

# ATC Program Essential Skills Package

## Automotive Technology Program



ARTS & TECHNOLOGY  
C E N T R E

**Instructional Methods:** Classroom Lectures, Practical Lab Activities, and other.

**Course Format:** Classroom: Individual and group work

Lab: Individual and group work (practical application)

### Rationale:

Workplace Education Manitoba has listed nine Essential Skills needed to be successful in any workplace. All nine Essential Skills are used in different combinations, in different applications, in every occupation. They are the foundational skills you use to carry out your work tasks and are the building blocks you use to learn new ones. The importance of, and need for, employees to have appropriate levels of workplace Essential Skills is clear and strong.

What specifically are the Essential Skills needed in the workplace?

To help answer this question, the Federal Government, since 1994, has surveyed more than 3,000 Canadians in workplaces in all sectors and all types and sizes of organizations. All participants were asked what workplace Essential Skills they felt were needed in order for workers to be most effective, efficient and productive.

### The result has been the identification of the following nine workplace Essential Skills:

1. [Reading](#)
2. [Writing](#)
3. [Numeracy](#)
4. [Document Use](#)
5. [Oral Communication](#)
6. [Working With Others](#)
7. [Thinking](#)
8. [Digital Technology](#)
9. [Continuous Learning](#)

To help students be successful in their training, ATC has developed a package focused specifically on these Essential Skills and how they apply to the program of **Automotive Technician**. The purpose of this package is not to dissuade students from attending the program, but to help them become successful by informing them of the skills required. We highly encourage all students to take some time to work through the package and become informed of the program requirements.

*Material in this document has been developed around the Workplace Education Manitoba 9 Essential Skills, which can be found here: <http://www.wem.mb.ca/>*

## Reading

### Literacy (Reading)

- Read work orders to understand problems, repair requirements, and service schedule
- Read instructions and safety warnings/information on product labels
- Read repair manuals in both hard copy and electronic form to diagnose and repair vehicle system problems

### Literacy (Writing)

- Fill out work orders to describe repairs to customer's vehicle
- Write reports and/or emails on web based systems and technical support sites describing unusual or difficult repairs
- Complete letters/reports for manufacturer's warranty claims describing the break down or vehicle defect

### Literacy Reading, Example 1

A customer is dropping his/her vehicle off at the repair shop after business hours. Since there is nobody to take the customer/vehicle information and the repairs/services the customer would like to get done to his/her car, the customer left a written note with detailed instructions in the vehicle. In the morning the service advisor reads the instructions and opens up a work order.

- a. Please read the instructions and complete the work order below. Please fill in all the necessary customer & vehicle information.
- b. Please list the customer requests and complaints on the work order. This information is important for the technician to perform the required service work.

*Customer's instructions:*

Dear Service Advisor,

My name is John Smith, my address is 123 Louis Riel Drive, Winnipeg Manitoba, R1T 4O9 and my phone number is 204 654 3210.

I dropped my 97 white Chevy Lumina (MKL 654) for an Oil Change, Winterization Package, and an Inspection. I need the brakes check and my right rear tire has a slow leak. Please call me with an estimate if any major repairs are required. The vehicle has 152458 km on its odometer.


Thank you,

John Smith

**Additional Instructions:**



Please use the VIN from Example 5, and use the VIN Chart to decode the VIN.

 <p><b>Arts &amp; Technology Centre</b> 5 de Bourmont Avenue Winnipeg MB R2J 1J9 Phone: 204-237-8951 ext. 319</p>			DATE:		WRITTEN BY:		TAG NO.					
			OWNER'S NAME:				PH #:					
			LICENCE PLATE #:		COLOR:		TRANSMISSION: A S		ABS: Y N		A.C.: Y N	
			YEAR:		MAKE:		MODEL:		ENGINE:			
			VIN#:						MILEAGE:			
PARTS AND MATERIALS			TECH #	INSTRUCTION				WORK COMPLETED				
QTY.	PARTS DESCRIPTION	PRICE										
TOTAL PARTS			<small>I hereby authorize the above repair work to be done along with necessary parts. ATC Automotive Technology staff and designated students may operate about vehicle for testing, inspection or delivery at my risk. An express mechanic's lien is acknowledged on above vehicle to secure the amount of repairs thereto. I further recognize that ATC is an educational training facility and agree that the repairs authorized for the above vehicle may be used for educational demonstration purposes. ATC will not be held responsible for loss or damage to the vehicle or articles left in the vehicle in case of fire, theft, accident or any other cause beyond ATC's control.</small>				PARTS TOTAL					
SUBLETS							GAS					
TOTAL							SERVICE FEE		TOTAL			
			CUSTOMER SIGNATURE:									

