

Math 211

October Mid-term Test

20 October 2021

- [3] 1. Use the Euclidean algorithm to reduce the following fraction to its lowest terms.

$$\frac{847}{938}$$

- [4] 2. (a) Let a, b and c be integers. *Define* the term “ a divides b ” ($a|b$) and *prove* that if $a|b$ and $b|c$, then $a|c$.
(b) *Define* the term “greatest common divisor” (gcd) of two integers a and b .
(c) *State* (but do not prove) Euclid’s Lemma.

- [10] 3. Consider the Diophantine equation

$$123x + 174y = 12000.$$

- (a) Find all the integer solutions of this equation.
(b) Determine all non-negative integers $x \geq 0, y \geq 0$ which satisfy this equation.

- [3] 4. **Without** finding the general solution, find all the non-negative integer solutions of the Diophantine equation

$$3x + 4y + 5z = 8.$$

(Justify that you found them all).