

Developing OALCF Apprenticeship Tasks for the Competency “Use Digital Tasks” (2014/2015) Task-based Activity Cover Sheet

Task Title: RAC Mechanic Apprentices use Digital Technology at school

Learner Name:	
Date Started: _____ Date Completed: _____	
Successful Completion: Yes ___ No ___	
Goal Path: Employment <input checked="" type="checkbox"/> Apprenticeship <input checked="" type="checkbox"/> Secondary School <input checked="" type="checkbox"/> Post Secondary <input checked="" type="checkbox"/> Independence	
Task Description: While in school, RAC Mechanic apprentices use digital technology to learn, research and work on group projects.	
Competency: A: Find and Use Information B: Communicate Ideas and Information C: Understand and Use Numbers D: Use Digital Technology	Task Group(s): A1: Read continuous text A2: Interpret documents B2: Write continuous text B3: Complete and create documents C1: Manage money
Level Indicators: A2.2: Interpret simple documents to locate and connect information B3.2a: Use layout to determine where to make entries in simple documents B3.2b: Create simple documents to sort, display and organize information C1.2: Make low-level inferences to calculate costs and expenses that may include rates such as taxes and discounts D.2: Perform well-defined, multi-step digital tasks	
Performance Descriptors: see chart on last page	
Materials Required: <ul style="list-style-type: none"> • Computer, laptop or tablet with word processing and spreadsheet software • Calculator • Access to the internet • Email account 	

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RAC Mechanic apprentices attend school as part of the program. They learn about trade specifics. Assignments may be individual or group. RAC Mechanic apprentices use digital technology to complete assignments and share information with other apprentices and instructors. During the school portion, they also learn about and use new digital technologies of the trade.

Learner Information and Tasks:

Task 1: While in Block F of the apprenticeship program, RAC Mechanic apprentices attend school to learn about maintaining and servicing systems. You are a member of a group working on a project about cleaning burners. Your role is to research three methods of cleaning burners for the Lennox brand of furnaces.

- a) Complete an internet search for a Lennox brand EL180DFE Installation Manual. Scroll to the Table of Contents and navigate to the Service page. Locate the Cleaning the Burner section and copy to a Word document. Ensure that each step is on a separate line.
- b) Using Times New Roman, 12 point font, enter your name at the top of the page. On the next line in 16 point font, bold and centre enter the name “Lennox”. On the next line, in 12 point font, left justification, no bold, enter the model number of the furnace.
- c) Use the highlight feature of the word processor to feature steps 1, 5 and 10. Save the document as Lennox and your initials.
- d) Email the document as an attachment to your instructor.

Task 2: The next assignment in the school term is to learn about and use a Solar Calculator. This online digital device determines cost savings, ecological benefits and carbon dioxide (CO₂) reduction percentages when a customer uses solar panels to provide electricity to an air conditioner. In this assignment, you will use the Solar Calculator to determine these values for three Lennox air conditioner models based on the number of solar modules installed.

- a) Create a spreadsheet and name the file Lennox Air Conditioner_Solar Modules_your initials. Rename the “Sheet 1” as ‘7’.

