

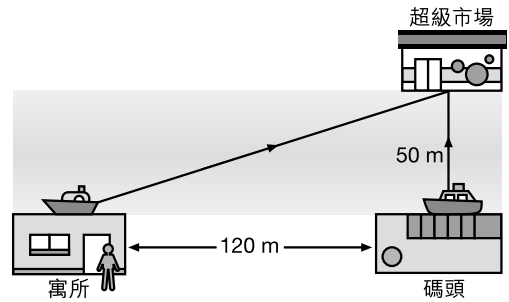
思考站



陳先生想到對岸的超級市場購物。他有兩種到達超級市場的方法：

- (1) 他可以駕駛他的小艇直接由寓所到達超級市場；
- (2) 他可以先跑到碼頭，然後乘搭小船到達超級市場。

若兩船的速率皆為 4 m/s，而他跑步的速率為 6 m/s，哪一種方法較快？



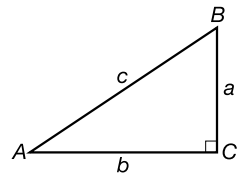
答案：
 寓所至超級市場的距離 = $\sqrt{50^2 + 120^2}$ m = 130 m
 方法 (1) 所需時間 = $(130 \div 4)$ s = 32.5 s
 方法 (2) 所需時間 = $(120 \div 6 + 50 \div 4)$ s = 32.5 s
 \therefore 兩個方法所需時間一樣。

應試錦囊



1. 直角三角形中，斜邊 (hypotenuse) 的長度必為最長。
2. 只有直角三角形方可應用畢氏定理 (Pythagoras' theorem)。

$$c^2 = a^2 + b^2$$



3. 畢氏定理的逆定理 (converse of Pythagoras' theorem) 可用來判斷一個三角形是否為一直角三角形。

3. 累積頻數多邊形是一個表示數據的累積頻數變化的圖像。

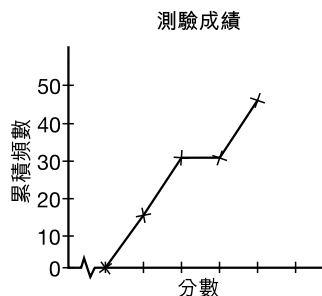
(a) 頻數不斷累積。

(b) 圖像只可向上或向右伸展。

(c) 累積頻數多邊形的最後一點為數據的總數。

(d) 同樣地，如以平滑曲線連結各累積頻數，則可得出累積頻數曲線。

4. 上四分位數 (upper quartile) 及下四分位數 (lower quartile) 分別為累積頻數的第 75 個和第 25 個百分位數 (percentile)，它們的值可在累積頻數多邊形的上觀察得到。



Warm Up Practice



1. Which of the following data can be used to construct a cumulative frequency polygon? Put a tick (✓) for the suitable one.

(a) The lifetime of 100 batteries

(b) The number of different types of vehicles in a car park

(c) The monthly income of a group of workers

(d) The weights of 160 Secondary 2 students

(e) Blood types of patients in a hospital

2. The following shows the heights (in cm) of some basketball players.

170	172	175	168	167	181	179	182	176	175
169	168	169	174	181	162	164	172	172	183

(a) Complete the following frequency distribution table.

Height (cm)	Class boundaries (cm)	Tally	Frequency
161 – 165	160.5 – 165.5	//	2
166 – 170			
171 – 175			
176 – 180			
181 – 185			

