

## TB(1A) Ch. 2 Introduction to Algebra Conventional Questions

### 1. [12-13 Standardized Test 1]

Simplify the following expressions.

(a)  $m \times n - n \times (-m)$

(2 marks)

(b)  $(x + x + x + x) \div (3x - x)$

(2 marks)

### 2. [12-13 Standardized Test 1]

Consider a sequence  $\frac{1}{3}, 0, -\frac{1}{3}, \dots$ ,

(a) what kind of sequence is it?

(1 mark)

(b) write down the fourth and the fifth terms.

(1 mark)

(c) write down the general term of the sequence.

(1 mark)

(d) by setting up an equation, which term is  $-12$  in the sequence?

(2 marks)

### 3. [12-13 Mid-year 3]

It is given that  $V = 2a^2 - b^3$ . Find the value of  $V$  if  $a = 5$  and  $b = -3$ .

(3 marks)

### 4. [12-13 Final Exam 1]

Simplify  $\frac{2}{3}a \times \frac{b}{4} - \frac{b}{9} \div \left(-\frac{2}{a}\right)$ .

(2 marks)

### 5. [13-14 Standardized Test 1]

It is given that  $S = n[2a - (1 - n)p]$ . When  $n = 12$ ,  $a = 2$  and  $p = 3$ , find the value of  $S$ . (2 marks)

### 6. [13-14 Standardized Test 1]

Simplify  $2a^2b \div a - 3a \times 2b$ .

(2 marks)

### 7. [13-14 Standardized Test 1]

Figure 2 shows a sequence of dots.

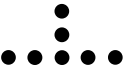
|                                                                                     |                                                                                     |                                                                                     |                                                                                      |                 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------|
|  |  |  |  | ?               |
| 1 <sup>st</sup>                                                                     | 2 <sup>nd</sup>                                                                     | 3 <sup>rd</sup>                                                                     | 4 <sup>th</sup>                                                                      | 5 <sup>th</sup> |

Figure 2

(a) Complete the table below.

(1 mark)

| Figure      | 1 <sup>st</sup> | 2 <sup>nd</sup> | 3 <sup>rd</sup> | 4 <sup>th</sup> | 5 <sup>th</sup> |
|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| No. of dots | 1               | 4               | 7               | 10              |                 |

(b) The number of dots in each pattern shown in Figure 2 forms a sequence. Write down the general term of this sequence.

(1 mark)

(c) Hence, write down the general term of the sequence 1, 16, 49, 100, .....

(1 mark)

**8. [13-14 Final Exam Q3]****(a)** Write down the first 5 terms of a sequence with general term  $2n - 1$ . **(1 mark)****(b)** Let  $y$  be the sum of the first  $n$  terms of the sequence in **(a)**. Fill in the table below. **(1 mark)**

|     |   |   |   |   |   |
|-----|---|---|---|---|---|
| $n$ | 1 | 2 | 3 | 4 | 5 |
| $y$ |   |   |   |   |   |

**(c)** Express  $y$  in terms of  $n$  in the simplest form. **(1 mark)****9. [13-14 Mid-year Exam]**

Simplify the following expressions.

**(a)**  $7 + 6ba^2 + ab + 5ab^2 - 2ab - 8ab^2$  **(2 marks)****(b)**  $-a(3 - a) - 4a$  **(2 marks)****(c)**  $6a^7 \times 8a^2 \div 2a^5$  **(2 marks)****10. [13-14 Mid-year Exam]**

A passenger lift can bear a weight up to 500 kg. Each adult weighs 64 kg and each child weighs half of an adult. There are  $x$  adults and  $y$  children going into the lift at the same time. Their total weight is  $W$  kg.

**(a)** Express  $W$  in terms of  $x$  and  $y$ . **(1 mark)****(b)** Cherry claims that the lift can bear 7 adults and 2 children at the same time. Do you agree? Explain briefly. **(3 marks)****11. [13-14 Mid-year Exam]**

The business class of an Airbus A380 has  $(3x^2 - x + 2)$  rows of seats and each row has  $(2 - 7x)$  seats.