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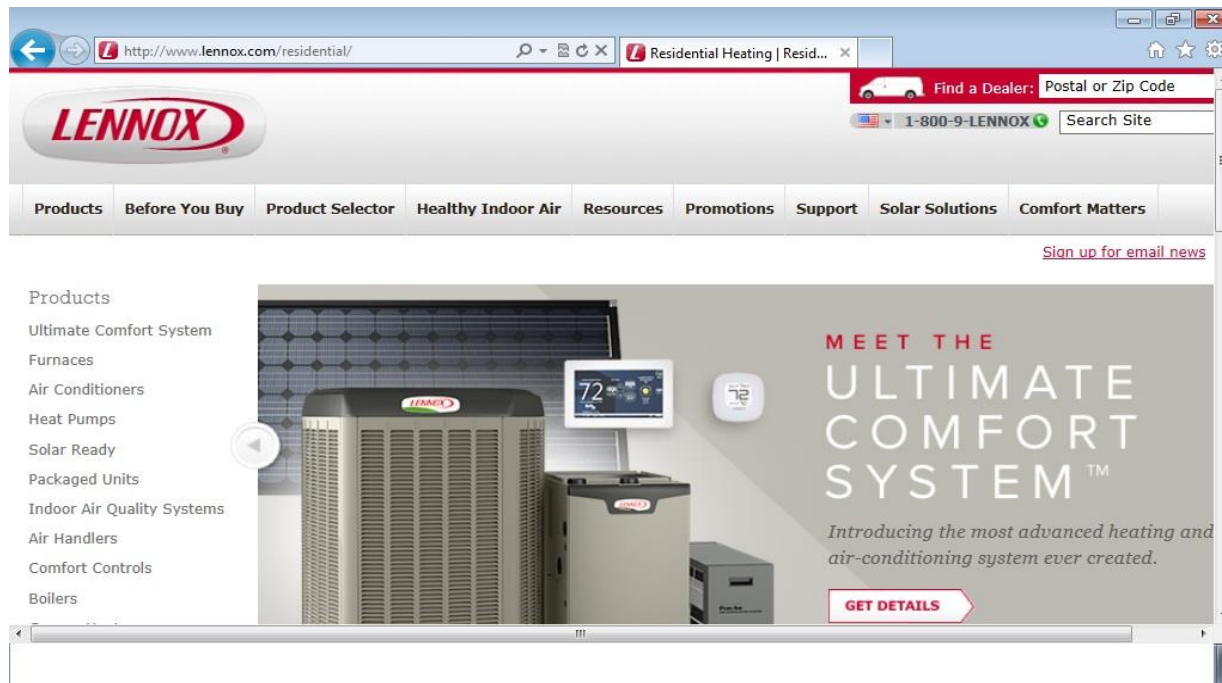
- b) Merge and Centre the cells at Row 3 from column A to E. Type Lennox Air Conditioners and Solar Energy. Label Columns B to D in Row 4 as ‘Cost Savings’, ‘Trees Planted’ and ‘CO₂ Reduction’. (Hint: use the subscript feature in the Font section to change the ‘2’.) Label the Rows 5, 6 and 7 in Column A as XC25, XC21 and XC17.
- c) Locate and select the Solar Calculator under Lennox Tools on the <http://www.lennox.com/residential/> web site. Use the Solar Calculator to determine and input the values into the Excel file for Region 5 for the three models of the Lennox air conditioner attached to seven solar modules. Save the file.
- d) Click the ‘?’ beside the Estimated heating/cooling operation costs on the Solar Calculator website. Note the calculation for the \$200 household utility bill. Your assignment is to calculate the money saved if the monthly utility bill is \$300. Use the same percentage of heating/cooling costs to the total bill as the previous bill and the same cost savings percentage. A calculator is permitted. Type your answer in cell C10 of the worksheet named ‘7’. Resave the file by adding ‘Final’ to the file name. Email the file as an attachment to your instructor. In the body of the email let your instructor know where the calculation result is and in which worksheet.

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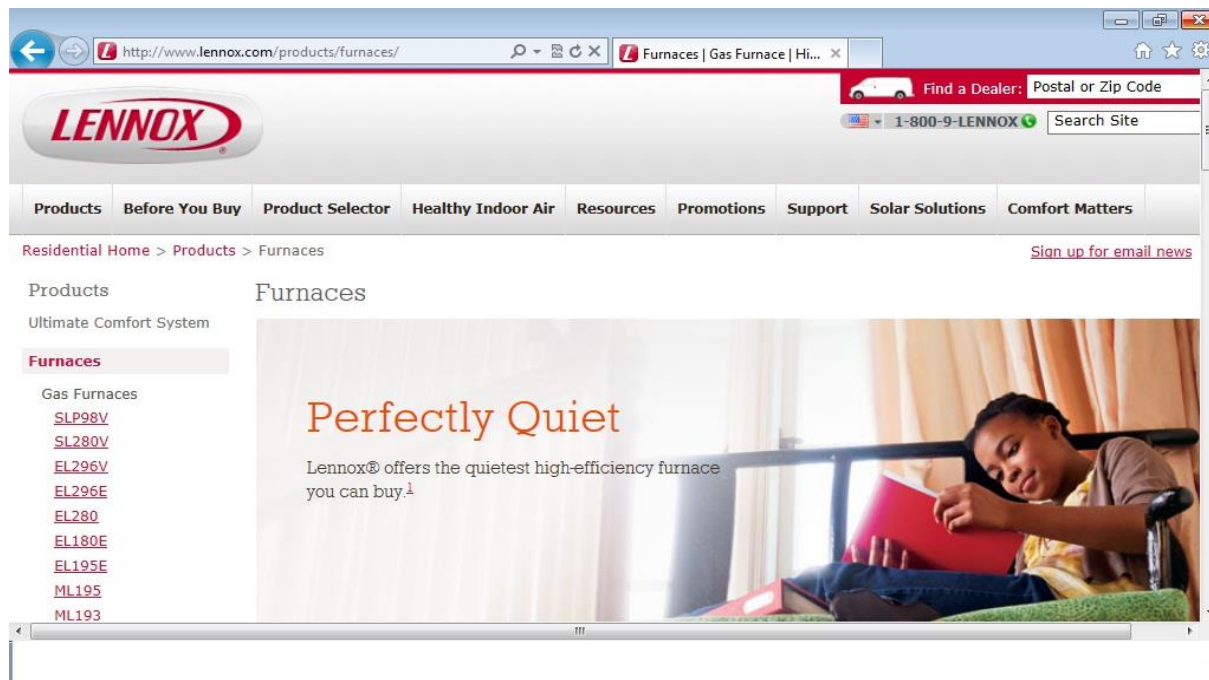
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Answer Key