Test Your Understanding



Fundamental Stage

A. Multiple-choice Question

1. Which of the following is NOT a common factor of $4ab^2$ and $6ac$?
- A. 2
B. a
C. $2a$
D. ac
- TSA 2.** Which of the following equations is NOT an identity?
- A. $2x + 6 = 2(x + 3)$
B. $x - (y - z) = x - y + z$
C. $(x + 1)^2 = x^2 + 2x + 1$
D. $(2x - 3)^2 = 4x^2 - 9$
3. If $(2x + 3)(x - 5) \equiv Ax^2 + Bx + C$, find C .
- A. -15
B. -5
C. -7
D. 2
4. Which of the following is a factor of $4a^2 - 2a$?
- A. $a^2 - 2$
B. $2a + 1$
C. $2a - 1$
D. $4a$
5. Factorize $p(2a - b) - b + 2a$.
- A. $(p + 1)(2a - b)$
B. $(p - 1)(2a + b)$
C. $(p - 1)(2a - b)$
D. $(p + 1)(2a + b)$
6. Which of the following expressions has $x - 4$ as a factor?
- A. $x^2 - 4$
B. $x^2 + 4x$
C. $x^2 - 4x$
D. $2x - 4$
7. $(2x - 3)^2 =$
- A. $4x^2 - 12x + 9$
B. $4x^2 + 12x + 9$
C. $2x^2 - 12x + 9$
D. $2x^2 - 6x + 9$
8. If $(x - 3)^2 = 10$, then $x^2 + 3x =$
- A. $3x - 1$.
B. $6x + 1$.
C. $9x + 10$.
D. $9x + 1$.
9. Factorize $6ac - 4bc - 3a + 2b$.
- A. $(2c - 1)(3a + 2b)$
B. $(2c - 1)(3a - 2b)$
C. $(2c + 1)(3a - 2b)$
D. $(2c + 1)(3a + 2b)$
10. Factorize $p(a - b) - q(b - a)$.
- A. $(p + q)(a + b)$
B. $(p - q)(a - b)$
C. $(p + q)(a - b)$
D. $(p - q)(a + b)$

33. Evaluate the following expressions without using a calculator.

(a) $195^2 - 5^2$

(b) 1.02^2

34. Evaluate the following expressions without using a calculator.

(a) $1999 \times 1999 - 1999 \times 999$

(b) $941 \times 95 - 941 \times 17 + 941 \times 22$

Advanced Stage

A. Multiple-choice Question

1. $(x + 4 - 2b)(x + 4 + 2b) =$

A. $(x - 4)^2 - 4b^2$

B. $(x + 4)^2 - 2b^2$

C. $(x + 4)^2 - 4b^2$

D. $(x + 4)^2 + 4b^2$

2. Which of the following is/are true?

I. $4a - 2b = -2(b - 2a)$

II. $2a - 1$ is a factor of $b - 2ab$.

III. $a^2 + b^2 = (a + b)^2$

A. I only

B. II only

C. I and II only

D. I, II and III

3. Factorize $u^2 + 9v - uv - 9u$.

A. $(u - v)(u - 3)$

B. $(u - v)(u - 9)$

C. $(u - v)(u + 9)$

D. $(u + v)(u - 9)$

4. Factorize $(x^2 + 8x + 16) - 16y^2$.

A. $(x + 4y - 4)(x + 4y + 4)$

B. $(x - 4y + 4)(x - 4y - 4)$

C. $(x + 4 - 4y)^2$

D. $(x + 4y + 4)(x - 4y + 4)$

DSE 5. Simplify $(3x + y)^2 - (3x - y)^2$.

A. 0

B. $2y^2$

C. $6xy$

D. $12xy$

6. Which of the following is different from the others?

A. $\left(x - \frac{1}{2}y\right)^2$

B. $\left(\frac{1}{2}y - x\right)^2$

C. $- \left(-x + \frac{1}{2}y\right)^2$

D. $x^2 - xy + \frac{1}{4}y^2$



考題趨勢

- DSE 常見題型有兩類：
 1. 取數字的近似值
 2. 應用題，多涉及上限及下限
- DSE 不常見「單獨考核科學記數法」題型

Step-by-Step Demo

A pack of coffee sugar is termed *normal* if its weight is measured as 80 g correct to the nearest g.