**Writing**

Literacy Writing Example 2:

Please prepare an up-to-date resume and write a cover letter outlining your reasons why you chose the automotive technology program at ATC. The cover letter should include your short term goals (12- 24 month) and long term goals (1 – 5 years).

**Numeracy**

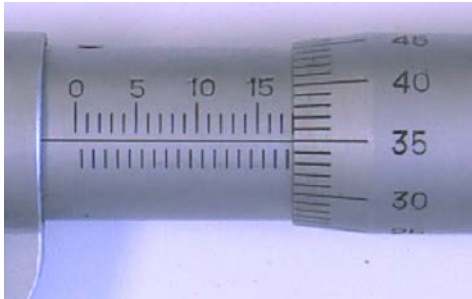
- Measure parts and components, such as brake discs/drums, piston, cylinder walls, and bearings using both metric and standard calipers, micrometers and dial indicators
- Using measuring devices such as, tire pressure gage, compression tester, fuel and oil pressure gages, and volt/amp/ohm tester to check and diagnose vehicle systems
- Calculate and prepare repair estimates using labor guides/rates, parts and taxes.
- Check and correct levels of engine oil, transmission fluids, brake fluid and mixing ratios for vehicle coolant strength
- Retrieve torque specifications and measure the tightness of nuts/bolts/fasteners using a torque wrench



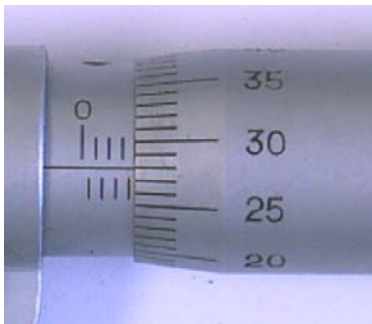
- Analyze electrical readings in fault finding applications, such as engines no start condition, high fuel consumption, and emission output

Please read the settings on the following 0.01 millimeter scales. For additional information use this link: <http://www.youtube.com/watch?v=O8vMFFYNlfo>

