

MAT 120 Homework 1

Fall 2023

Due date: Tuesday, Sep 5

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:

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

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