



Mathematics 17
Final Examination

M17_FIN_001
College Algebra and Trigonometry
First Semester, AY 2012-2013

I. Write TRUE if the statement is always true, otherwise write FALSE.

1. For all real numbers x , $|-x| = x$.
2. $\text{Arccos}(\cos x) = \cos(\text{Arccos} x)$
3. For all $y, |z| \geq |y + z| - |y|$.
4. For a real number b , $b^0 = 1$.
5. 3.1416 is a rational number.
6. The graph of the rational function $g(x) = \frac{x^2 - 2x}{x - 2}$ coincides with the graph of the identity function $f(x) = x$.
7. An infinite set may have infinite proper subset.
8. The points $(2\sqrt{3}, 3\sqrt{2})$, $(4\sqrt{3}, -\sqrt{2})$, and $(\sqrt{3}, 5\sqrt{2})$ are collinear.
9. In the complex plane, the point representing the additive inverse of a nonzero complex number z is obtained by rotating z 180° about the origin.
10. If a line l_1 has a slope m_1 , then the slope of the line l_2 which is perpendicular to l_1 is $-m_1$.

II. FILL in the blanks.

1. The domain of $f(x) = \sqrt{\frac{1-x}{1+x}} - 5$ is _____.
2. The 10511th term of the geometric progression 1,4,16,64,... is _____.
3. The cardinality of the set $\{a,b,\{a,b,\{\}\}\}$ is _____.
4. $(2\text{cis}240^\circ)(3\text{cis}150^\circ) =$ _____ in $x + iy$ form.
5. The sum of all integers between 100 and 10000 that is divisible by 4 is _____.

III. Solve for x.

1. $1 + \sqrt[3]{x^3 - 3x^2 + \sqrt{5x^2 - 2x + 9}} = x$
2. $\text{Arccos}\left(\frac{x}{\sqrt{2}}\right) - \text{Arcsin}(\sqrt{2} \cdot x) = -\frac{\pi}{6}$
3. Arithmetic Progression: $2x + 2, 5x - 11, 7k - 13$
4. $2x^5 - x^4 - x^3 - 2x^2 + x + 1 = 0$
5. $x^2 + 8 = -8\sqrt{3}i$

IV. WORD Problems

1. Nine books are arranged from left to right. The price of each book is $\frac{3}{2}$ times the price of the book to its left. If twice the price of the rightmost book (the most expensive book) is 288 pesos more than the sum of the prices of the six other books, what is the price of the cheapest book?
2. Pipe QWERTY can fill a tank in 300 minutes while Pipe UIOP can fill a tank in 240 minutes. Pipe QWERTY was opened to fill a tank, and an hour later Pipe UIOP was opened to help Pipe QWERTY fill the tank. But due to carelessness, I forgot to seal the tank, causing a liter of water to evaporate in 8 hours in the whole process. How many days would it take for me to fill the tank?
3. Tom was 60 meters directly east of Jerry when he heard him cry for help. At the same time, Tom noticed a bomb which was on top of a building 100 meters directly west of him. The angle of elevation of the bomb was 60 degrees. If Tom travels at a constant speed of $50\sqrt{3}$ meters per second, would Tom save Jerry? If so, how long will it take Tom to save Jerry and then fly to the top of the building to defuse the bomb?

END OF EXAM