

Final Examination Review

MTH 13 Section E01

Exam Date: 25 May 2017

1. A river flows at the rate of 3 km/h, A rower who can travel 4 km/h in stillwater, heads directly across the current. Find the rate and direction of travel of the boat. You may use $\tan^{-1} \frac{4}{3} = 53.13^\circ$.

2. Express the following complex number in the form of $a + bi$:

$$\frac{-4 - 3i}{-1 - 2i}$$

3. Find all three roots of $z^3 = i$, where z is a complex variable.

4. Let $f(x) = x^2 + x + 2017$. Compute

$$\frac{f(x+h) - f(x)}{h}$$

5. Suppose \$200 is deposited with 3% of APR. What is the total value of the investement after 10 years?

6. Solve for x : $\log_3(6x^2 - 5x + 23) = 3$.

7. Draw the graph of $y = \cos(x - \frac{\pi}{3})$, where $0 \leq x \leq 2\pi$.

8. Prove the following identity:

$$\sec x + \tan x + \cot x = \frac{1 + \sin x}{\cos x \sin x}$$

9. Prove the following identity:

$$\frac{\sin(x-y)}{\sin(x+y)} = \frac{\tan x - \tan y}{\tan x + \tan y}$$

10. Use Cramer's rule to solve the following linear system:

$$\begin{cases} x + y - z = -3 \\ x + z = 2 \\ 2x - y + 2z = 3 \end{cases}$$