Name: Wang Yuanxi Student ID: a1805637

Assumptions: Runners who arrived before and after Rachel are non-inclusive of Rachel herself

There were no runners who did not arrive

Model: Let the number of runners who arrived before Rachel = B

Let the number of runners who arrived after Rachel = A

Total number of runners who arrived excluding Rachel is Equation 1.

Equation 1: A + B = 2016 – 1 (Rachel)

The value of B is 4 times that of A.

Equation 2: B = $\frac{1}{4}$ A

Solution: Substitute equation 2 into equation 1: A + $\frac{1}{4}$ A = 2015

$\frac{5}{4}$ A = 2015

A = 1612

1612 runners arrived after Rachel.

B = 2015 – 1612 = 403

There were 403 runners who arrived before Rachel, therefore she arrived in the 404^{th} position.

Discussion: It is crucial that everyone who participated in the marathon arrived for this model to function, or the total number of runners who arrived before or after Rachel would not add up to 2015, and the model would fail.s