

# MAT 120 Homework 1

## Fall 2024

Due date: Thursday, Sep 12

For all problems, show any relevant work that you did in order to reach the conclusion.

1. Classify the following numbers as rational or irrational:

- (a)  $\sqrt{3}$
- (b)  $\frac{7}{3}$
- (c) 2.33333
- (d)  $2.\overline{333}$
- (e) 2.03003000300003000003...
- (f)  $(\sqrt{8})^3$
- (g)  $7^3$
- (h)  $(1 - \sqrt{5})(1 + \sqrt{5})$
- (i)  $(\sqrt{2} - 1)^2$

2. Classify the following numbers as real or complex nonreal:

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

3. Find the fractional representation of the following numbers, using the formula for the sum of a geometric series:

$$1 + r + r^2 + r^3 + \dots = \frac{1}{1 - r}.$$

- (a)  $2.\overline{333}$
- (b)  $.01212\overline{12}$
- (c)  $12.453453\overline{453}$