AUTOMOTIVE SERVICE TECHNICIAN STUDY PACKAGE
Revised November 2019

- For more information and study help beyond the attached package, please visit:
  https://services.viu.ca/assessments/automotive-service-technician

The following areas will be covered in this assessment:

Area of Study	Minimum Score	Details	Time
Reading Comprehension	21/30	30 questions (true/false, short answer)	45 min.
Combined Reasoning	18/30	30 multiple choice questions that assess the ability to recognize abstract, spatial and mechanical concepts.	30 min.
Math (calculator is allowed, basic formula table is provided)	21/30	30 questions on: • converting from and to metric units & imperial units • reading a ruler • using Pythagorean Theory • Ratio and Proportion • decimals • fractions • percent • exponents and square roots- basic • word problems • geometry: area, perimeter/circumference	60 min.
Approximate Time: 2 1/2 Hours - A dictionary is not permitted. A calculator is permitted.			

Trades Math – Practice Assessment Test

- Please leave 2 or 3 digits after the decimal point – rounding is optional
- Calculators ARE allowed
- For full marks, you MUST include units in your answer e.g. 2 ft. or 2' NOT 2.

_____

Decimals and Simple Arithmetic

1. 3.5 + 8.09=   _____
2. 3.5 – 0.34=   _____
3. 3.5 x 8.09=   _____
4. 3.5 ÷ 8.09=   _____
5. If Max is paid $795.45 for a 35 hour work week. What is his hourly wage?   _____

> TIP: Use your calculator for these calculations, but, to avoid calculator error, have a rough idea of what the answer will be. For example, if the question is '*8.75 x 2.3*', multiply the whole numbers 8 and 2 to get the approximate answer of 16
>
> *For more practice with decimals, whole numbers and simple arithmetic go to Study Guide 1 – Decimal Review*

Adding and Subtracting Fractions:

6. $2\frac{2}{3} + 1\frac{5}{6} + \frac{1}{4} =$ _____

7. $\frac{12}{16} - \frac{2}{4} =$ _____

8. $\frac{9}{12} - \frac{1}{6} + 1\frac{3}{4} =$ _____

9. A piece of wood is cut into 3 pieces. The lengths are $3'\,1\frac{3"}{8}$, $6'\,3\frac{4"}{16}$ and $7'\,4\frac{1"}{8}$.
   If $\frac{1"}{8}$ is used up for each saw cut (kerf), what is the length of the original board?

   HINT: 2 kerfs are made in cutting the board. Reduce fraction to simplest terms.

   _____

> *For more practice with decimals, whole numbers and simple arithmetic go to Study Guide 2 – Adding and Subtracting Fractions*

Converting Fractions to Decimals and Decimals to Fractions

10. Write the following as a decimal :   25 hundredths   _____

11. Write ⅓ as a decimal _____

12. Write 1.35 as a faction   _____

13. Write 18% as a decimal   _____

> TIP: When converting fractions to decimals, remember that the line that separates the numerator from the denominator means *divide.* For example, if the question is *'write 5 tenths as a decimal',* write the fraction in a form you recognize e.g. 5/10, and then do the simple division $5 \div 10 = 0.5$
>
> When converting from decimals to fractions, think about the tenth, hundredth and thousandth columns. For example, if the question is *'write 6.67 as a fraction',* Look at the digits before the decimal point first. In this example, you have a 6 which is a whole number. Now look at the digits after the decimal point. You have a .6 and a .07 - the .6 denotes tenths, and the .07 denotes hundredths, so the answer is
>
> 6 67/100 (6 and 67 hundredths)
>
> ***For more practice with fractions and decimals, go to Study Guide 3 – Converting Fractions to Decimals and Vice Versa***

Exponents and Square Roots

14. Calculate 7^2 _____

15. Calculate 2^3 _____

16. What is the square root of 144?   _____

> TIP: Sometimes it is easy to get confused about the meaning of ^{2} or ^{3}. When we 'square' a number we are multiplying it by itself. When we 'cube' a number, we are multiplying it by itself and itself again; for example' 5^2 means 5x5 and means 5^3 5x5x5
>
> ***For more practice with exponents and square roots, go to Study Guide 6 – Exponents and Roots***