Task 1: a)

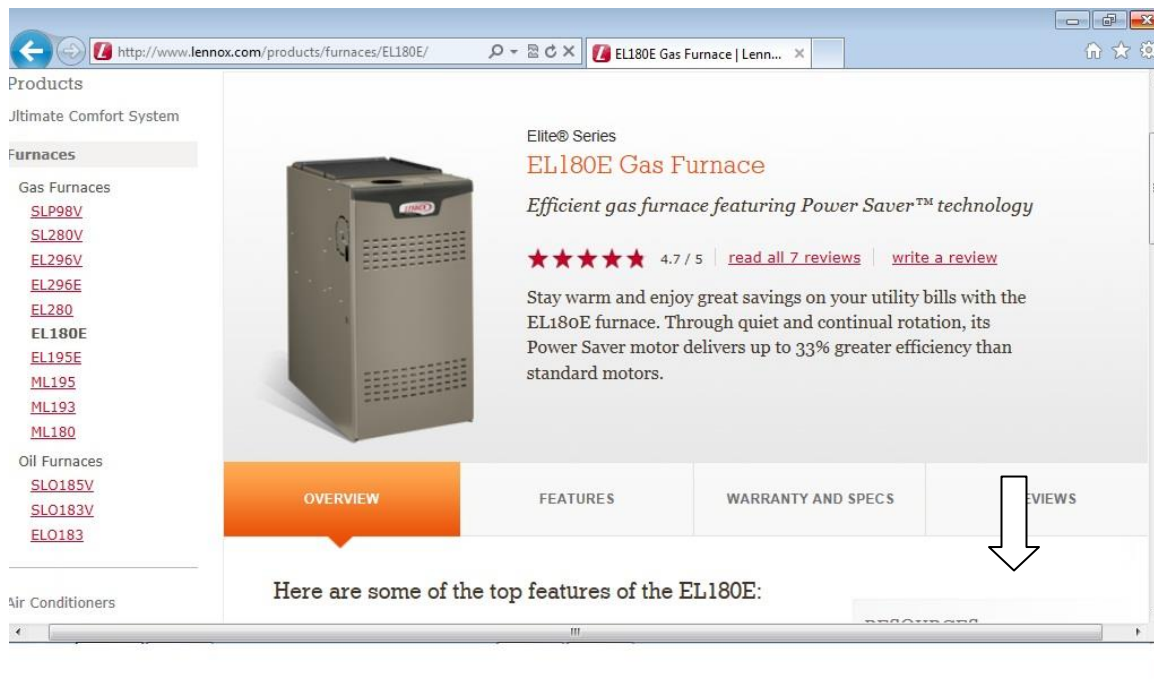


b)



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c)



Products
Ultimate Comfort System

Furnaces

Gas Furnaces

- [SLP98V](#)
- [SL280V](#)
- [EL296V](#)
- [EL296E](#)
- [EL280](#)
- [EL180E](#)
- [EL195E](#)
- [ML195](#)
- [ML193](#)
- [ML180](#)

Oil Furnaces

- [SLO185V](#)
- [SLO183V](#)
- [ELO183](#)

Air Conditioners

Elite® Series
EL180E Gas Furnace
Efficient gas furnace featuring Power Saver™ technology

