 80	60	No
80 - 90	100	No
90 - 180	120	Yes (75%)

Answer: The minimum legal service size is 100 amps. (Logic: 84 m^2 is more than 80 m^2 but less than 90m^2.)

Scan the Electrical Rules below.

Rule 12–4,000: A maximum of 12 outlets may be connected to a circuit. These may be plugs (excluding special ones in the kitchen or for appliances such as a refrigerator) or lights or any combination. It is better to have a circuit contain both lights and plugs. Light switches do not count as part of the 12. It is encouraged that 10 (or even 8) plugs or lights be on any circuit but 12 is the legal maximum.
Count a single or duplex receptacle (plug) as one outlet.
Rule 2-316 and 30-502: The Electrical Code requires at least one light, controlled by a switch for the dining room, den and living room.
Rule 26-712(a)(c) requires that a receptacle (plug) be no further than 1.8 m from an appliance (e.g. lamp, television).

Task 6: A house has a living room, a dining room and a den. Both the living room and the den have 4 receptacles, and the dining room has 3.

a) Using the information provided in the "Electrical Rules", calculate the number of lights, plugs and switches required for the three rooms.

Answer: Add the receptacles of the 3 rooms - 4 + 4 + 3 = **11**
Each room must have a light and a switch.
The three rooms will have 3 lights and 3 switches.
Add the lights, switches and receptacles.
3 + 3 + 11 = 17

b) Can the three rooms be put on one circuit? Explain your answer.

Answer: The maximum number of outlets on a circuit is 12. Light switches do not count. Therefore, 17 – 3 (light switches) = 14
The 3 rooms cannot be on the same circuit because there are more than 12 outlets.

NOTE - This answer must be based on the answer the learner gave in Task 6 a) …if that number was different than 17 then base the result for 6 b) on the number they use.

Performance Descriptors

Levels	Performance Descriptors	Needs Work	Completes task with support from practitioner	Completes task independently
A1.2	Scans text to locate information			
	Locates multiple pieces of information in simple texts, makes low-level inferences			
	Makes connections between sentences and between paragraphs in a single text			
	Reads more complex texts to locate a single piece of information			
	Follows the main events of descriptive, narrative and informational texts			
	Obtains information from detailed reading			
A2.1	Scans to locate specific details			
C3.2	Calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers			
	Understands and uses formulas for finding the perimeter, area and volume of simple, common shapes			
	Chooses and performs required operation(s); may make inferences to identify required operation(s)			

Levels	Performance Descriptors	Needs Work	Completes task with support from practitioner	Completes task independently
	Selects appropriate steps to solutions			
	Interprets, represents and converts measures using whole numbers, decimals, percentages, ratios and simple, common fractions (e.g. ½, ¼)			
	Uses strategies to check accuracy (e.g. estimating, using a calculator, repeating a calculation, using the reverse operation)			

This task: Was successfully completed ☐ Needs to be tried again ☐

Learner Comments:

Instructor (print): _____

Learner (print): _____