

Thompson Rivers
University

**Math Assessment Test:
Fundamental Level
through University
Level**

Open Learning Faculty of
Arts and Faculty of Science
Programs

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Printed in Canada by:
Thompson Rivers University
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Kamloops, BC, Canada
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Introduction and Instructions

To the Student:

When considering studies in mathematics and related subjects, many people find it difficult to judge where to begin. Others simply wish to ensure they have the background to take a particular course or program. Regardless of why you have decided to write this assessment, we hope that it will enable you to realistically evaluate your mathematical skills and knowledge and that, as a result, your studies will be rewarding, enriching, and stimulating.

Test Instructions:

1. Treat this as a real test.
 - Do not seek any help in answering the questions.
 - Do not refer to any materials.
 - Do not use a calculator.
2. Attempt all questions in the section(s) that are applicable.
 - While you may write the entire assessment test, only some sections may apply to the course or level you are interested in. If attempting Sections B, C or D, be sure to write at least one preceding section. See the placement instructions on the next page for further details.
3. Score the sections you attempt using the answer key provided.
 - Each question is worth 1 mark.
4. Use the placement instructions on the next page.
 - Feel free to contact us if you require further assistance in choosing an appropriate course.

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PLACEMENT INSTRUCTIONS

To Register In:	You Should Score (correct answers in specified sections):
MATH 0401 (Intermediate Math–9/10 level)	At least 10 in A and B combined (but less than 17/25 in B)
MATH 0523 (ABE Advanced Level–11 level)	At least 17 in Section B (but less than 14 in C)
MATH 0633 (ABE Provincial Level–12 level)	At least 14 in Section C (but less than 14 in D)
MATH 1001 (Pre-Calculus Math–12 level)	At least 14 in Section C (but less than 14 in D)
MATH 1157 (Calculus for Biol. and Social Sciences)	At least 16 in Section C (and 10 in D suggested)
MATH 1171 (Calculus for Business. and Mgmt.)	At least 16 in Section C (and 10 in D suggested)
MATH 1091 (Business Mathematics)	At least 16 in Section A and 15 in Section B
MATH 1141 (Calculus I)	At least 18 in Section C and 15 in Section D
MATH 1101 (Finite Mathematics)	At least 16 in Section C (and 12 in Section D advised)
PHYS 0501 (Introductory Physics)	At least 40 in Sections A, B, and C combined
PHYS 1103 (General Physics I)	At least 16 in Section C and 12 in Section D
PSYC 2101 (Statistics in the Social Sciences)	At least 55/85 on all four sections combined
STAT 1201 (Intro to Probability and Statistics)	At least 40 in Sections A, B, and C (with 7/9 in part I of B)

SECTION A

I. Solve the following.

1. $243 - 98 =$

2. $0.65 \times 11.3 =$

3. $95 \div 0.19 =$

4. $6 + 24 \div 8 - 6 =$

5. $(3 + 2) \times 8 \div 4 - 2 =$

Note: Give your answers to questions 6, 7, and 8 as fractions.

6. $11\frac{1}{9} - 4\frac{3}{4} =$

7. $8\frac{1}{9} \div \frac{2}{3} =$

II. Answer the following as directed.

8. Write $\frac{3584}{5440}$ in lowest terms.

9. Round to the nearest thousandth:

7.81662

10. Find the lowest common multiple:

10, 12, 14

11. List all the factors of 44.

12. Write as a per cent:

$$\frac{19}{25} =$$

13. Write as a decimal:

$$36\frac{1}{2}\% =$$

14. Solve for N :

$$\frac{10}{14} = \frac{N}{42}$$

15. What number is 12% of 172?

16. 150% of what number is 39?

III. Solve the following.

17. Heather is paid a commission of 7.5% of the selling price of any house she sells. How much is she paid if she sells a house for \$99,000?

18. If Jackie spends \$277 per month on food and her monthly take-home pay is \$1385, what per cent of her monthly income does she spend on food?

19. Find the volume of a rectangular container 3.4 m wide, 4.9 m long, and 2.8 m high:

20. When four times a number is increased by 11, the result is 35. What is the number?

SECTION B

Note: Where rounding is required, give your answer to 2 decimal places.

Solve the following.