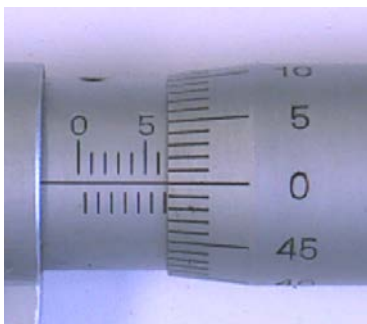
### Example 1, Metric Scales



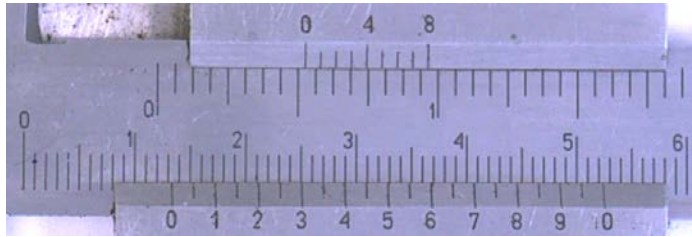
### Example 2, Metric Scales



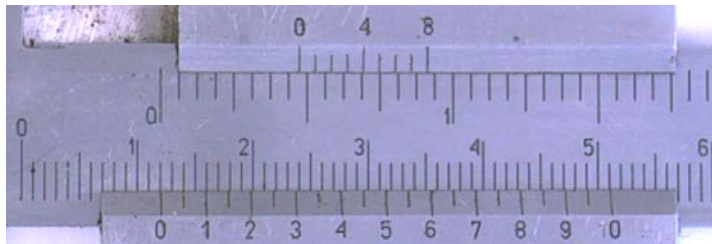
### Example 3, Metric Scales



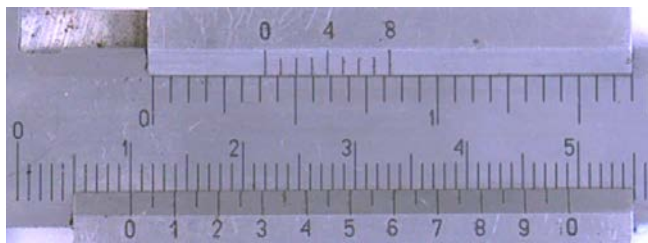
### Example 4, Metric Scales



### Example 5, Metric Scales



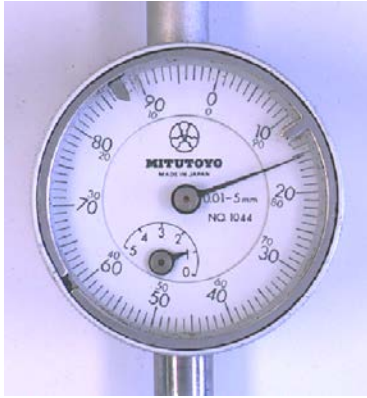
### Example 6, Metric Scales



### Example 7, Dial Indicator



### Example 8, Dial Indicator

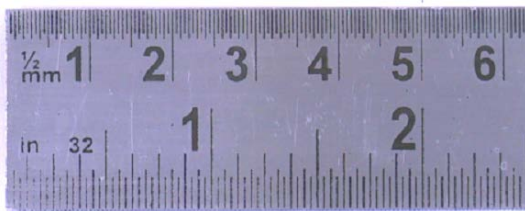


### Example 9, Dial Indicator



### Example 10, Ruler

Please mark 1.5 "on the ruler illustrated below.





### Example 11, Standard to Metric conversions

What are the equivalent metric values for the following?

A. 1" = \_\_\_\_\_ mm

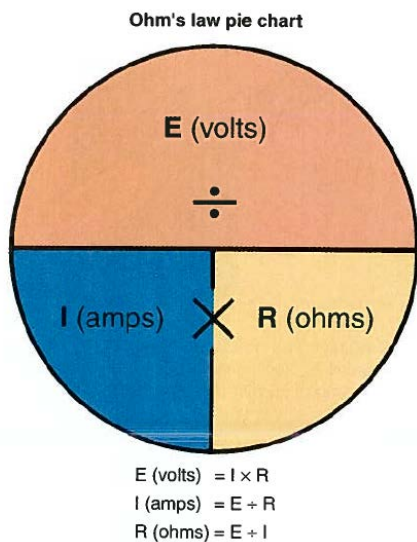
B. 3.5" = \_\_\_\_\_ mm

C. 1/2 quart = \_\_\_\_\_ liter

D. 55 mph = \_\_\_\_\_ km/h

### Example 12, Ohm's Law

Using Ohms Law please solve the following questions.



- Voltage in the circuit is 12 V and current flow is 6 amps. What is the resistance in the circuit?
- Current in the circuit is 10 amps and the resistance is 5 ohms. What is the applied voltage?
- Voltage in the circuit is 24 V and the resistance is 6 ohms. What is the current draw in this example?

