

**\*\*\*Please see "Important Notes" on back page\*\*\***

## Mathematics Practice Test

### College Preparatory (Grade 11 & 12)

This practice test is for those of you who have completed Grade 10 academic math or a higher level course and are planning to take a College mathematics course or program. The Assessment Centre (370-3597) has a different practice test for the Foundations Mathematics courses (up to and including grade 10).

This practice test contains a sample of some of the types of questions that you will see on the test and a list of topics for each section of the test. As well, on the back page, we have included a table with suggested books that you may use to review for the test. There are multiple copies of each of these books in the main libraries at both campuses. If you are not a Camosun student, you may still borrow books provided that you have identification with both your picture and a current address south of the Malahat.

Note: placement tests are designed to be written **once** only. It is better not to write the test until you feel ready.

#### **Directions**

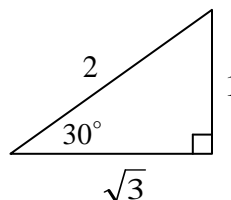
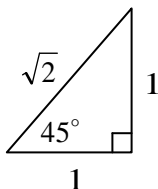
Regardless of your background, please start at question 1. Read each question carefully and then choose the best answer. You may find it helpful to read all the possible answers before making a choice. It is very important that you do this practice test **without a calculator** since calculators are not allowed during the real test. (The reason calculators are not permitted is that we are testing basic concepts and numeracy. You need to be comfortable working with fractions, decimals, percentages, roots, and signed numbers.) After you have done as many of the questions as you can, check your answers with those provided in the answer key on the last page. The table provided on the back page will help you to interpret your score.

We allot 3 hours for the *actual* test session: approximately 30 minutes for paperwork/ instructions and the balance for testing. The *actual* Mathematics Placement Test was designed to be completed in 2 hours by someone who has academic math 12. If you have *less* than math 12, it may take you correspondingly less time but you are entitled to use the full test time regardless of your math background.

### Trigonometric Formula for MATH 137, 073, 107, & 115

(These will be provided with the test.)

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \qquad c^2 = a^2 + b^2 - 2ab \cos C$$



$$\begin{aligned} \cos(A + B) &= \cos A \cos B - \sin A \sin B \\ \cos(A - B) &= \cos A \cos B + \sin A \sin B \\ \sin(A + B) &= \sin A \cos B + \cos A \sin B \\ \sin(A - B) &= \sin A \cos B - \cos A \sin B \end{aligned}$$

$$\begin{aligned} \sin 2A &= 2 \sin A \cos A \\ \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

$$\begin{aligned} \cos^2 A + \sin^2 A &= 1 \\ 1 + \tan^2 A &= \sec^2 A \\ 1 + \cot^2 A &= \csc^2 A \\ \tan 2A &= \frac{2 \tan A}{1 - \tan^2 A} \end{aligned}$$

$$\begin{aligned} \sin A \csc A &= 1 \\ \cos A \sec A &= 1 \\ \tan A \cot A &= 1 \\ \tan A &= \frac{\sin A}{\cos A} \end{aligned}$$

## Parts A – D (Foundations)

**Topics:** whole numbers, fractions, decimals, percent, ratio and proportion, and an introduction to algebra, geometry, and trigonometry.

1. The number 8 900 021 in words is:

- a) eight million, nine thousand and twenty one
- b) eight million, ninety thousand and twenty one
- c) eight million, nine hundred and twenty one
- d) eight million, nine hundred thousand and twenty one
- e) eighty nine million and twenty one

2. Divide:  $12\frac{1}{2} \div 3\frac{1}{3}$

- a)  $3\frac{3}{4}$
- b)  $4\frac{1}{6}$
- c)  $4\frac{1}{4}$
- d)  $5\frac{1}{2}$
- e) none of these

3. Joan answered all 50 questions on a multiple choice test. If she scored 78% on the test, how many questions did she get wrong?