Percentages

17. 5 is 20% of what amount? _____

18. What is 7% of 138? _____

19. John buys 3 t-shirts for $18.32 each, 1 pair of shorts for $29.99. How much is the total with 6% tax? _____

> TIP: Percentages can be tricky, but a couple of things might help:
>
> 1. % means 'out of 100', so 50% is the same as   50/100 or 0.5
>
> 2. The word 'of' in percentage calculations often means *multiply*
>
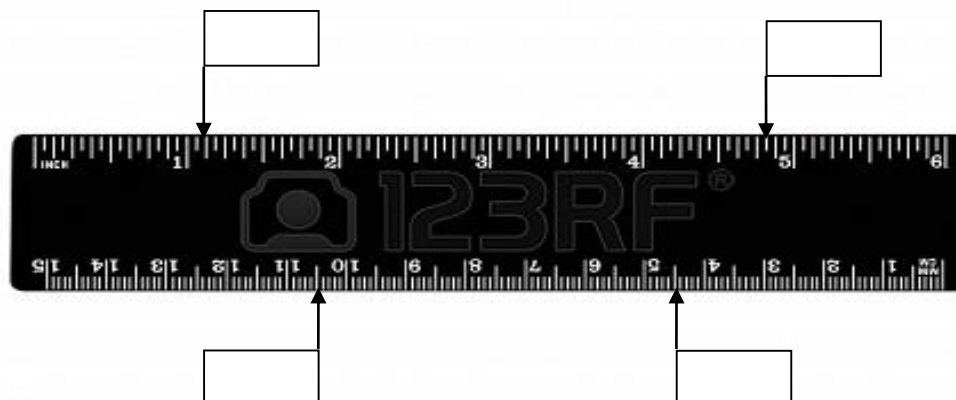> *For more practice with percentages, go to Study Guide 7 – Percentages*

Units of Measure

20. What is the distance between the centres of the 2 holes in the following diagram?

_____
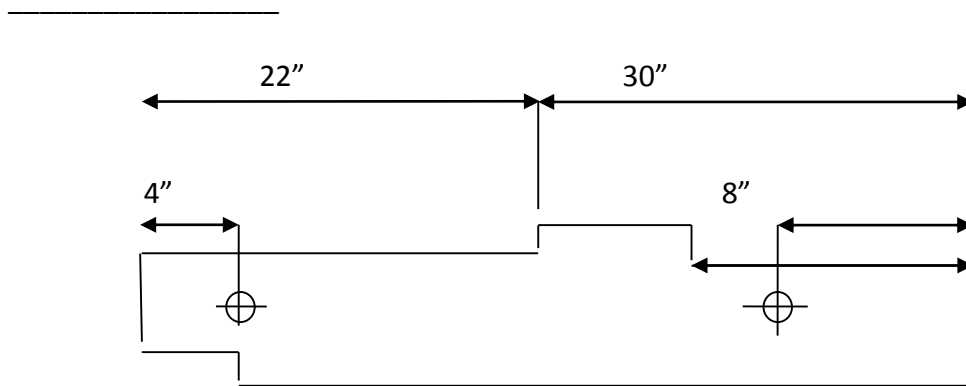
21-24.   Label this measuring tape with the correct lengths at the marks indicated.

Remember to include the correct units: inches or centimeters.

Conversions

25. Use the formula/conversion table at the end of this test to convert the following

A. 25 km = _____miles	E. 5 kg= _____pounds
B. 93 litres= _____gallons	F. 15"= _____' _____"
C. 5 gallons= _____litres	G. 3'= _____"inches
D. 12 pounds (lbs)= _____kg	H. 5"= _____ cm

> TIP: 1. When making conversions, you have a choice between dividing and multiplying. 2. Always check the units of measure being used. Sometimes we will test your accuracy and focus by mixing units of measure…
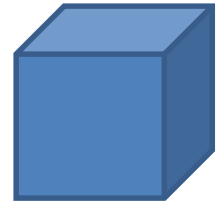>
> ***For more practice with conversions, go to Study Guide 4 – Units of Measurement and Study Guide 8 Using Imperial and Metric Rulers***

Geometry *(use the formula table (if required)* **to answer these questions**

26. Find the perimeter and area of the following shapes:

I.