## Example 13 (VIN Decoder)



VIN = Vehicle Identification Number

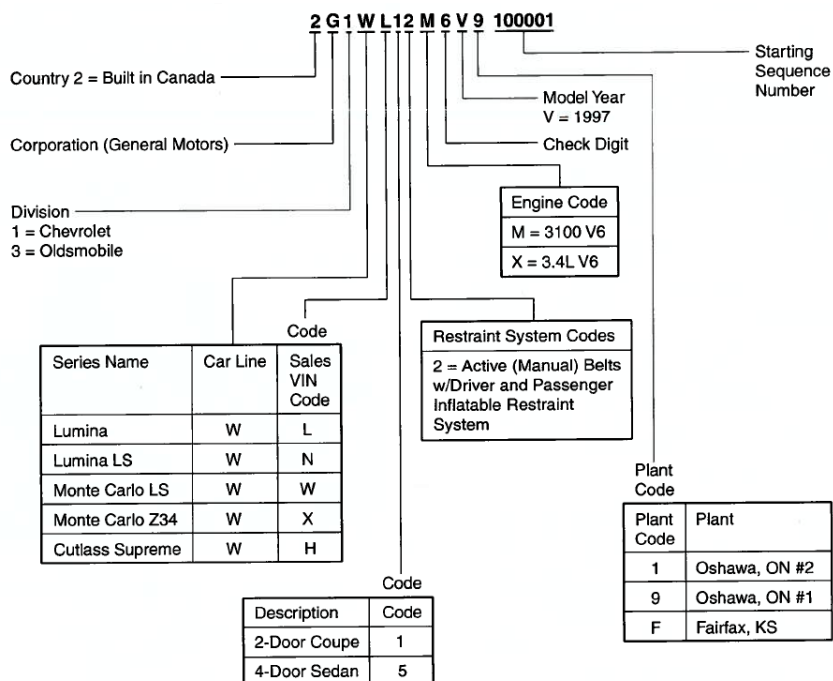
Please use the information below to decode the Vehicle Identification Number (VIN) and determine the Model Year of the vehicle.

**VIN                    2 G 1 W L 1 2 M 6 V 9 1 0 0 0 0 1**

### Position 10

The 10th letter or number of the VIN tells you the model year of the vehicle. Note that this may be different from when it was manufactured, as many automobile manufacturers start to produce next years model this year. Find the model year by matching the 10th digit of your VIN to the table below:

A = 1980	S = 1995	A = 2010	S = 2025
B = 1981	T = 1996	B = 2011	T = 2026
C = 1982	V = 1997	C = 2012	V = 2027
D = 1983	W = 1998	D = 2013	W = 2028
E = 1984	X = 1999	E = 2014	X = 2029
F = 1985	Y = 2000	F = 2015	Y = 2030
G = 1986	1 = 2001	G = 2016	1 = 2031
H = 1987	2 = 2002	H = 2017	2 = 2032
J = 1988	3 = 2003	J = 2018	3 = 2033
K = 1989	4 = 2004	K = 2019	4 = 2034
L = 1990	5 = 2005	L = 2020	5 = 2035
M = 1991	6 = 2006	M = 2021	6 = 2036
N = 1992	7 = 2007	N = 2022	7 = 2037
P = 1993	8 = 2008	P = 2023	8 = 2038
R = 1994	9 = 2009	R = 2024	9 = 2039







## Document Use

- Prepare a variety of documents, such as repair estimates, warranties, inspection reports and safety papers. (see example # 1)
- Use work order information such as vehicle identification number to find vehicle service information, parts orders, repair information. (see example # 2a & 2b)
- Locate vehicle system faults by interpreting diagnostic graphs, values, and specifications.(see example # 3)

### Example 1

#### LUBE OIL FILTER AND SERVICE CHECKLIST

Customer.....Date:.....

Make: .....Year: ..... Lic: .....Engine: .....

Vin #

.....

#### Under Vehicle.

Oil Filter Replaced  
 Lubricate Chassis No. of  
 Fittings.....  
 Differential Fluid Level  
 Shocks  
 Brake Hoses/Lines Front  
 Brake Hoses Lines Rear  
 Universal Joints  
 Drive Axle Boots  
 Manual Trans. Level  
 Exhaust System  
 Oil Leaks

#### Under Hood

Washer Fluid  
 Engine Crankcase Oil Level  
 Power Steering Fluid Level  
 Brake Master Cylinder Fluid  
 Level  
 Auto. Trans Fluid Level  
 Drive Belts  
 Oil Leaks  
 Air Filter Element  
 Crankcase Filter  
 Wires Cables Hoses etc.  
 PCV Valve and Hoses

#### Cooling System

Radiator Cooling Fan  
 Antifreeze Freeze Point.....  
 Block Heater  
 Pressure Test Cap/Rad.  
 Coolant Hoses

#### Battery

Clean posts and Terminals  
 Wash Top of Battery  
 Load Test Battery  
 Check Battery hold down

