

# Worksheet 13 Solution

March 22, 2020

## Question 1

- a. **Exact number of iterations:**  $n$   
**Simplest theta expression:**  $f_1 \in \Theta(n)$

Correct Solution:

**Exact number of iterations:**  $\frac{n}{5}$   
**Simplest theta expression:**  $f_1 \in \Theta(n)$

- b. **Exact number of iterations:**  $n - 4$   
**Simplest theta expression:**  $f_2 \in \Theta(n)$

- c. **Exact number of iterations:**  $n$   
**Simplest theta expression:**  $f_3 \in \Theta(n)$

Correct Solution:

**Exact number of iterations:**  $\frac{\frac{n}{10}}{10} = 10$   
**Simplest theta expression:**  $f_3 \in \Theta(1)$

- d. **Exact number of iterations:**  $n^2 - 20$   
**Simplest theta expression:**  $f_4 \in \Theta(n^2)$

Correct Solution:

**Exact number of iterations:**  $\frac{n^2-20}{3}$   
**Simplest theta expression:**  $f_4 \in \Theta(n^2)$

e. **Exact number of iterations:**  $n^2 - 20 + n$

**Simplest theta expression:**  $f_5 \in \Theta(n^2)$

**Correct Solution:**

**Exact number of iterations:**  $\frac{n^2-20}{3} + 100n$

**Simplest theta expression:**  $f_5 \in \Theta(n^2)$

## Question 2

a.  $i_3 = 8$

$i_4 = 16$

$i_k = 2^k$

b. **Exact number of iterations:**  $\lceil \sqrt{n} \rceil$

c.  $f \in \Theta(n^{\frac{1}{2}})$

d. With  $i = 0$ , the  $i$  in loop will be forever 0. This will result in the while loop running indefinitely.

## Question 3