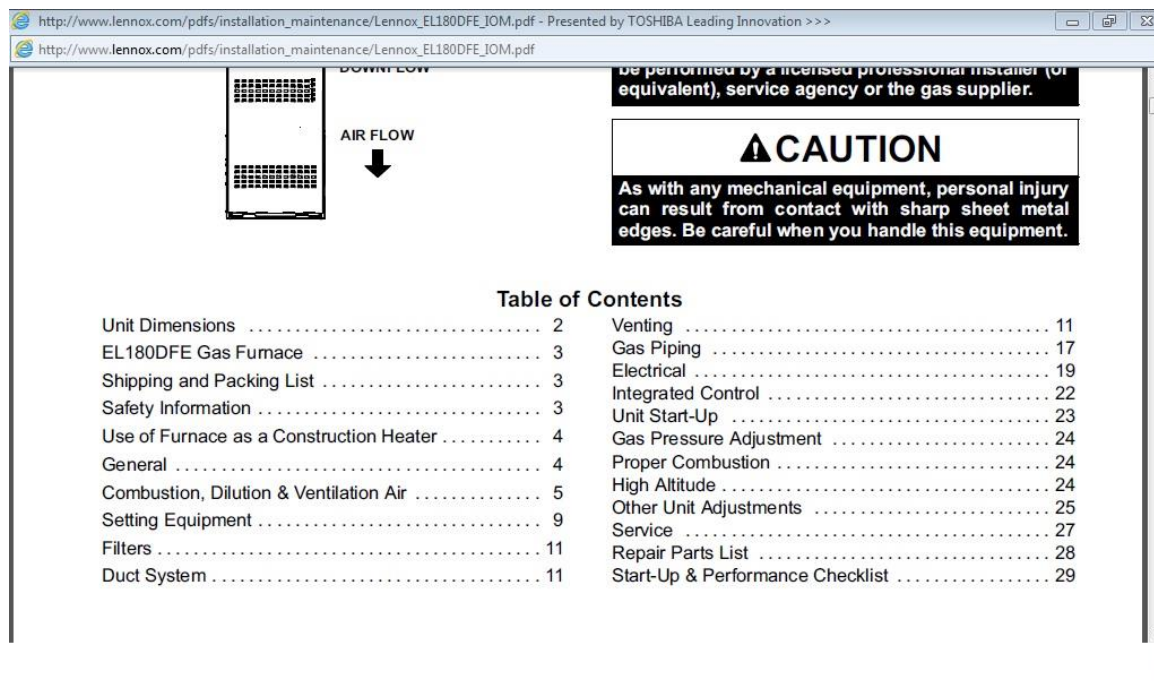
★★★★★ 4.7 / 5 | [read all 7 reviews](#) | [write a review](#)

Stay warm and enjoy great savings on your utility bills with the EL180E furnace. Through quiet and continual rotation, its Power Saver motor delivers up to 33% greater efficiency than standard motors.

OVERVIEW | FEATURES | WARRANTY AND SPECS | **REVIEWS**

Here are some of the top features of the EL180E:

d)



http://www.lennox.com/pdfs/installation_maintenance/Lennox_EL180DFE_IOM.pdf - Presented by TOSHIBA Leading Innovation >>>

http://www.lennox.com/pdfs/installation_maintenance/Lennox_EL180DFE_IOM.pdf

DOWNFLOW

AIR FLOW

be performed by a licensed professional installer (or equivalent), service agency or the gas supplier.

CAUTION

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

Table of Contents

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EL180DFE Gas Furnace	3	Gas Piping	17
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e)

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http://www.lennox.com/pdfs/installation_maintenance/Lennox_EL180DFE_IOM.pdf - Presented by TOSHIBA Leading Innovation >>>
http://www.lennox.com/pdfs/installation_maintenance/Lennox_EL180DFE_IOM.pdf

Service	Electrical
<p>⚠ WARNING</p> <p>ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD.</p> <p>Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death or property damage. Improper servicing could result in dangerous operation, serious injury, death, or property damage. Before servicing, disconnect all electrical power to furnace. When servicing controls, label all wires prior to disconnecting. Take care to reconnect wires correctly. Verify proper operation after servicing.</p>	<p>1 - Check all wiring for loose connections.</p> <p>2 - Check for the correct voltage at the furnace (furnace operating). Correct voltage is 120VAC ± 10%.</p> <p>3 - Check amp-draw on the blower motor with blower access panel in place. Unit Nameplate _____ Actual _____</p>
<p>At the beginning of each heating season, a licensed professional technician (or equivalent) should check the system as follows:</p> <p>Blower Check the blower wheel for debris and clean if necessary.</p>	<p>Cleaning the Burners <i>NOTE - Use papers or protective covering in front of the furnace during cleaning.</i></p> <p>1 - Turn off both electrical and gas power supplies to furnace.</p> <p>2 - Remove access panel.</p> <p>3 - Label the wires from gas valve and rollout switches then disconnect them.</p> <p>4 - Mark and disconnect sensor wire from the sensor. Disconnect plug from the ignitor at the burner box.</p> <p>5 - Disconnect gas supply piping. Remove the four screws securing the burner manifold assembly to the vestibule panel and remove the assembly from the unit.</p> <p>6 - Remove screws securing burner box and remove</p>

f) The selected section will be pasted into the Word document in task 1h.

g) See 1h

h)

My Name

Lennox

EL180

1 - Turn off both electrical and gas power supplies to furnace.