#### Car Exterior/Interior

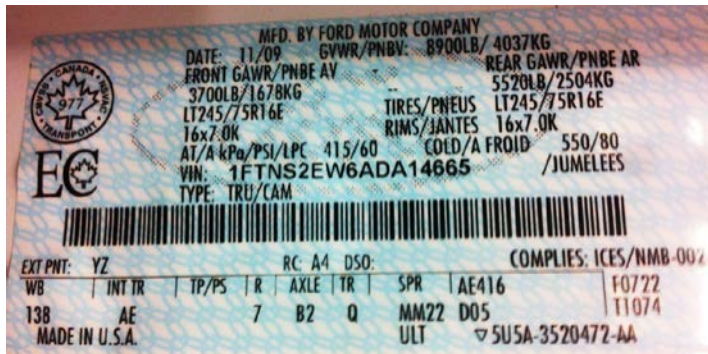
Running Lights  
 License  
 Brake lights  
 Back-up Lights  
 Courtesy Lights  
 Dash Lights  
 Signal Lights  
 Hazard lights  
 Windshield Wiper Blades  
 Windshield Wiper Operation  
 Check Horn Operation

#### Check Tires

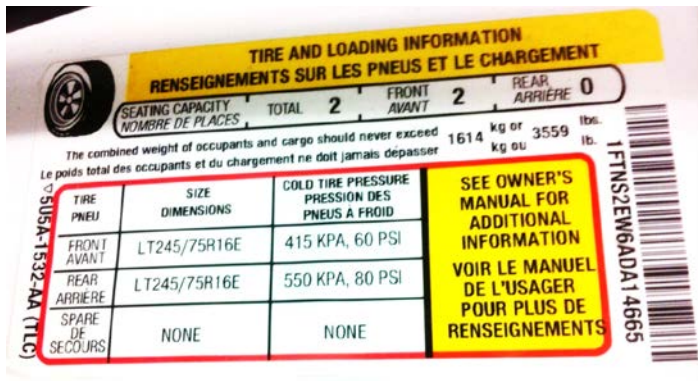
Pressure RF.....LF.....  
 RR.....LR.....  
 Condition RF.....LF.....  
 RR.....LR.....  
 Tread Depth RF.....LF.....  
 RR.....LR.....

Comments: \_\_\_\_\_

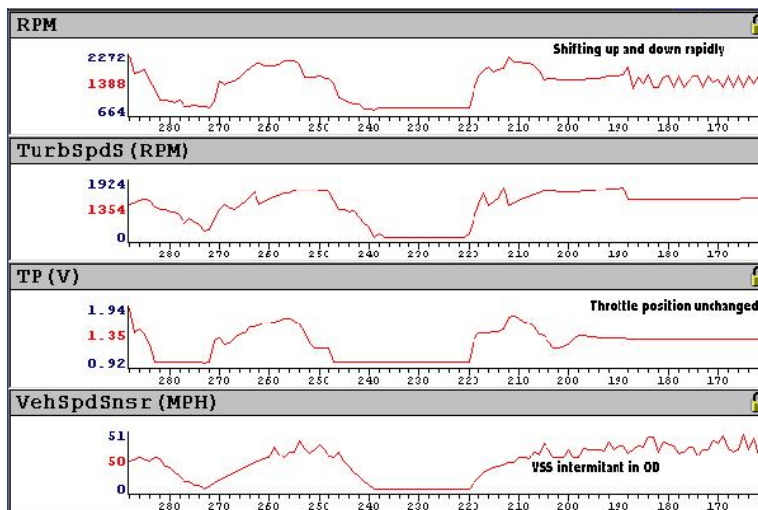
## Example 2a



## Example 2b



## Example 3





## Oral Communication

- Give/receive and understand verbal instructions/demonstrations related to automotive repair, and safe work procedures
- Communicate effectively with instructors, customers, and classmates
- Participate in discussion groups to learn new skills, concepts, and procedures
- Speaking to clients and co-workers is paramount in the automotive repair industry
  - Being able to make connections can be the deciding factor in a technician's career
- Sometimes, a task is nearly impossible to complete alone: communicating and working with a friend or coworker can be much more effective
- Find a friend or family member willing to participate and help them complete a task they are not familiar with. (e.g. select a number of late model vehicles, research different areas such as performance, emissions, and fuel consumption based on engine type and fuel systems. Diesel, Gasoline, and Hybrid powered vehicles etc.) Instruct them step-by-step on how to complete the task.
- Be sure to be patient with your volunteer if they do not understand
- Try a different approach! Use different wording if you don't succeed at first