Length of one side = 8 m
Width of one side = 8 m
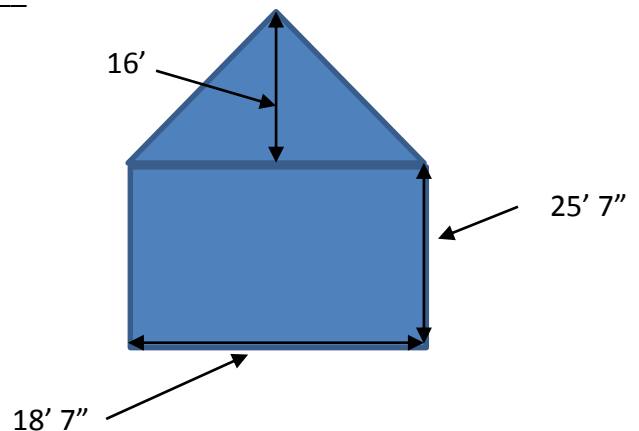
a) Perimeter (of one side of the cube) = _____

b) Area of entire cube = _____

II.

a) Perimeter of entire shape = _____

b) Area of entire shape = _____

16'

25' 7"

18' 7"

> TIP: When finding the area of 'unusual' shapes – try breaking the shape down into recognizable shapes, finding the area of each one and then adding them together for the area of the whole thing; for example, the 'house' shape above is really just a rectangle and 2 identical triangles.
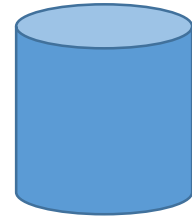
III.

a) Area of the circle = _____

b) Radius of the circle = _____

c) Circumference of the circle = _____

5"
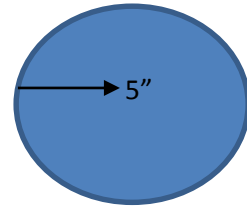
27. What is the volume of a can with a radius of 3 cm and a height of 15 cm?

_____

Using Pythagoras to Calculate the Length of an Unknown Side:

28. Calculate the length of side AC _____

C

5cm

A

B

6 cm
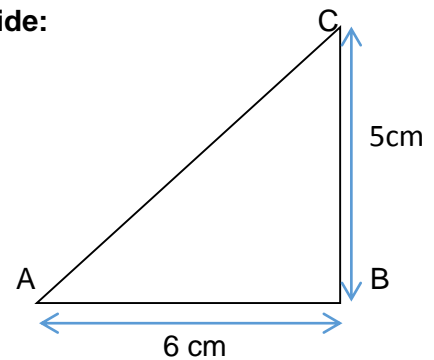
For more practice with geometry, go to Study Guide 5 – Area and Perimeter and Study Guide 9 - Using Pythagoras to Calculate the Length of an Unknown Side

Ratio and Proportion:

29. If Tom can drive 60 km on 3 gallons of fuel, how far can he drive on 19 gallons fuel?

_____

30. Find the length of the missing side in these similar triangles. _____

6 m

?

8 m

18 m

21 m

24 m
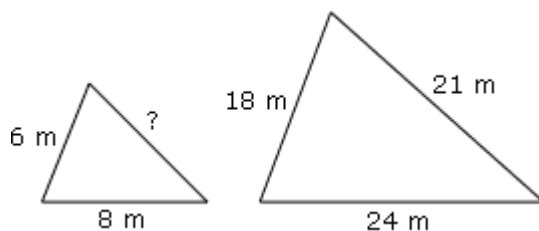
For more practice with ratio and proportion, go to Study Guide 12 – Ratio and Proportion

Algebra (Electrical, Power Engineering, RACM and HEO only)

31. Find the value of x

a) 3x = 25 -4   _____

b) $x/6$ = 72   _____

For more practice with algebra, go to Study Guide 10 – Basic Algebra

Transposing and Conversions (Electrical and Power Engineering only)

32. Given that Efficiency % = <u>Output Watts</u> x 100, solve for Input Watts:
Input Watts

Input Watts = _____

33. Given that A = $\frac{\pi Dd}{4}$, solve for D: D = _____

34. Convert 250 cm to m   _____ m
35. Convert 25 cm² to m²   _____ m²
36. Convert 900 cm³ to m³   _____ m³

For more practice with transposing and converting go to Study Guide 11 – Transposing Formulae

Formula table	Conversion Table
Area of Square/ Rectangle = l x w	1 litre = .26 gallons
Area of Triangle = $\frac{b \times h}{2}$	1 kilogram = 2.2 pounds
Volume of Cylinder = $\pi\, r^2\, h$	1'' (Inch) = 25.4mm
Area of Circle = $\pi\, r^2$	1 kilometre = .62mile
Circumference of Circle = $\pi\, d$	1'' (Inch) = 2.5cm
Pythagoras = $a^2 + b^2 = c^2$	

You have completed the practice test. Review your answers below.