2 - Remove access panel.

3 - Label the wires from gas valve and rollout switches then disconnect them.

4 - Mark and disconnect sensor wire from the sensor. Disconnect plug from the ignitor at the burner box.

5 - Disconnect gas supply piping. Remove the four screws securing the burner manifold assembly to the vestibule panel and remove the assembly from the unit.

6 - Remove screws securing burner box and remove burner box.

7- To clean burners, run a vacuum cleaner with a soft brush attachment over the face of burners. Visually inspect inside the burners and crossovers for any blockage

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caused by foreign matter. Remove any blockage. Figure 24 shows burner detail.

8 - Reinstall the burner box assembly using the existing four screws. Make sure that the burners line up in the center of the burner ports.

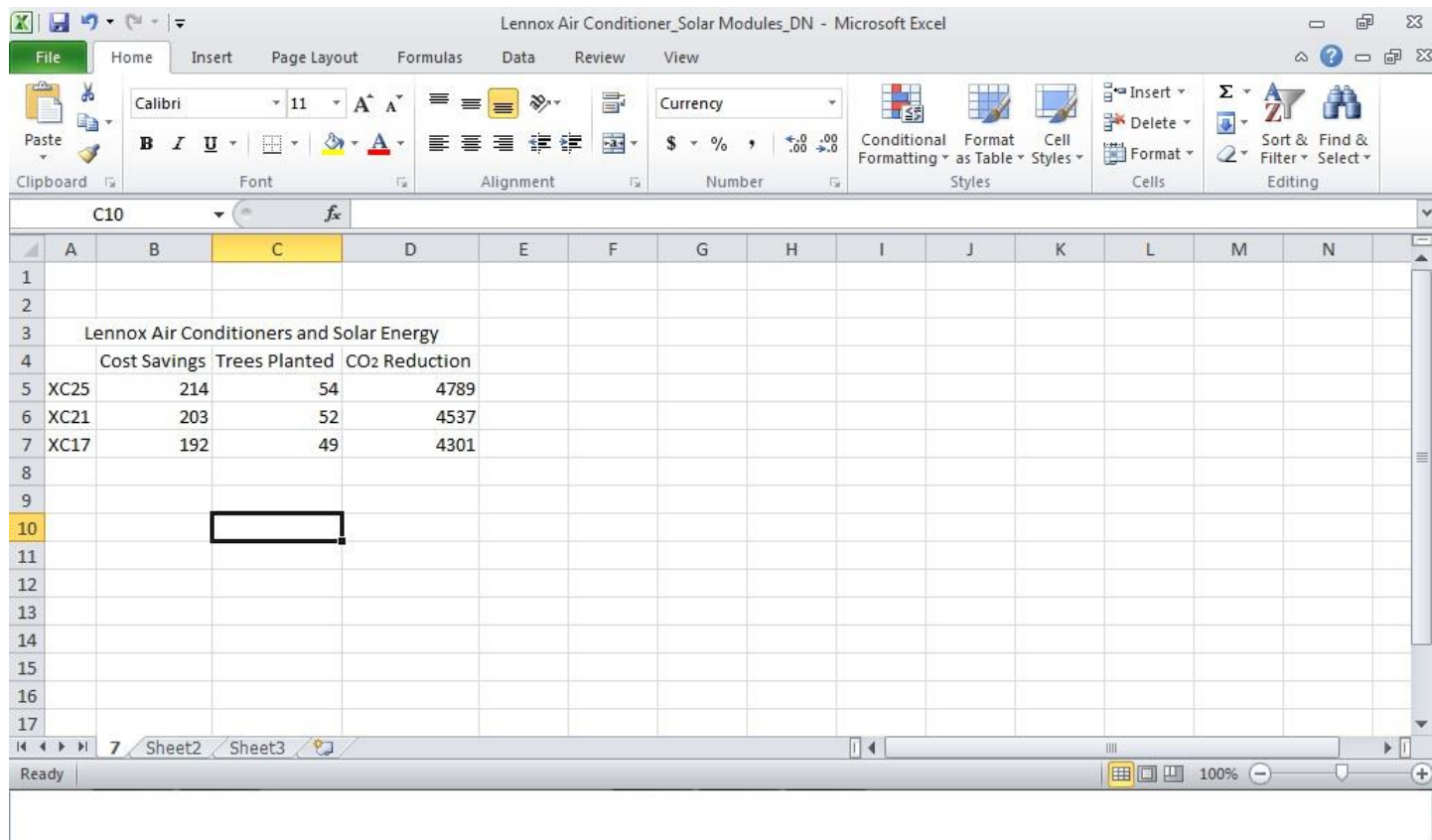
9 - Reconnect the sensor wire and reconnect the 2-pin plug to the ignitor wiring harness.