1. $-13 - (-4) =$

2. $4 \cdot (-6) \cdot (-3) \cdot (-2) =$

3. Solve, giving your answer as a fraction.

$$\frac{-3}{5} \div \frac{9}{20} =$$

4. $4.8 - |-2.9| =$

5. $\sqrt{3^2 + (-4)^2} =$

6. $\frac{(3.1 - 5.5)^2}{1.2} =$

7. $\sqrt{0.7^2 + 2.4^2} =$

8. What is the average of:

4.5, 7.2, 1.8, 6.9

9. What is the average of the squares of:

2.3, -1.4, 5.4, -2.3

II. Answer the following as directed.

10. Multiply:

$$(2 - x)(3 + 2x) =$$

11. Factor completely:

$$7x^2 - 28x =$$

12. Collect like terms:

$$10a + 6b - 2a + 3c - 7b =$$

13. Write in exponential notation:

$$x \cdot x \cdot x \cdot x =$$

14. Remove the parentheses and simplify:

$$[4(x + 6) - 3] - [3(x - 2) + 1] =$$

15. Solve:

$$6.2x = 49.6$$

16. State the greatest common factor of the following terms:

$$4x^3y, 6x^2y^7, 8x^4y^3$$

17. Express the ratio 10 m : 2 cm in simplest form.

18. Multiply and simplify:

$$y^4 \cdot y^{-5} =$$

19. Simplify:

$$(a^{-3})^2$$

III. Solve the following.

20. If \$100 is invested at 12% compounded annually, how much is in the account after two years?
21. To change Fahrenheit temperature to Celsius, we can use the formula $C = \frac{5}{9}(F - 32)$. What is the temperature in Fahrenheit if the temperature is 25° Celsius?
22. A right triangle has two legs of length 8 m and 10 m respectively. Find the length of the hypotenuse.
23. A ski jacket marked down 30% now costs \$56. What was its original price?
24. Twice a number is subtracted from five and the result is 10. What is the number?

25. Five kilograms of apples costs \$4.50. How much do 12 kg cost?

SECTION C

I. Solve the following.

1. $9(x-1) - 3(x-2) = 1$

2. $5x + 3y = 2$

$$3x + 5y = -2$$

3. $x + y - z = 0$

$$3x + y + z = 6$$

$$x - y + 2z = 5$$

4. $\frac{6}{n} + \frac{6}{n+2} = \frac{5}{2}$

5. $y^2 - 29y + 100 = 0$

6. $\log(x+5) = 2$

II. Answer the following as directed.

7. Solve $A = P + Prt$, for r .

8. Solve:

$$|2y + 3| > 8$$

9. Simplify:

$$(5a^2 - 3ab - 7b^2) - (2a^2 + 5ab + 8b^2) =$$

10. Write as a single radical expression:

$$\frac{\sqrt[3]{(x+1)^5}}{\sqrt{(x+1)^3}}$$

11. $\sqrt{x-5} = 5 - \sqrt{x}$

12. Simplify:

$$\frac{3x + 3y}{5x - 5y} \div \frac{3x^2 + 3y^2}{5x^2 - 5y^2}$$

13. Factor:

$$4x^2 - 12x + 9$$

14. Rationalize the denominator and simplify:

$$\frac{1 - \sqrt{x}}{1 + \sqrt{x}}$$

15. Multiply:

$$(6x^2 - 2y)^2$$

16. Divide:

$$(7x^4 - 5x^3 + x^2 - 4) \div (x - 2)$$

III. Solve.

17. Find three consecutive even integers whose sum is 198.

18. Two jets leave the same airport and travel in opposite directions. Plane A travels at 600 km/h, and Plane B travels at 480 km/h. How long does it take for them to be 5400 km apart?

19. Bill can mow a lawn in 21 minutes, and Frank can mow the lawn in 14 minutes. How long would it take if the two worked together?

20. The centripetal force F of an object moving in a circle varies directly as the square of the velocity v and inversely as the radius r of the circle. If $F = 8$ when $v = 1$ and $r = 10$, what is F when $v = 2$ and $r = 16$?

SECTION D

1. Simplify the expression:

$$\frac{1}{2}(\sqrt{a+b} + \sqrt{a-b})^2$$

2. Factor the polynomial:

$$x^3 - 2x^2 + 2x - 4$$

3. Write as a single rational expression in simplified form:

$$\frac{x}{x-y} - \frac{y}{x+y}$$

4. Find all the real solutions (if any) of:

$$\sqrt{2x-1} = 1 - \sqrt{4x-1}$$

5. Solve the following inequality, expressing the solution in the form of intervals:

$$\frac{5x-2}{2x+3} < -1$$

6. Find the domain of the function:

$$f(x) = \sqrt{|x| - 5}$$

7. f $f(x) = \frac{1}{x}$ and $g(x) = \frac{x^2 - 1}{x^2 + 1}$, show that:

$$g(f(x)) = -g(x)$$

8. Sketch the graph of:

$$y = 2x^2 + 4x + 5$$

9. Find all the solutions of:

$$2x + 3y = 0$$

$$-4x + 6y = -4$$

10. Find all the solutions of:

$$e^{x+y} = 1$$

$$2x - y = 3$$

11. Solve the equation:

$$2^{x^3} = 4^x$$

12. Determine the exact value of:

$$\cos(-585^\circ)$$

13. Determine the exact value of:

$$\csc\left(\frac{44\pi}{3}\right)$$

14. Prove that:

$$\frac{\sin 2x}{\sin x} - \frac{\cos 2x}{\cos x} = \sec x$$

15. A triangle has sides identified by a , b , and c , with the corresponding opposite angles identified by α , β , and γ . Given that $\beta = 30^\circ$, $a = 1$, and $b = 1$, calculate the remaining elements of the triangle.

