



### 思考站

某基金投資公司的李主任正在向陳先生推銷基金。

李主任：「我們現正代理兩種新推出的保證基金，回報率如下：

- (1) 生物科技基金 —— 每年保證有 4% 的複式增長；
- (2) 環球債券基金 —— 保證 3 年後有 15% 的增長。」

陳先生：「我打算投資三年，該買哪一種基金呢？」



答案：  
 $(1 + 4\%)^3 \approx 1.125 > 1 + 15\%$   
 ∴ 應購買 (2) 環球債券基金



### 學習錦囊

1. 利息的利率一般以年利率 (p.a.) 計算，所以時期需以年為單位。
2. 計算複利息時，若利息不是每年結算一次，則需注意在公式中  $A = P \times (1 + r\%)^n$ ， $r\%$  及  $n$  的變化。  
 例：若本金 = \$4000，年利率 = 6%，年期 = 3 年，複利息每半年結算一次，則

$$r\% = 6\% \times \frac{6}{12} = 3\% \text{ (因每次只可得到全年利息的一半)}$$

$$n = 6\% \times 3 = 6 \text{ (因每年計算利息 2 次，共有 3 年)}$$



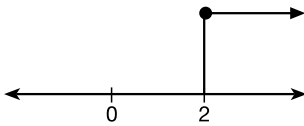
# Test Your Understanding



## Fundamental Stage

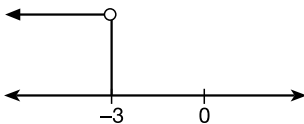
### A. Multiple Choice Question

1. The following graph represents the inequality



- A.  $x > 2$ .  
 B.  $x \geq 2$ .  
 C.  $x < 2$ .  
 D.  $x \leq 2$ .

2. The following graph represents the inequality



- A.  $x > -3$ .  
 B.  $x \geq -3$ .  
 C.  $x < -3$ .  
 D.  $x \leq -3$ .

3. If  $a > b > 0$ , which of the following may not be true?

- A.  $-2a < -2b$   
 B.  $\frac{a}{3} > \frac{b}{3}$   
 C.  $(1 - a)(1 - b) < 0$   
 D.  $1 - a < 1 - b$

4. How many positive integers satisfy the inequality  $x \leq \frac{5\pi}{2}$ ?

- A. 6  
 B. 7  
 C. 8  
 D. 9

5. Which of the following numbers does not satisfy the inequality  $x > \sqrt{7}$ ?

- A. 2.65  
 B.  $\frac{8}{3}$   
 C.  $\frac{3\pi}{2}$   
 D.  $\frac{9}{4}$

6. Suppose  $0 < a < b < 1$ . Which of the following is false?

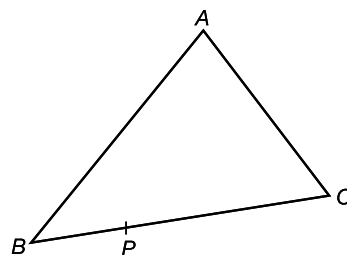
- A.  $ab > 1$   
 B.  $2a < 2b$   
 C.  $\frac{1}{a} > \frac{1}{b}$   
 D.  $b - a > 0$



## Open-ended Question

1. The figure shows a triangle  $ABC$ .  $P$  is an arbitrary point on  $BC$ .

Write down as many as inequalities in relating the line segments in the figure.



2. (a) Construct a triangle such that its circumcentre lie on one side of the triangle.  
(b) Construct the corresponding circumcircle of the triangle in (a).



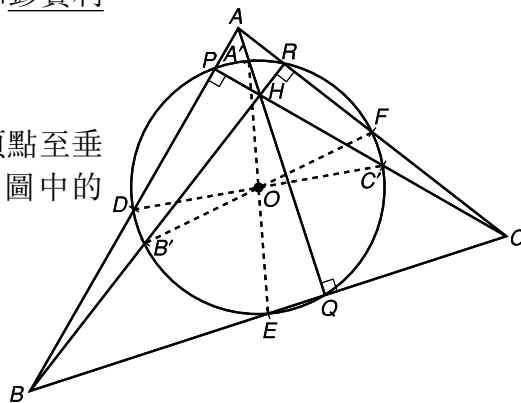
## 休憩室

### 九點圓

九點圓是一個十分著名的定理，其內容與三角形的中線及頂垂線有關。此定理最初由英國數學家培亞敏·俾幾 (Benjamin Beven) 於 1804 年提出。而到了 1820 年，兩位法國數學家熱而工 (Charles-Julien Brianchon) 和彭賽利 (Jean-Victor Poncelet) 一起證明了此定理。

九點圓的定理如下：

一個三角形的三個垂足、三邊的中點及三個由頂點至垂心的連線的中點，這九點能被同一圓通過，即圖中的  $C'$ 、 $Q$ 、 $E$ 、 $B'$ 、 $D$ 、 $P$ 、 $A'$ 、 $R$  及  $F$  九點。