- a) 39
- b) 38
- c) 22
- d) 12
- e) 11

4. Evaluate  $8 - 3(x - 2) - 5x$  when  $x = -3$ .

- a) -14
- b) -10
- c) 30
- d) 38
- e) none of these

5. The length of a rectangle is 3 times its width. If  $w$  represents the width, then the area of the rectangle is

- a)  $2w+3$
- b)  $3w^2$
- c)  $4w$
- d)  $3w$
- e)  $w^2+3w$

6. Evaluate  $ac^2 - b^2c$  given  $a = -2$ ,  $b = 3$ , and  $c = -1$ .

- a) -11
- b) 11
- c) 7
- d) -7
- e) none of these

7. If  $-3(x+2) - 4(-2x+1) - 5 = 0$ , then  $x$  is closest to

- a) -10
- b) -5
- c) 0
- d) 5
- e) 10

8. One factor of  $a^2 - 8a + 12$  is

- a)  $a+3$
- b)  $a-3$
- c)  $a-4$
- d)  $a+2$
- e)  $a-6$

## Part E - MATH 137, 135, 072

**Topics:** simplifying exponents, linear equations and inequalities, lines, systems of linear equations, linear inequalities in two variables, and polynomials.

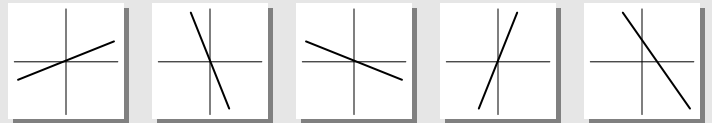
9. Solve for  $y$ :  $y - m = wy$

- a)  $\frac{m}{1-w}$
- b)  $m + wy$
- c)  $m + w$
- d)  $\frac{wy}{m}$
- e)  $\frac{m}{w-1}$

10. Karen drove for 100 km at one speed and then increased her speed by 5 km/hr and drove an additional 200 km. If  $x$  is her initial speed, then her total traveling time in hours is

- a) 140
- b)  $100x + 200(x+5)$
- c)  $\frac{300}{2x+5}$
- d)  $\frac{100}{x} + \frac{200}{x+5}$
- e)  $\frac{300}{6x}$

11. Which of the following look most like the graph of  $y = -2x$  ?



- a)
- b)
- c)
- d)
- e)

12. Solve the system  $\begin{cases} 3y - x = 0 \\ x - 4y = -2 \end{cases}$  for  $x$  and  $y$ . The sum of the solution for  $x$  and the solution for  $y$  is

- a) 8
- b) 4
- c) 6
- d) 10
- e) none of these

13. Evaluate:  $4^{-3/2}$

- a) 8
- b) -6
- c)  $\frac{1}{6}$
- d)  $-\frac{11}{2}$
- e)  $\frac{1}{8}$

14. What is the slope of the line which is perpendicular to the line passing through the points  $(-2, 5)$  and  $(5, 3)$  ?

- a)  $\frac{2}{5}$
- b)  $-\frac{2}{7}$
- c)  $-\frac{1}{5}$
- d)  $\frac{7}{2}$
- e)  $\frac{2}{7}$

15. Solve the inequality:  $\frac{8+3x}{-2} > 5$

- a)  $x > 6$
- b)  $x < \frac{2}{3}$
- c)  $x < -\frac{2}{3}$
- d)  $x < -6$
- e)  $x > -6$

16. One factor of  $(2x+1)^2 - 4$  is

- a)  $2x+1$
- b)  $4x-3$
- c)  $2x-1$
- d)  $2x+5$
- e)  $2x-3$

## Part F - MATH 137, 073

**Topics:** exponents, polynomials, rational expressions, radicals, quadratic equations, quadratic functions, and triangle trigonometry.

17. One factor of  $x^2 - y^2 + 2y - 1$  is

- a)  $x+1$                       b)  $x-y$   
 c)  $x-y+1$                   d)  $x-y-1$                   e) none of these

18. Simplify:  $(9x^{-1} + 3)^{-1}$

- a)  $\frac{x}{9+3x}$     b)  $9x + \frac{1}{3}$     c)  $\frac{x+27}{9}$     d)  $\frac{9x}{1+27x}$     e)  $\frac{3x+1}{9}$

19. Solve the rational equation:  $\frac{30}{x} = \frac{50}{x+10} + \frac{1}{2}$ . The sum of the two solutions for  $x$  is:

- a) 50      b) 70      c) 10      d) -50      e) -10

20. Rationalize the denominator:  $\frac{1-\sqrt{x}}{1+\sqrt{x}}$

- a)  $\frac{1-2\sqrt{x}+x}{1-x}$     b) 1    c)  $\frac{1+x}{1-x}$     d) -1    e) none of these

21. Solve for  $r$ :  $\frac{E}{e} = \frac{R+r}{r}$

- a)  $\frac{R}{E}$     b)  $\frac{R}{E-1}$     c)  $\frac{eR}{E-1}$     d)  $\frac{eR}{E-e}$     e)  $\frac{R(e-E)}{E}$

22. The length of a rectangle is 4 metres longer than its width and its area is 10 square metres. The perimeter in metres is

- a)  $-2 + \sqrt{14}$     b)  $4\sqrt{14}$     c)  $2 + \sqrt{14}$     d)  $2\sqrt{14}$     e) none of these

23. A triangle has two of its angles that measure  $60^\circ$  and  $45^\circ$ . If the side opposite the  $60^\circ$  angle measures 60 units, find the length of the side opposite the  $45^\circ$  angle.

