

Collingwood 29

Andre Ye

16 November 2020

6.13a Problem: Simplify as far as possible: $\frac{1}{1+\frac{1}{a}} - \frac{a}{a+1}$.

6.13a Solution: The expression can be simplified as:

$$\begin{aligned} & \frac{1}{1+\frac{1}{a}} - \frac{a}{a+1} \\ &= \frac{1}{1+\frac{1}{a}} \cdot \frac{a}{a} - \frac{a}{a+1} \\ &= \frac{a}{a+1} - \frac{a}{a+1} \\ &= 0 \end{aligned}$$

The simplified expression is $\boxed{0}$.

6.13b Problem: Find a, b, c that simultaneously satisfy these three equations: $a+b-c = 5$, $2a-3b+c = 4$, $a+b+c = -1$.

6.13b Solution: We can find the value of c as follows:

$$\begin{aligned} (a+b-c) &= 5 \\ -(a+b+c) &= -(-1) \\ -2c &= 6 \\ c &= -3 \end{aligned}$$

Then, we find $a+b-c = 5$ and be written as $a+b+3 = 5 \rightarrow a+b = 2 \rightarrow 2a+2b = 4$ and $2a-3b+c = 4$ and be written as $2a-3b-3 = 4 \rightarrow 2a-3b = 7$. We can subtract these equations to form $5b = -3 \rightarrow b = -\frac{3}{5}$. Plugging this into $a+b = 2$, we find that $a = 2 + \frac{3}{5} = \frac{13}{5}$. Therefore, the solutions are:

- $a = \frac{13}{5}$
- $b = -\frac{3}{5}$
- $c = -3$