10 - Follow lighting instructions to light and operate furnace for 5 minutes to ensure that heat exchanger is clean and dry and that furnace is operating properly.

11 - Replace access panel.

- i) When you receive the email, look that your name is in the ‘cc’ section. Compare the attached document with the one above (1h).

Task 2: Answers for a), b), and c) are shown in the diagram



Lennox Air Conditioners and Solar Energy			
	Cost Savings	Trees Planted	CO ₂ Reduction
XC25	214	54	4789
XC21	203	52	4537
XC17	192	49	4301

- d) The original calculation is

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Household utility bill = **\$200/month**

Heating and cooling portion = **\$112**

Operating cost savings = **118% of
\$112, or \$132** of your total energy costs

To determine the savings when the monthly utility bill is \$300, the learner first calculates the heating and cooling portion of \$300.

$$112/200 = x/300$$

$$200x = 33,600$$

$$X = 168$$

The heating and cooling portion is \$168.

To calculate the operating cost savings, the learner uses the constant 118%.

118% of \$168

$$118/100 = 1.18$$

$$1.18 * 168 = 198.24$$

The operating savings cost when the monthly utility bill is \$300 is **\$198.24**.

In the email, look for the attached Excel document. Compare it to the one shown above with the addition of the answer (\$198.24) in cell C10. Check the body of the email for the worksheet and cell references.

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Performance Descriptors		Needs Work	Completes task with support from practitioner	Completes task independently
A2.2	<ul style="list-style-type: none"> performs limited searches using one or two search criteria 			
	<ul style="list-style-type: none"> extracts information from tables and forms 			
	<ul style="list-style-type: none"> locates information in simple graphs and maps 			
	<ul style="list-style-type: none"> uses layout to locate information 			
	<ul style="list-style-type: none"> makes connections between parts of documents 			
B3.2a	<ul style="list-style-type: none"> uses layout to determine where to make entries 			
	<ul style="list-style-type: none"> begins to make some inferences to decide what information is needed, where and how to enter the information 			
	<ul style="list-style-type: none"> follows instructions on documents 			
B3.2b	<ul style="list-style-type: none"> follows conventions to display information in simple documents (e.g. use of font, colour, shading, bulleted lists) 			
	<ul style="list-style-type: none"> sorts entries into categories 			
	<ul style="list-style-type: none"> displays one or two categories of information organized according to content to be presented 			
	<ul style="list-style-type: none"> identifies parts of documents using titles, row and column headings and labels 			
C1.2	<ul style="list-style-type: none"> calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers 			
	<ul style="list-style-type: none"> calculates percentages 			
	<ul style="list-style-type: none"> interprets and applies rates 			

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	<ul style="list-style-type: none"> chooses and performs required operations; may make inferences to identify required operations 			
	<ul style="list-style-type: none"> selects appropriate steps to reach solutions 			
	<ul style="list-style-type: none"> represents costs and rates using monetary symbols, decimals and percentages 			
	<ul style="list-style-type: none"> uses strategies to check accuracy (e.g. estimating, using a calculator, repeating a calculation, using the reverse operation) 			
D.2	<ul style="list-style-type: none"> selects and follows appropriate steps to complete tasks 			
	<ul style="list-style-type: none"> locates and recognizes functions and commands 			
	<ul style="list-style-type: none"> makes low-level inferences to interpret icons and text 			
	<ul style="list-style-type: none"> performs simple searches using keywords (e.g. internet, software help menu) 			

This task: was successfully completed ___ needs to be tried again ___

Learner Comments

Instructor (print)

Learner Signature