

HW 2.4

April 1, 2015 9:08 PM

#2) "Telescoping"

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{19 \times 20}$$

$$\boxed{\frac{1}{n} - \frac{1}{n+1} = \frac{1}{n(n+1)}}$$

$$\frac{1}{3} - \frac{1}{4} = \frac{1}{12}$$

$$\frac{n+1}{n(n+1)} - \frac{n}{n(n+1)}$$

$$\frac{1}{4} - \frac{1}{5} = \frac{1}{4 \times 5}$$

$$\frac{1}{5} - \frac{1}{6} = \frac{1}{5 \times 6}$$

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{19 \times 20}$$

$$\left(\frac{1}{1} - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \left(\frac{1}{4} - \frac{1}{5}\right) + \dots + \left(\frac{1}{19} - \frac{1}{20}\right)$$

$$\boxed{\frac{1}{1} - \frac{1}{20} = \frac{19}{20}}$$

$$\#5) \frac{1}{n(n+3)} = \frac{1}{3} \left(\frac{1}{n} - \frac{1}{n+3} \right)$$

$$\frac{1}{3} \left(\frac{n+3}{n(n+3)} - \frac{n}{n(n+3)} \right)$$

$$\frac{1}{3} \left[\frac{3}{n(n+3)} \right]$$

$$\frac{1}{1 \cdot 4} + \frac{1}{4 \cdot 7} + \frac{1}{7 \cdot 10} + \dots + \frac{1}{298 \cdot 301}$$

$$\frac{1}{3} \left(\frac{1}{1} - \frac{1}{4} \right) + \frac{1}{3} \left(\frac{1}{4} - \frac{1}{7} \right) + \frac{1}{3} \left(\frac{1}{7} - \frac{1}{10} \right) + \dots + \frac{1}{3} \left(\frac{1}{298} - \frac{1}{301} \right)$$

$$\frac{1}{3} \left(\frac{1}{1} - \frac{1}{301} \right) = \frac{1}{3} \left(\frac{300}{301} \right) = \frac{100}{301}$$

$$\boxed{\frac{1}{n(n+a)} = \frac{1}{a} \left[\frac{1}{n} - \frac{1}{n+a} \right]}$$

$$\frac{1}{n(n+a)} = \frac{1}{a} \left[\frac{1}{n} - \frac{1}{n+a} \right]$$

$$12) f(x+y) = f(x) + f(y) + 2(xy)$$

$$f(1) = 4 \quad f(8) = ??$$

$$f(1+1) = f(1) + f(1) + 2(1)(1)$$

$$f(2) = 4 + 4 + 2$$

$$f(2) = 10$$

$$f(2+2) = f(2) + f(2) + 2(2)(2)$$

$$f(4) = 10 + 10 + 8$$

$$f(4) = 28$$

$$f(8) =$$

$$\#(6) \quad \boxed{t_4 = 5}$$

$$\boxed{t_4 = 32}$$

$$t_n - t_{n-1} = 2n + 3$$

$$\boxed{t_5 = 45}$$

45

$$t_n = (2n + 3) + t_{n-1}$$

$$\boxed{t_6 = 60}$$

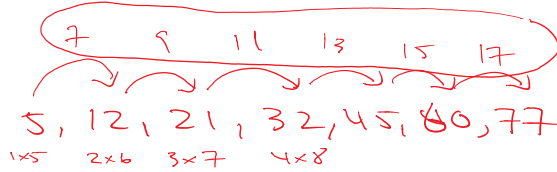
$$t_2 = 2(2) + 3 + 5$$

$$\boxed{t_7 = 77}$$

$$\boxed{t_2 = 12}$$

$$t_3 = 2(3) + 3 + 12$$

$$\boxed{t_3 = 21}$$



$$t_n = n(n+4)$$

$$t_1 = 1 \times 5 = 5 \checkmark$$

$$t_2 = 2(2+4) = 12 \checkmark$$

$$t_3 = 3(3+4) = 21 \checkmark$$

5

$$\boxed{5 + 7}$$

$$5 + 7 + 9$$

$$5 + 7 + 9 + 11$$

$$5 + 7 + 9 + 11 + 13$$

$$t_5 = 5 + \left(\frac{7+13}{2} \right) 4$$

$$t_6 = 5 + \left(\frac{7+15}{2} \right) 5$$

$$t_{10} = 5 + \left(\frac{7 + \text{?}}{2} \right) 49$$