16. Verify that $(x - 4)$ is a factor of $x^4 - 4x^3 - 2x^2 + 8x$ and find the other factors.
17. A circular pond has a radius of 8 feet, and there is a reed in the middle of the pond that protrudes 4 feet above the surface. When the top of the reed is pulled to one side (the entire reed below and above the surface remaining straight in the process), the tip just touches the edge of the pond. How deep is the pond?
18. It has been found experimentally that under optimum conditions the population of a colony of brown rats grows exponentially from 50 rats to 11 070 during the course of one year. How long does it take for the population to grow from 50 to 100?
19. Suppose a university receives \$1,000,000 in contributions in 1990, and each year thereafter the amount of the yearly contributions increases by \$100,000. How much will the university have received by the end of 1999?
20. A student has five mathematics books, three science books, and two history books. In how many ways can the books be placed on a shelf if all the books are distinct, but the mathematics books are to be together, the science books together, and the history books together?

ANSWER KEY

SECTION A Answers

1. 145
2. 7.345
3. 500
4. 3
5. 8
6. $6\frac{13}{36}$
7. $12\frac{1}{6}$
8. $\frac{56}{85}$
9. 7.817
10. 420
11. 1, 2, 4, 11, 22, 44
12. 76%
13. 0.365
14. 30
15. 20.64
16. 26
17. \$7425
18. 20%
19. 46.648m^3
20. 6

SECTION B Answers

1. -9
2. -144
3. $-1\frac{1}{3}$
4. 1.9
5. 5
6. 4.8
7. 2.5
8. 5.1
9. 10.4
10. $6 + x - 2x^2$
11. $7x(x - 4)$
12. $8a - b + 3c$
13. x^4
14. $x + 26$
15. 8
16. $2x^2y$
17. $500:1$
18. y^{-1} or $\frac{1}{y}$
19. a^{-6} or $\frac{1}{a^6}$
20. $\$125.44$
21. 77°F
22. 12.8 m or $2\sqrt{41}\text{ m}$
23. $\$80$
24. $-2\frac{1}{2}$
25. $\$10.80$

SECTION C Answers

1. $\frac{2}{3}$

2. $(x,y)=(1,-1)$

3. $(x,y,z)=(2,-1,1)$

4. $n = -\frac{6}{5}$ or 4

5. $y = 25, 4$

6. $x = 95$

7. $r = \frac{A - P}{Pt}$

8. $y > \frac{5}{2}$ or $y < -\frac{11}{2}$

9. $3a^2 - 8ab - 15b^2$

10. $\sqrt{x+1}$

11. $x = 9$

12. $\frac{(x+y)^2}{x^2+y^2}$

13. $(2x-3)^2$

14. $\frac{1-2\sqrt{x}+x}{1-x}$

15. $36x^4 - 24x^2y + 4y^2$

16. $7x^3 + 9x^2 + 19x + 38 + \frac{72}{x-2}$

17. 64, 66, 68

18. 5 h

19. 8.4 min

20. $F = 20$

SECTION D Answers

1. $a + \sqrt{a^2 - b^2}$

2. $(x-2)(x^2+2)$

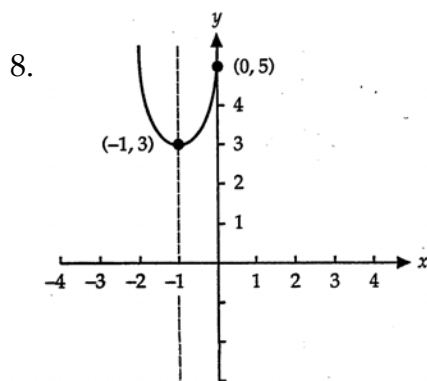
3. $\frac{x^2 + y^2}{(x-y)(x+y)}$

4. $\frac{1}{2}$

5. $\left(-\frac{3}{2}, -\frac{1}{7}\right)$

6. $(-\infty, -5) \cup [5, \infty)$

7. Equality of LHS = RHS



9. $\left(\frac{1}{2}, -\frac{1}{3}\right)$

10. $(1, -1)$

11. $0, \sqrt{2}, -\sqrt{2}$

12. $-\frac{1}{\sqrt{2}}$

13. $\frac{2}{\sqrt{3}}$

14. Equality of LHS = RHS

15. $c = \sqrt{3}, \alpha = 30^\circ, \gamma = 120^\circ$

16. $x(x-4)(x-\sqrt{2})(x+\sqrt{2})$

17. 6 feet

18. $\frac{\ln(2)}{\ln(221.4)} \text{ yr}$

19. \$14,500,000

20. 8640