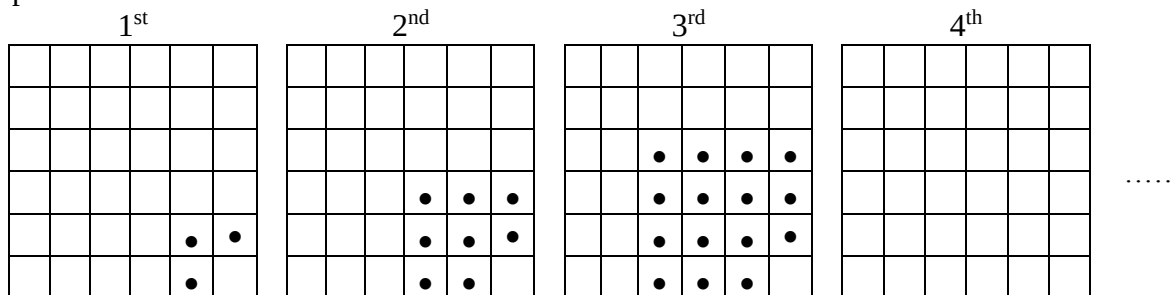
**(a)** Find the number of seats in the business class. Arrange the terms in descending powers of  $x$ . **(3 marks)****(b)** In the peak season, all the seats are fully occupied. Find the total number of passengers in the business class in the peak season if  $x = -1$ . **(2 marks)****12. [13-14 Mid-year Exam]**Consider the sequence  $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \dots$ .**(a)** Determine what kind of sequence it is. **(1 mark)****(b)** Write down the general term of the sequence. **(1 mark)****(c)** Hence, write down the general term of the sequence  $\frac{2}{5}, \frac{2}{11}, \frac{2}{29}, \frac{2}{83}, \dots$ . **(1 mark)****13. [14-15 Mid-year Exam Q11]****(a)** The general term of a sequence is  $0.1n$ . Write down the first 4 terms of the sequence. **(1 mark)****(b)** Write down the general term for each of the following sequences.**(i)**  $-2.9, -2.8, -2.7, -2.6, \dots$  **(1 mark)****(ii)**  $-0.1, 0.2, -0.3, 0.4, \dots$  **(1 mark)**

**14. [14-15 Mid-year Exam]**

The total number of \$10-notes and \$20-notes is 100. The total value of the notes is \$1760. Find the number of \$10-notes and \$20-notes respectively.

**15. [14-15 Final Exam #7]**

The following shows a sequence of figures where dots were put in the grids following a certain pattern.



(a) Draw the pattern in the 4<sup>th</sup> figure with dots. (1 mark)

(b) Complete the table below. (1 mark)

| Figure         | 1 <sup>st</sup> | 2 <sup>nd</sup> | 3 <sup>rd</sup> | 4 <sup>th</sup> | 5 <sup>th</sup> |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Number of dots | 3               |                 |                 |                 |                 |

(c) The number of dots in the above figures forms a sequence. Write down the general term of this sequence. (1 mark)

(d) Write down the number of dots in the 10<sup>th</sup> figure. (1 mark)

**16. [15-16 Mid-year Exam #4]**

The general term of a sequence is  $\frac{1}{3^n}$ .

Write down the first two terms of the sequence. (1 mark)

What kind of sequence is it? (1 mark)

**17. [15-16 Mid-year Exam #5]**

(a) Simplify  $-2a + 8a^3 \div 4a^2$ . (2 marks)

(b) Simplify  $a^3 + 3ab^2 - b^3 - (3b^2a + b^3 - a)$ . (2 marks)

(c) Expand and simplify  $(a+1)(a-2)$ , arrange the terms in ascending powers of  $a$ . (2 marks)

**18. [15-16 Mid-year Exam #9]**

Consider the formula  $y = x(x^2 + 1)$ . Find the value of  $y$  when  $x = -1$ . (3 marks)

**19. [15-16 Mid-year Exam #12]**

It is given that  $a, b, c$  are three consecutive terms of an arithmetic sequence.

(a) Express  $b$  in terms of  $a$  and  $c$ . (1 mark)

(b) If 3,  $x$ ,  $y$ , 39 are four consecutive terms of an arithmetic sequence, write down the values of  $x$  and  $y$ . (1 mark)

**20. [15-16 Final Exam, #1]**

(a) Simplify  $\frac{3x^7 \times 4x^5}{12x^{10}}$ . (1 mark)

(b) Simplify  $5x^2 - 3x + 4 - 2(7x^2 + 2x - 1)$  and arrange the expression in descending powers of  $x$ . (2 marks)

**21. [16-17 Mid-year Exam, #4]**

It is given that  $S = a^2 + ab$ . When  $a = 2$  and  $b = -5$ , find the value of  $S$ . (2 marks)

**22. [16-17 Mid-year Exam, #5]**

Simplify  $-2x + 5y + 7xy - 6y + 3x - 9xy$ . (2 marks)

**23. [16-17 Mid-year Exam, #8]**

(a) Consider the arithmetic sequence 6, 11, 16, 21, write down

(i) the next term, (1 mark)

(ii) the 10<sup>th</sup> term, and (1 mark)

(iii) the general term. (1 mark)

(b) Write down the general term of the sequence 10, 40, 90, 160, .... (1 mark)

**24. [16-17 Final Exam, #1]**

Write down the result of the algebraic expression in each of the following. (2 marks)

(a) Amy has  $x$  candies. John has 15 candies less than twice that of Amy.

John has \_\_\_\_\_ candies.

(b) Multiply  $c$  by the sum of  $a$  and  $b$ , the product is \_\_\_\_\_.

**25. [16-17 Final Exam, #2]**

Given the formula  $M = \frac{b - a^2}{2b}$ , find the value of  $M$  if  $a = -1$  and  $b = 2$ . (2 marks)

~ End ~