## Working with Others

- Work in small groups
- Assist others as required
- Work independently

Automotive technicians spend much of their time working independently when maintaining, diagnosing, and repairing automotive systems. On larger and more complex repairs, they coordinate tasks and exchange information with other team members. They may work as team members or leaders depending on their organizations' structures and personal experience. They may demonstrate, train and assign tasks to junior automotive technicians.

### **Read the information about teamwork and answer the questions.**

Companies look for individuals who can get along well with other people – bosses, co-workers, clients. Most job postings usually have a line stating “ability to work well with others” or “ability to work well in a team environment”. Developing good teamwork skills comes from experience in teams and an understanding of what is expected. Team work requires:

- Each team member contributing their knowledge and skills
- Roles and responsibilities that are clear
- Positive attitudes
- Strong relationships

- Being accepting of others
- Embracing diversity
- An understanding of the common goal
- Good time management
- Clear communication
- The ability to give and receive feedback
- The ability to resolve conflicts
- Sharing successes and failures

In a team it is important to know what the expectations are, ask questions, manage time well, and work hard. Being professional and a good team player also requires employees to embrace diversity and work with all different types of people.

1. What do you think is important when working on a team?

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2. What do you think it means to be a good team player?

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3. Describe a poor team player.

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4. Explain the effect the following can have on a team environment:

a. Negative attitude \_\_\_\_\_

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b. Gossip \_\_\_\_\_

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c. Laziness \_\_\_\_\_

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d. Getting mad about feedback/criticism \_\_\_\_\_

\_\_\_\_\_

e. Absenteeism and/or tardiness \_\_\_\_\_

\_\_\_\_\_

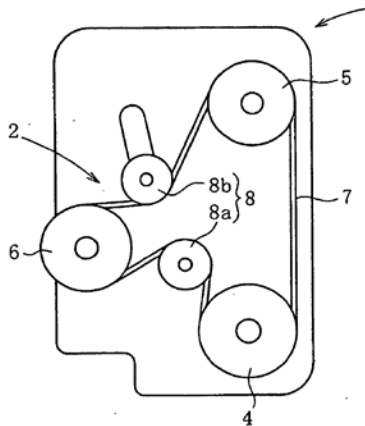
## Problem Solving/Thinking

- Evaluate the complexity and potential danger of jobs to determine safe work procedures
- Select proper tools for the repairs following instructions in repair manuals
- Follow diagnostic and test procedures appropriate for vehicles malfunction
- Interpret information on computerized scan equipment and onboard vehicle systems to find relevant operational information
- Understand information on labels, assembly drawings and repair manual systems to determine the proper use, application, and installation of replacement parts

### Example 14, Identifying Turning Direction and Ratios

1. Please identify the turning direction of the pulleys in the illustration below. Pulley # 4 is turning clockwise.

2. Please compare and identify the turning ratio and speed of pulleys 8a, 8b, 4, 5, and Pulleys 8a & 8b are  $\frac{1}{2}$  the size of pulley 4, 5, and 6.



To # 1

Pulley 5 turns \_\_\_\_\_

Pulley 6 turns \_\_\_\_\_

Pulley 8a turns \_\_\_\_\_

Pulley 8b turns \_\_\_\_\_



To # 2

The turning ratio of pulleys 8a & 8b compared to pulleys 4, 5, and 6 is \_\_\_\_\_.

Pulleys 8a & 8b turning at \_\_\_\_\_ the speed compared to pulleys 4, 5, and 6.

