VANCOUVER ISLAND
UNIVERSITY

Math 121 Test 1 – Jan 27 2020

name (printed)	*student number*

Instructions:

1. There are **7 pages** (including this cover page) in the test. You will be given **80 minutes** to write the test. Justify every answer, and clearly show your work. Unsupported answers will receive no credit. Read over the test before you begin.
2. No notes or books are to be used during the test. The last page is for scrap work. Put your name on the scrap paper and return it along with your completed test. **To be considered for grading, your test must include the scrap paper with your name on it.**
3. Calculators are not permitted. The use of a calculator, music player, cell phone or any other electronic device during the test is cheating.
4. At the end of the test you will be given the instruction to stop writing. **Continuing to write after this instruction is cheating**.
5. **Academic dishonesty:** Exposing your paper to another student, copying material from another student, or representing your work as that of another student constitutes academic dishonesty. Cases of academic dishonesty may lead to a zero grade in the test, a zero grade in the course, and other measures, such as suspension from this university.

question	value	score
1	3	
2	3	
3	3	
4	4	
5	3	
6	4	
7	3	
8	3	
9	4	
10	4	
11	4	
12	2	
13	10	
Total	50	

Question 1: Expand and simplify: $(1 - x + x^3)^2$

[3]

Question 2: Express as a single simplified fraction: $\frac{c}{ab^2} + \frac{a}{bc} + \frac{b}{ac}$

[3]

Question 3: Factor completely: $8x^2 + 10x + 3$

[3]

Question 4: Find all solutions: $x^3 - 2x + 1 = 0$

[4]

Question 5: Simplify and express your answer using only positive exponents: $\left(\dfrac{3x^{3/2}y^3}{x^2y^{-1/2}}\right)^{-2}$

[3]

Question 6: Find an equation of the line that passes through the midpoint of $A(-7, 4)$ and $B(5, -12)$ and which is perpendicular to the line through these two points.

[4]

Question 7: Determine $\sin(7\pi/6) - \sec(5\pi/4)$. Express your answer as a single simplified fraction.

[3]

Question 8: Find all values of x in the interval $[0, 2\pi]$ for which $2\sin(x) = \tan(x)$.

[4]

Question 9: If $\tan(\theta) = -3/4$ where $\dfrac{3\pi}{2} < \theta < 2\pi$ then determine $\csc(\theta)$.

[3]

Question 10: Express the area A of an equilateral triangle (that is, a triangle having all sides of equal length) as a function of the length x of one of its sides.

[4]

Question 11: Evaluate and simplify the difference quotient $\frac{f(x+h)-f(x)}{h}$ where $f(x)=\frac{5}{x^2}$. Express your final answer as a single simplified fraction.

[4]

Question 12: Evaluate the limits:

(i) $\lim_{x\to 4} \frac{x^2-6x+5}{x^2-4}$

[1]

(ii) $\lim_{x\to -2} \frac{\sqrt{x^2+5}}{x^2-4}$

[1]

Question 13: Evaluate the following limits, if they exist:

(a) $\lim_{x \to 0} \dfrac{x}{\sqrt{4+x} - \sqrt{4-x}}$

[3]

(b) $\lim_{x \to 3} \dfrac{x^2 - 6x + 9}{x^2 - 9}$

[3]

(c) $\lim_{x \to 2} \left(\dfrac{1}{x-2} - \dfrac{4}{x^2-4} \right)$

[4]