

Week 3  
MATH 34A  
TA: Jerry Luo

10. For each of the values of  $h$  given, when  $x$  is increased from 3 to  $3 + h$ , work out

$$\frac{\text{the change in } x^2}{h}.$$

(a)  $h = 1$

(b)  $h = 0.1$

(c)  $h = 0.01$

(d)  $h = 0.001$

18. (a) If  $a_k = \frac{k(k-1)}{2}$ , then what is  $a_{k+1} - a_k$  in terms of  $k$ ? (Hint: work out  $a_{k+1}$  by replacing  $k$  by  $k + 1$  in the definition of  $a_k$ .)

- (b) Use part (a) and the fact that  $\sum_{n=1}^m (a_{n+1} - a_n) = a_{m+1} - a_1$  to find the following sum (in terms of  $N$ ):  $\sum_{k=0}^N k$ .

- (c) Use part (b) to find the sum of the numbers 1 through 102.

21. Find the following sums:

(a)

$$\sum_{n=1}^{104} 2$$

(b)

$$\sum_{n=1}^7 (n^2)$$

(c)

$$\sum_{k=1}^2 \left( \sum_{n=1}^3 k \cdot n \right)$$

26. How much longer does it take to inflate a balloon to a diameter of 20 inches instead of a diameter of 5 inches. Assume the rate that air enters is constant.