- (a) Find the least possible weight of a *normal* pack of coffee sugar.
- (b) Is it possible that the total weight of 45 *normal* packs of coffee sugar is measured as 3.5 kg correct to the nearest 0.1 kg? Explain your answer.
- (5 marks)

Solution:

- (a) Least possible weight = $(80 - 0.5)$ g ◀ 最大絕對誤差 = $1\text{ g} \div 2 = 0.5\text{ g}$ (1 M)
 = 79.5 g (1 M)
- (b) Least possible total weight of 45 *normal* packs of coffee
 = 45×79.5 g (1 M)
 = 3577.5 g (1 M)
 = 3.5775 kg
 = 3.6 (cor. to the nearest 0.1 kg)
 > 3.5 kg
 ∴ It is not possible that the total weight of 45 *normal* packs of coffee sugar is measured as 3.5 kg. (1 M)

參考 DSE 2013 Paper 1 Q8

Exam-type Question

1. The weight of a pack of *standard* salt is measured as 90 g correct to the nearest g.
- (a) Find the least possible weight of a pack of *standard* salt.
- (b) Eric puts 60 packs of standard salt in a bag. He claims that the weight of a bag of salt is 5.3 kg correct to the nearest 0.1 kg. Is he right? Explain your answer.
- (5 marks)
2. $0.007\ 048\ 48 =$
- A. 0.0071 (correct to 2 significant figures)
 B. 0.007 05 (correct to 3 decimal places)
 C. 0.007 048 (correct to 4 significant figures)
 D. 0.007 04 (correct to 5 decimal places)



◀ Open-ended Question
 ◀ 休憩室

Score sheet (Assessment 1)

- Target I: To understand and use the rate and ratio (Chapter 1)
 Target II: To understand the law of indices (Chapter 2)
 Target III: To acquire the concept of approximation and find different types of errors (Chapter 3)
 Target IV: To explore the meaning of identities and techniques of factorization (Chapter 4)
 Target V: To recognize some simple formulas (Chapter 5)
 Target VI: To understand how to construct and interpret simple statistical diagrams and graphs (Chapter 6)

Question	Target	I	II	III	IV	V	VI	Total
Section A (30%)	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							
	11							
	12							
	13							
	14							
	15							
Section B (37%)	16							
	17							
	18							
	19							
	20							
	21							
	22							
	23							
Section C (33%)	24							
	25							
	26							
	Scores							
	☹	0 – 10	0 – 8	0 – 2	0 – 6	0 – 10	0 – 10	0 – 46
	☺	11 – 17	9 – 15	4 – 4	7 – 11	11 – 16	11 – 17	47 – 80
	☺	18 – 21	16 – 18	6 – 6	12 – 14	17 – 20	18 – 21	81 – 100

Key: ☹ Not Yet able to ☺ Beginning to develop the ability to ☺ Generally able to

Assessment 1 (Revision for Chapters 1 – 6)

Time allowed: 1 hour and 30 minutes

Full marks: 100

Answer ALL questions

Section A: Multiple-choice Question (30 marks)

Each question carries 2 marks.

1. If $8x - y = 5y$, find $x : y$.
A. 1 : 2
B. 2 : 1
C. 3 : 4
D. 4 : 3
2. Which of the following speeds is the fastest?
A. 60 km/h
B. 12 m/s
C. 100 m in 1 minute
D. 20 km in 15 minutes
3. If $y : 15 = 2 : 2\frac{2}{3}$, then $y =$
A. $6\frac{2}{3}$.
B. 10.
C. $11\frac{1}{4}$.
D. 12.
4. If n is a positive integer, then $3^{3n} \cdot 8^n =$
A. 6^n .
B. 6^{3n} .
C. 24^n .
D. 24^{3n} .
5. Which of the following is not an even number?
A. $2A_{(16)}$
B. $C_{(16)}$
C. $10101_{(2)}$
D. $74_{(10)}$
6. $BE000001040_{(16)} =$
A. $11(16^{10}) + 14(16^9) + 260$
B. $11(16^{10}) + 14(16^9) + 4160$
C. $12(16^{11}) + 15(16^{10}) + 4160$
D. $11(16^{11}) + 14(16^{10}) + 4160$
7. How many significant figures are there in 0.00 308 0?
A. 3
B. 4
C. 6
D. 7
8. The mean diameter of the Earth is 12 700 km correct to the nearest 100 km. Find the percentage error of this measurement correct to 3 significant figures.
A. 0.39%
B. 0.394%
C. 0.787%
D. 0.79%