## Digital Technology

### Example 14, Accessing and Navigating CDX On-Line Text Book

<http://cdxplus.com/login>

- **CDX Information for Download:** <http://www.cdxglobal.com/launcher/>

Access code:       riel  
User Name:         auto.tech  
Password:         2012

- **Internet Access to View Animations and Videos:**

All lessons use CDX as a resource, each lesson and topic has the information listed to navigate to the attended animations, videos, and Hand-out Activities on CDX. (See sample below)



Dashboard	Topic Area	Topic Group	Topic
Fuel Systems	EFI Engine Management	Electronic Control – Unit ECU	EFI system ECU
Auxiliary Systems	Peripheral Systems	Satellite assisted systems	Global positioning satellites

### To self-assess complete Handout Activity: HA383 & HA864

The screenshot shows a web browser window with the address bar containing [http://cdxplus.com/categories/9747/topics/2937/handout\\_activity\\_sheet](http://cdxplus.com/categories/9747/topics/2937/handout_activity_sheet). The page content includes a breadcrumb trail: **Dashboard > Fuel Systems > EFI Engine Management > Electronic Hi Auto Tech (Logout) from Louis Riel School Division : Louis Riel Arts & Technology Centre - CDX ARK [v5.1]**. Below the breadcrumb, there is a search bar with the text "Enter search words" and a "Go" button. A navigation bar contains several icons: a left arrow, a play button, a question mark, a document icon, a printer icon, a hand icon, and a right arrow. At the bottom of the page, the copyright notice "©2009 Jones and Bartlett Publishers LLC" and the page number "20070828 Page 1" are visible.

Please login to CDX, follow the instructions and complete Hand-out Activity HA 383 & HA 864

## **Example 14, Software and Web Based Systems**

In the section *Reading & Writing* you were asked to prepare your resume and a cover letter. Both, your resume and your cover letter should be prepared in Microsoft Word and electronically send (e-mailed) to the program teacher(s) at ATC.

List of automotive technology teachers at ATC and their e-mail address.

[wayne.coutts@lrsd.net](mailto:wayne.coutts@lrsd.net)  
[murray.menzies@lrsd.net](mailto:murray.menzies@lrsd.net)  
[andreas.schramm@lrsd.net](mailto:andreas.schramm@lrsd.net)

## **Continuous Learning**

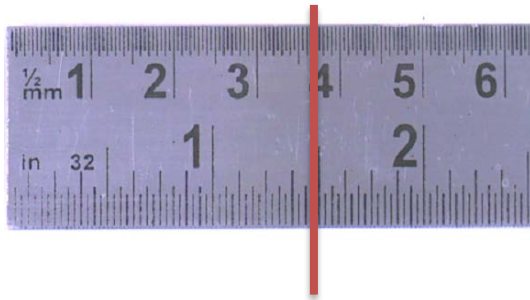
- Learn about the latest technology and innovations
- Keep current in the automotive sector and its changes based on economic and environmental requirements
- You will learn the latest technology on the job
- Participating in training seminars
- Read, and complete self-study courses to get and maintain certification







### Example 10



### Example 11

Answers to Question # 1

- A. Answer 25.40 mm
- B. Answer 88.90 mm
- C. Answer .475 liter
- D. Answer 88 km/h

### Example 12

- A. 2 ohms
- B. 50 volt
- C. 4 amps

### Example 13

The Model Year is  $V = 1997$

### Example 14

Answers to Question # 1:

- Pulley 5 turns clockwise
- Pulley 6 turns clockwise
- Pulley 8a turns counter clockwise
- Pulley 8b turns counter clockwise

Answers to Question # 2:

The turning ratio 2:1

Pulleys 8a & 8b turning at twice the speed then pulleys 4, 5, and 6

Or

Pulleys 4, 5, and 6 turning at  $\frac{1}{2}$  the speed then pulleys 8a & 8b



## **Example 14**

Answer Key HA 383

1. Management
2. Fuel
3. Semiconductor
4. Ignition
5. Dynamometer

Answer Key HA 864

1. GPS
2. Sensors

## **References**

Workplace Education Manitoba Website

<http://www.wem.mb.ca/>

MODERN AUTOMOTIVE TECHNOLOGY James E. Duffy Automotive Writer, Publisher:  
THE GOODHEART-WILLCOX COMPANY, INC, Tinley Park, Illinois

<http://cdxplus.com>

[Frontier Manitoba](#)

<http://www.youtube.com/watch?v=O8vMFFYNlfo>