



Self Diagnostic Test for BCIT Renewable Resources Program

In order to test just how much you do remember of the basics, please try the enclosed self-diagnostic test. When you are done, check your answers against the answer page provided and use the score sheet to record the number of correct answers. Then total your score. If you score:

1. Compute the following **without** using a calculator:

a) $\frac{3}{8}(4+12)$

e) $\left(\frac{3}{2}\right)^2(16)^{1/2} + \sqrt[3]{27}$

b) $\frac{3}{8}(4)+12$

f) 2^{-3}

c) $\frac{3 \times 8}{4-12}$

g) $27^{1/3}$

h) $\log 100$

d) $\frac{3}{4+5}\left(15-\frac{12}{2}\right)-\frac{2}{0.5}$

2. Compute the following. **You may use a calculator.** Give the answers to 2 decimal places.

a) $\frac{3}{4}(15)$

e) $\left(\frac{5}{2}\right)^3$

b) $14.31+2.85/0.09$

f) $11^{-1.4}$

c) $\sqrt{1142}$

g) $\log 16$

d) $\frac{3.54 \times 10^2}{11 + \sqrt{13}}\left(\frac{29}{\sqrt{6}} - 3.86\right)$

h) $\ln(8.3^{2.1})$

3. Simplify the following expressions:

a) $(a+b)^2 - (a-b)(a+b)$

e) x^3x^{-2}

b) $\frac{x^2 - x - 6}{x - 3}$

f) $(3x)^2(x^3)^2$

c) x^3x^2

g) $\left(\frac{5x+10}{ab^2}\right)\left(\frac{a^2b}{2x+4}\right)(x-2)$

d) $\frac{x^3 + x^2}{x}$

h) $\log x + \log y - \log(xy)$

4. Solve the following equations for x :

a) $3x + 5 = 8$

b) $\frac{5x + 2}{4x} = 15$

c) $\frac{1}{6}x + \frac{3}{4}x = 11$

d) $\sqrt{6x - 23} = 6$

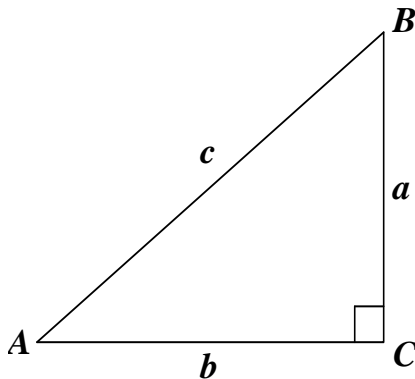
e) $3^x = 42$

f) $x^2 = 3x + 10$

HINT: Recall the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

5. Consider the following triangle



In terms of a , b , and c , what is

a) $\sin A$

b) $\cos A$

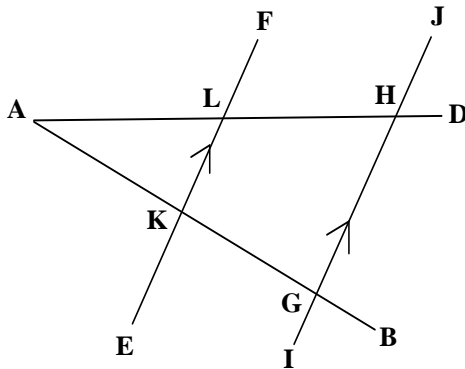
c) $\tan A$

d) If the angle at A is 41° , what is the angle at B ?

e) What is the Pythagorean relationship between a , b , and c ?

f) If $c = 13$ in. and $b = 12$ in., what is the length of a ?

6. Consider the following diagram



EF and IJ are two parallel lines which are cut by two other lines AB and AD .

a) Angle LKG is 115° and angle FLH is 60° . What are the following angles in degrees?

i) $\angle KLH$

ii) $\angle LHG$

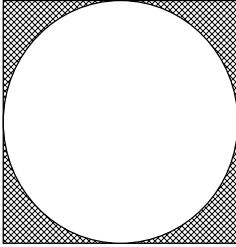
iii) $\angle HGB$

iv) $\angle KAL$

b) If LH has length 6 cm, KG has length 5 cm, and AK has length 4 cm, what is the length of AL ?

7. Roger travels at 50 km/hr for 45 minutes and then travels at 85 km/hr for 15 minutes.
- How far does he travel?
 - If he were to cover the same distance in the same time but at a constant speed, how fast would he need to go?
8. A technician can process 18 photographs every hour if she works continuously. In a four-hour period, how many photographs can be processed if she takes a 10-minute break every hour, i.e. works for 50 minutes and then takes 10 minutes off?

9.



A circle is drawn within a square with sides of 1 cm. What is the area of the shaded section between the circle and the square?

Recall area of a circle: πr^2

10. Carol contributes \$250 and Adam \$175 to purchase 50 m. of rope for a mountain climbing expedition. After the trip they decide to divide the rope in two so that each will take home a length that is in proportion to the amount each paid. What length of rope will each take home? Give your answer to the nearest 0.1 m.

ANSWERS TO QUESTIONS

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. a) 6
 b) 13.5
 c) -3
 d) -1</p> | <p>e) 12
 f) 0.125 or 1/8
 g) 3
 h) 2</p> |
| <p>2. a) 11.25
 b) 45.98
 c) 33.79
 d) 193.39</p> | <p>e) 15.63
 f) 0.035
 g) 1.20
 h) 4.44</p> |
| <p>3. a) $2b(a + b)$

 $x + 2$
 b)
 x^5
 c)
 $x^2 + x$ or $x(x + 1)$
 d)</p> | <p>x
 e)
 $9x^8$
 f)
 $\frac{5a(x-2)}{2b}$
 g)
 0
 h)</p> |
| <p>4. a) 1
 b) 2
 c) 12</p> | <p>d) 9.83
 e) 3.40
 f) 5 and -2</p> |
| <p>5. a) a/c
 b) b/c
 c) a/b</p> | <p>d) 49^0
 $a^2 + b^2 = c^2$
 e)
 f) 5</p> |
| <p>6. a) i) 120^0
 ii) 60^0

 b) 4.8 cm</p> | <p>iii) 115^0
 iv) 55^0</p> |
| <p>7. 58.75 km/hr</p> | |
| <p>8. 60 photos</p> | |
| <p>9. 0.21 cm^2</p> | |
| <p>10. 29.4 m for Carol
 20.6 m for Adam</p> | |

SCORE SHEET

Question	Number of parts	Marks for each	×	Number correct	=	Total for question
1	8	1	×		=	
2	8	1	×		=	
3	8	1	×		=	
4	6	1	×		=	
5	6	1	×		=	
6a	4	1	×		=	
6b	1	2	×		=	
7	2	3	×		=	
8	1	4	×		=	
9	1	4	×		=	
10	1	4	×		=	
		Total Marks			=	

If you scored:
more than **45**,

You should be just fine;

from **25** to **45**,

You should borrow a book (see *Suggested References* below), and review the concepts you missed with a knowledgeable friend;

less than **25**,

You should definitely take advantage of one of the refresher opportunities listed on the next page.

Suggested References

1. **Mathematics for Technical and Vocational Students - A Workbook**, R.C. Spangler and J.G. Boyce. Prentice-Hall. Chapters 1 - 11 and 14.
2. **Mathematics 11: British Columbia Edition**, Kelly, Alexander, Atkinson, and Swift. Addison-Wesley. ISBN 0-201-50776-5
3. **Mathematics 12: British Columbia Edition**, Kelly, Alexander, Atkinson, and Swift. Addison-Wesley