**a**. By examining the values of the expression for small values of 𝑛, we have:

For 𝑛 = 1: 1/(1x2) = 1/2

For 𝑛 = 2: 1/(1x2) + 1/(2x3) = 1/2 + 1/6 = 2/3

For 𝑛 = 3: 1/(1x2) + 1/(2x3) + 1/(3x4) = 1/2 + 1/6 + 1/12 = 3/4

Based on these values, the formula for the expression is:

1/2 + 2/3 + 3/4 + ... + 1/n(n+1) = 𝑛/(𝑛+1)

Formula: 𝑛/(𝑛+1)

**b**. Let P(n): 1/2 + 2/3 + 3/4 + ... + 1/n(n+1) = 𝑛/(𝑛+1)

Basis Step:

Let 𝑛 = 1:

L.H.S = 1/2

R.H.S = 1/ (1+2) = ½

L.H.S = R.H.S

Therefore, P(1) is true.

Inductive step:

Inductive hypothesis: Assume P(k) is true.

P(k): 1/2 + 2/3 + 3/4 + ... + 1/k(k+1) = k/(k+1)

Considering 𝑘+1,

P(k+1): 1/2 + 2/3 + 3/4 + ... + 1/k(k+1) + 1/k+1(k+2) = (k+1)/(k+2)

Starting with the left-hand side of the equation:

P(k+1): 1/2 + 2/3 + 3/4 + ... + 1/k(k+1) + 1/(k+1)(k+2)

= [1/2 + 2/3 + 3/4 + ... + 1/k(k+1)] + 1/(k+1)(k+2)

by the induction hypothesis:

= k/(k+1) + 1/(k+1)(k+2)

= [k(k+2)+ 1]/(k+1)(k+2)

= [k^2 +2k + 1]/ (k+1)(k+2)

= [(k+1)(k+1)]/ (k+1)(k+2)

= (k+1)/ (k+2)

Therefore, P(𝑘+1) is true, and by mathematical induction, P(n) is true for all positive integers 𝑛.