1. 11.59
2. 3.16
3. 28.31 (28.32)
4. 0.43
5. $22.73
6. $3\frac{21}{12}$ or $4\frac{9}{12}$ or $4\frac{3}{4}$
7. $\frac{2}{8}$ or $\frac{1}{4}$
8. $1\frac{16}{12}$ or $2\frac{4}{12}$ or $2\frac{1}{3}$
9. 201" or 16 ft. 9 in.
10. 0.25
11. 0.33 (0.32)
12. $1\frac{35}{100}$
13. 0.18
14. 49
15. 8
16. 12
17. 25
18. 9.66 (9.67)
19. $90.04 ($90.05)
20. 40 in.
21. $1\frac{1}{8}$ in.
22. $4\frac{13}{16}$ in.
23. 10.5 cm
24. 4.5 cm
25. a) 15.5 miles b) 24.18 gallons c) 19.23 litres d) 5.45 kg e) 11 pounds f) 1 ft 3" g) 36" h) 12.5 cm
26. i) a) 32 m b) 384 m^2 ii) a) 106.75 ft. b) 624.09 sq. ft. iii) a) 78.5 sq.in   b) 5 "   c) 31.4 "
27. 423.9 cm^3
28. 7.81 cm
29. 380 km
30. 7 m
31. a) x=7   b) x=432
32. Input Watts = <u>100 x Output Watts</u>
                      Efficiency %
33. D = <u>4A</u>
          πd
34. 2.5m
35. 0.0025m²
36. 0.0009m³

If you find errors in this practice test, please email <u>assessments@viu.ca</u>

Reading Comprehension study Guide

Reading is one of the most important skills for any student in any program. Students are required to read a variety of different texts and reading materials from novels to blue prints, labels to poetry (depending on your program!)

It isn't just a matter of reading words. Students need to be able to make sense of what they read, make inferences, communicate the information clearly to others, and more.

You can improve your reading skills by reading as much and as widely as possible; read newspapers, magazines, adverts, stories, poetry, song lyrics…Challenge yourself by learning new vocabulary or by reading something then repeating back (without looking) what you have just read.

1.   **Tips to get started:**

- Look over the whole piece of writing. Notice its title.
- Notice its length.
- Read the first line of each paragraph to get an idea of how the writer has organized the piece.
- Read the first line of the last paragraph to get an idea of how it may finish.

2.   **Read with concentration.**

Concentrate on the words **AND** the meaning of groups of words. If there are vocabulary words that are unknown to you, read the sentence and try to understand what is meant by the sentence, so that you can guess at the meaning of the word.

When concentrating is challenging, try these strategies:

- Read the questions **before** you read the piece. It may help to know what you are looking for!
- Read **out loud**. Your own voice can sometimes focus your mind **AND** eliminate outside distractions.
- Discuss the meaning **as if** you were telling someone else what you think it means. Sometimes having to express your thoughts can clarify them.

3.   Practice specific reading skills:

- Recalling details/facts/information
- Understanding main ideas
- Making inferences

Reading Skill: Recalling Details, Facts, and Information

- Start by quickly scanning the text. Look at titles, sub-titles, pictures etc. This prepares your brain to receive the information
- When doing multiple choice quizzes, read the questions first before reading the text – then you'll know what information you are looking for
- Try to **get interested** in the details (readers recall what they are interested in)
- Decide what is **most important** and what is probably not worth remembering (you can't remember everything)
- **Reread** if you need to
- Go back and reread **after** you have read the question

Reading Skill: Understanding Main Ideas

The **main idea:**

- is the most important idea in the passage.
- can be found at the beginning, in the middle or at the end of the passage.
- may be stated clearly or it may be implied.
- is supported by all the sentences in the passage.

Sample Question:

If you, like most people, have trouble recalling the names of those people you have just met, try this. The next time you are introduced, plan to remember the names. Say to yourself, "I'll listen carefully; I'll repeat each person's name to be sure I've got it, and I will remember." You'll discover how effective the technique is and probably recall those names for the rest of your life.

