

MAT2540, Quiz3, Spring2026

ID: _____

Name: _____

- This quiz consists of 1 question for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Show all work and justify your answers.
- Wishing you success.

1. Given a n th-term sequence defined by

$$a_0 = 0, a_1 = 0, a_2 = 1, \text{ and } a_n = a_{n-1} + a_{n-2} + a_{n-3}, \text{ for } n = 3, 4, 5, \dots$$

a) Devise a recursive algorithm to find this sequence:

```

procedure Tribonacci( n: non-negative integer )
  if  $n=0$  then return 0
  else if  $n=1$  then return 0
  else if  $n=2$  then return 1
  else return Tribonacci( $n-1$ ) + Tribonacci( $n-2$ ) + Tribonacci( $n-3$ )

{ output is Tribonacci( $n$ ) }
    
```

b) Devise an iterative algorithm to find this sequence:

```

procedure iterative Tribonacci( n: nonnegative integer )
  if  $n=0$  then return 0
  else if  $n=1$  then return 0
  else if  $n=2$  then return 1
  else
     $x:=0, y:=0, z:=1$ 
    for  $i:=1$  to  $n-2$ 
       $w=x+y+z; x:=y; y:=z; z:=w$ 
    return  $z$ 

{ output is  $n^{\text{th}}$  term of the Tribonacci number }
    
```