- a)  $40\sqrt{6}$     b)  $20\sqrt{6}$     c) 45    d)  $30\sqrt{6}$     e)  $60\sqrt{2}$

24. What is  $\tan\theta$  if  $\sin\theta = -\frac{3}{4}$  and  $\theta$  is a third quadrant angle?

- a)  $\frac{3\sqrt{7}}{7}$     b)  $-\frac{3\sqrt{7}}{7}$     c)  $\frac{3}{5}$     d)  $-\frac{4}{5}$     e)  $\frac{\sqrt{7}}{4}$

## Part G - MATH 107, 115

**Topics:** rational inequalities, conic sections, algebra of functions, polynomial and rational functions, logarithmic and exponential functions, trigonometric functions and identities.

25. The inverse,  $f^{-1}(x)$ , of the function  $f(x) = -\frac{2}{3}x + 6$  is

- a)  $\frac{3}{2}x - 6$                       b)  $-\frac{3}{2}x + \frac{1}{6}$   
 c)  $-\frac{3}{2}x + 9$                       d)  $\frac{3}{2}x - 9$                       e) none of these

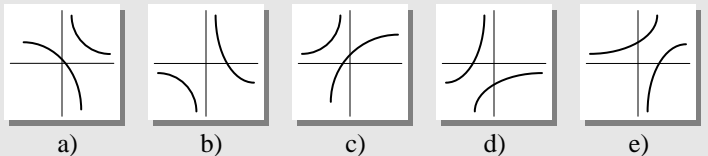
26. If  $f(x) = (x+5)^{\frac{7}{2}}$  and  $g(x) = x^{\frac{2}{3}}$  then  $g(f(x))$  is equal to

- a)  $x^{\frac{2}{3}}(x+5)^{\frac{7}{2}}$                   b)  $(x^{\frac{2}{3}}+5)^{\frac{7}{2}}$   
 c)  $(x+5)^{\frac{7}{3}}$                       d)  $(x+5)^{\frac{2}{3}}$                       e) none of these

27. If  $f(x) = \frac{2}{3x}$ , evaluate  $\frac{f(x+h) - f(x)}{h}$ .

- a) 1                                  b)  $\frac{-2}{3x(x+h)}$   
 c)  $\frac{-2h^2}{3x(x+h)}$                       d)  $\frac{-2}{3x(3x+h)}$                       e)  $\frac{-1}{x+h}$

28. The graph of  $f(x) = \frac{-1}{x-1} + 2$  looks most like:



29. The points  $(-1, -2)$  and  $(5, 2)$  are the end points of the diameter of a circle which has the equation

- a)  $(x-2)^2 + y^2 = 52$     b)  $(x-3)^2 + y^2 = 12$   
 c)  $x^2 + y^2 = \sqrt{13}$     d)  $(x-2)^2 + y^2 = 13$     e) none of these

30. Solve for  $y$  in terms of  $a$  and  $x$ :

$$3\log_2 y + \log_2 x = 3\log_2 4 + \log_2 a$$

- a)  $4\sqrt[3]{\frac{a}{x}}$     b)  $\frac{4a}{x}$     c)  $4\sqrt[3]{\frac{x}{a}}$     d)  $\frac{64a}{3x}$     e)  $\sqrt[3]{64a-x}$

31. If  $\cos\theta = \frac{12}{13}$  and  $\theta$  is a fourth quadrant angle, find  $\sin 2\theta$ .

- a)  $\frac{5}{13}$     b)  $-\frac{120}{169}$     c)  $\frac{10}{13}$     d)  $\frac{120}{169}$     e)  $-\frac{10}{13}$