The main idea of this passage maintains that memory

- A. always operates at peak efficiency
- B. breaks down early in the day
- C. improves if new information is used immediately
- D. becomes unreliable when a person is tired

Answers: 1. C Supports are "discover how effective"; "probably recall those names for the rest …"

Reading Skill: Making Inferences

Sometimes when you are reading you must go beyond the printed word on the page, to what is hinted at or likely to be true, given the set of facts. Inferences can only be made when there are facts to back them.

Example: The old man staggered along the sidewalk, his torn, grey coat flapping in the wind.

You might **infer** that the man is drunk, but really the facts don't substantiate that inference. That would be a guess. It could be that the man has been mugged, that he is sick, or that he has had a medical crisis such as a heart attack. All of these could be the case, or some other explanation may be possible. Unless the facts support the inference, it could be incorrect.

You can make accurate inferences when you:

- think about all the ideas that are presented.
- think about the suggested or implied meaning of the words used.
- ensure they are supported by facts.

The following words in a reading may suggest you need to make an inference:

"implies that …"   "infers that …"   "might be described as…"
"indicates that …"   "seems to be …"   "can assume that
…""suggests …"   "probably …"   "can conclude that …"

Reading Comprehension Practice Assessment

Directions: Circle the correct answer (answers are at the end of the assessment)

Part A: Reading Skill: Recalling Details, Facts, and Information

1. An adult drinks from one and one half to five, or more, quarts of water a day. Total daily intake depends on climate, workload, body size, and many other factors.
One of the factors that determines the amount of water an adult drinks per day is

    A. state of health
    B. body size
    C. age
    D. gender

2. Most of us think that the water we drink is safe. It usually is, but some of us are using poorly treated drinking water which has been spoiled by bacteria, toxic chemicals, metal, and a possible wide range of other pollutants.
Most of the time our drinking water is

    A.   contaminated by bacteria

    B.   contaminated by metals

    C.   undrinkable

    D.   safe to drink

3. At least 4,000 cases of water-borne illnesses occur each year in the U.S.A. The actual total may be ten times greater. Further, medical science has not yet determined the effects on people of long-term exposure to contaminated drinking water.
Medical science does not know

    A.   how to protect people from contaminated drinking water
    B.   why some drinking water is improperly treated
    C.   the long-term effects of unsafe drinking water on people
    D.   how much water is required for the average person

Read the following and answer the questions:

There are several things that every defensive driver should learn. To begin with, the defensive driver should learn to drive courteously. That is, he should always let the other person have the right-of-way if there is any doubt. Also, the defensive driver should learn to anticipate, or guess, what the other driver is going to do next. This gives him time to get his car into a safer position, if necessary. Furthermore, every defensive driver should learn to give the proper signal before changing directions, allowing enough time for other drivers to react to it. Lastly, every defensive driver should learn to keep a safe distance between his car and the car ahead.

4. A defensive driver is
    A. courteous
    B. an aggressive driver
    C. a slow driver
    D. a night driver

5. The motto of the defensive driver should be:
    a. If you drink, don't drive.
    b. A safe driver is a relaxed driver.
    c. Safe driving does not just happen; you have to work at it.
    d. When in doubt, give the other person the right-of-way.

6. A defensive driver
    a. should learn to anticipate the actions of others
    b. should maintain a steady speed at all times
    c. never stops to pick up hitchhikers
    d. always checks the tires for air pressure

Part B: Reading Skill: Understanding Main Ideas

Read the following and answer the questions:

It seems that everyone you meet these days knows something about astrology. Go to a party nowadays and chances are that the first stranger you meet will ask you, "What's your sign?" This question comes even before, "What is your name?" The stranger means, of course, "What sign of the zodiac are you born under?" You would answer "Virgo" or "Pisces" or whatever your sign is. But astrology is nothing new. It has been around for thousands of years. In the Orient, it has long been a part of religion and daily life.

1. Which sentence expresses the main idea of the paragraph?
    A. Go to a party nowadays and chances are that the first stranger you meet will ask you, "What's your sign?"
    B. It has been around for thousands of years.
    C. It seems that everyone you meet these days knows something about astrology.
    D. In the Orient, it has long been a part of religion and daily life.

2. The author is most interested in
    A. the newness of astrology
    B. the widespread interest in astrology
    C. the ancient forms of astrology
    D. the magic of astrology

3. This paragraph could be titled
    A. What's in a Star?
    B. Magic in its Many Forms
    C. Parties
    D. Religion of the Orient

Part C: Reading Skill: Making Inferences

Read the following passage and answer the questions that follow it.