32. In the interval  $0 \leq x < 2\pi$ , the equation  $\cos 2x - \cos x = 0$  has how many solutions?

- a) none    b) one    c) two    d) three    e) four

**Answer Key:**

- |              |              |              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1. <b>d</b>  | 2. <b>a</b>  | 3. <b>e</b>  | 4. <b>d</b>  | 5. <b>b</b>  | 6. <b>c</b>  | 7. <b>d</b>  | 8. <b>e</b>  |
| 9. <b>a</b>  | 10. <b>d</b> | 11. <b>b</b> | 12. <b>a</b> | 13. <b>e</b> | 14. <b>d</b> | 15. <b>d</b> | 16. <b>c</b> |
| 17. <b>c</b> | 18. <b>a</b> | 19. <b>d</b> | 20. <b>a</b> | 21. <b>d</b> | 22. <b>b</b> | 23. <b>b</b> | 24. <b>a</b> |
| 25. <b>c</b> | 26. <b>c</b> | 27. <b>b</b> | 28. <b>e</b> | 29. <b>d</b> | 30. <b>a</b> | 31. <b>b</b> | 32. <b>d</b> |

**Interpreting Your Score:**

Questions answered correctly	Course you are probably ready for:
1 - 8	MATH 137, 135, 072
1 - 16	MATH 137, 073
1 - 24	MATH 107, 109, 115
1 - 32	MATH 100, 108, 110

If you had difficulty with the first 8 questions, please ask at the Assessment Centre for a copy of the **Foundations Mathematics Practice Test**.

**Resources:**

Camosun Courses & Grade Levels	Library Textbooks & Sections to Review ( <i>check for current editions</i> )
<b>MATH 034/052/053</b> (Up to and including Math 10) Arithmetic, Geometry, Introductory Algebra	<ul style="list-style-type: none"> <li>• Bittinger, M.L. <i>Basic Mathematics</i>. Chapters 1 – 9 <b>QA 107 K43 (Lansdowne &amp; Interurban)</b></li> <li>• Bittinger, M.L. and J.A. Beecher. <i>Geometry Supplement</i>. <b>QA 455 B58 (Lansdowne &amp; Interurban)</b></li> <li>• Bittinger, M.L. and J.A. Beecher. <i>Introductory and Intermediate Algebra</i>. Chapters 1 – 4, 5.1 – 5.2 <b>QA 152.2 B5624 (Lansdowne &amp; Interurban)</b></li> </ul>
<b>MATH 137, 135, 072</b> (Math 11 )	<ul style="list-style-type: none"> <li>• Bittinger, M.L. and J.A. Beecher. <i>Introductory and Intermediate Algebra</i>. Chapters 3, 4, 5, 7, 8.1 – 8.4, 9.1 – 9.2 <b>QA 152.2 B5624 (Lansdowne &amp; Interurban)</b></li> </ul>
<b>MATH 137, 073</b> (Math 11 )	<ul style="list-style-type: none"> <li>• Bittinger, M.L. and J.A. Beecher. <i>Introductory and Intermediate Algebra</i>. Chapters 5, 6, 10, 11 <b>QA 152.2 B5624 (Lansdowne &amp; Interurban)</b></li> <li>• Bittinger, M.L. and J.A. Beecher. <i>Trigonometry Update</i>. Sections 6.1 – 6.3, 8.1 – 8.2 <b>QA 531 B488 (Lansdowne &amp; Interurban)</b></li> </ul>
<b>MATH 107, 115</b> (Math 12)	<ul style="list-style-type: none"> <li>• Beecher, J.A., J.A. Penna and M.L. Bittinger. <i>Algebra and Trigonometry</i>. Chapters R, 1 – 6, 8.1, 9, 10.1 – 10.3 <b>QA 152.3 B44 (Lansdowne &amp; Interurban)</b></li> </ul>

**Important Notes:**

- **Documented Disability?** If you have a documented disability and require accommodations/supports to write the College placement test contact the Resource Centre Students with a Disability in Dawson 119 or call 250 370-3312, TTY/TDD: 250 370-3311 to set up alternative testing arrangements.
- **Need help with Math?** Visit the friendly folks in the Math Lab. To see the locations and times go to [www.camosun.ca/math-help](http://www.camosun.ca/math-help).
- **Test Anxiety?** For the most up-to-date information on learning how to keep your cool at test time go to the Counselling website <http://camosun.ca/services/counselling/counselling-types.html>.
- **Need help planning your education?** Academic Advisors help you explore educational options, develop a Personal Learning Plan, understand admission processes, plan course selections and interpret educational institution rules and regulations as they apply to you. Email [AcademicAdvising@camosun.bc.ca](mailto:AcademicAdvising@camosun.bc.ca) or drop in to Academic Advising (hours on website).