Of all the farm animals a person might own, the goat is the best personal pet. For one thing, you can keep it for a longer time than other farm animals. Even after a doe is fully-grown and you are milking her, she will remain your pet. She will not lose her love of adventure or her "sense of humor". Goats nose over everything they see and they eat so many different things that people long ago thought that goats ate tin cans. A doe, often called a nanny goat, usually has a single birth. Sometimes, however, twins or even triplets are born. By the time a young kid is five months old; it may be taken from its mother and kept as a pet.

1. The writer implies that most farm animals
   A. are hard to train
   B. enjoy being with people
   C. become independent as they grow older
   D. like to live with other animals

2. The above paragraph suggests that goats are
   A. stubborn
   B. patient
   C. curious
   D. intelligent

3. According to the paragraph, the idea that goats can eat tin cans
   A. is based on a fact
   B. was argued many years ago
   C. is untrue
   D. is certainly possible

Read the following passage and answer the questions that follow it.

A Daily Record

A diary is a daily personal record. In it the writer is free to record anything at all. This may include events, comments, ideas, reading notes, or any subject on one's mind. Diaries may be kept for various purposes – to record the experiences of one's life so as not to forget them, to record ideas that might prove useful, or simply to express oneself through the medium of the printed word.

In past centuries people in public life often kept diaries. These have become valuable sources of fact and interpretation for later historians. The private candid observations set down in these personal journals often provide truer pictures of an age than do records or other books, which may have been censored during that time. For the most part, these diaries were never intended to be read by others. The entries were made simply as aids to memory or as a form of relaxation.

In modern times, however, politicians and other people realize that their diaries will likely be read by historians or, in published form, by the public. Thus they may make entries with these readers in mind. As a result, their diaries may lose the confidential, intimate nature of the older ones. On the other hand, their entries may tend to be more complete and self-explanatory.

The most famous diary ever written in English was that kept by Samuel Pepys. A civilian official of the British army, Pepys made regular entries between 1660 and 1669. His diary starts at the beginning of the Restoration period in English history and describes many of the court intrigues and scandals of his day. The diary reveals Pepys as a man with many human weaknesses but one who was honest with himself. He wrote his entries in a combined code and shorthand that was not solved until more than 100 years after his death. The most famous diary of the 20th century was published with the simple title <u>Diary of a Young Girl</u>. It was more commonly known as The Diary of Anne Frank. Anne was a young Jewish girl whose diary records the two years her family spent in hiding, mostly in the Netherlands, trying to escape the Nazi persecutors of the Jews. She and her family were finally caught in August 1944. She was imprisoned and died at a concentration camp in Germany in March 1945.

4. A diary is

   A. a report on world events

   B. a daily personal record

   C. a documentary

5. The most famous diary ever written in English was kept by

   A. Samuel Johnson

   B. Samuel Pepys

   C. Anne Frank

6 . <u>Diary of a Young Girl</u> was written

   A. during the civil war

   B. in the 1940s

   C. during the 19th century

7. Anne Frank's diary describes

   A. the years her family spent hiding from the Nazis

   B. a German concentration camp

   C. the life of an average young girl

8. Diaries of the past may give a truer picture of an age than published books because

     A. diaries are uncensored

     B. published books give only one point of view

     C. amateur writers were more thorough than professional writers

9. Today's diarists may not be as confidential as those in the past because

     A. they expect that their diaries will be read by others

     B. they have more secrets to hide

     C. people today are harsher critics

10 .You may conclude from the article that Samuel Pepys wrote his diary in code and shorthand because

     A. he was fond of mysteries

     B. he did not want his diary to be read by the wrong people

     C. he could not write in proper English

11. It is probable that most people keep diaries in order to

     A. become famous

     B. keep personal records

     C. practice their writing skills

Answers

Part A: Reading Skill: Recalling Details, Facts, and Information

1. B   2. D   3. C   4. A   5. D   6. A

Part B: Reading Skill: Understanding Main Ideas

1. C   2. B   3. A

Part C: Reading Skill: Making Inferences

1. C   2. C   3. C   *4.B*   *5. B*   *6. B*   *7. A*

 8. A   9. A   10. B   11. B