## Important Term

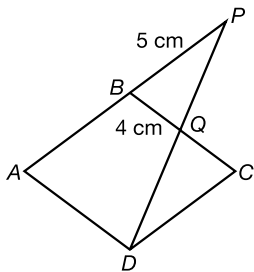
altitude (頂垂線 / 高)  
angle bisector (角平分線)  
centroid (形心)  
circumcentre (外心)  
concurrent (共點)

incentre (內心)  
median (中線)  
orthocentre (垂心)  
perpendicular bisector (垂直平分線)  
triangle inequality (三角形不等式)

# Advanced Stage

## A. Multiple Choice Question

1. In the figure,  $ABCD$  is a rhombus and  $ABP$  is a straight line.  $DP$  is a line cutting  $BC$  at  $Q$ . If  $BQ = 4$  cm and  $BP = 5$  cm, find  $AB$ .



- A. 12 cm  
B. 15 cm  
C. 16 cm  
D. 20 cm



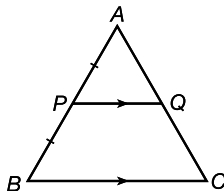
2. Which of the following about a rhombus is false?

- A. The opposite sides are parallel.  
B. The diagonals are not equal.  
C. The diagonals are perpendicular to each other.  
D. Its four angles are equal.



3. In the figure,  $AP = PB$  and  $PQ \parallel BC$ . Which of the following may be false?

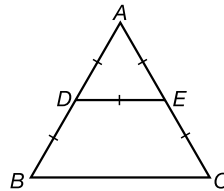
- I.  $AQ = QC$   
II.  $2PQ = BC$   
III.  $AQ = PQ$



- A. I only  
B. II only  
C. III only  
D. II and III only



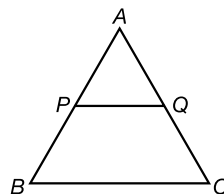
4. In the figure,  $AD = DE = DB = AE = EC$ , which of the following is false?



- A.  $DE \parallel BC$   
B.  $2DE = BC$   
C.  $\angle ADE = 60^\circ$   
D. None of the above



5. Which condition(s) is/are sufficient to show that  $PQ = \frac{1}{2} BC$ ?

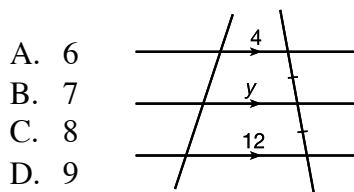


- I.  $AP = PB$  and  $AQ = QC$   
II.  $AP = PB$  and  $PQ \parallel BC$   
III.  $AP : PB = AQ : QC$  and  $PQ \parallel BC$

- A. I only  
B. I and II only  
C. I and III only  
D. I, II and III



6. Find the value of  $y$  in the following figure.



- A. 6  
B. 7  
C. 8  
D. 9



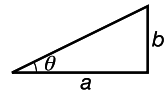


## Warm Up Practice

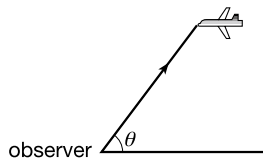


### Important Formulas and Terms:

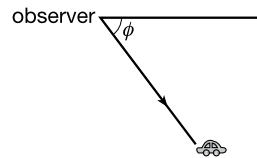
1. Gradient of an inclined road =  $\frac{\text{Vertical rise}}{\text{Horizontal distance}}$   
 $= \frac{b}{a} = \tan \theta = 1 : n$



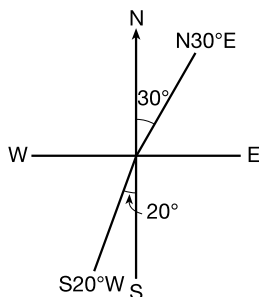
2. (a) Angle of elevation:  $\theta$



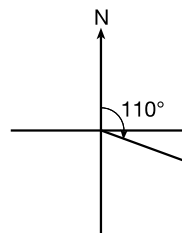
(b) Angle of depression:  $\phi$



3. (a) Compass bearing  
Measured from the  
North or South

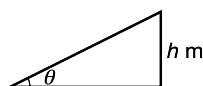


(b) True bearing  
Measured from the North  
in clockwise direction



1. State whether each of the following statements is true (T) or false (F).

(a) In the figure, a slide make an angle  $\theta$  with the horizontal and its height is  $h$  m. The length of the slide is  $h \sin \theta$  m.



(a) \_\_\_\_\_

(b) If the angle of elevation of  $A$  from  $B$  is  $20^\circ$ , then the angle of depression of  $B$  from  $A$  is also  $20^\circ$ .

(b) \_\_\_\_\_

14. What of the following points is at a distance of 10 units from  $A(8, 2)$ ?

- A.  $(8, 0)$
- B.  $(0, 8)$
- C.  $(18, 12)$
- D.  $(0, 4)$



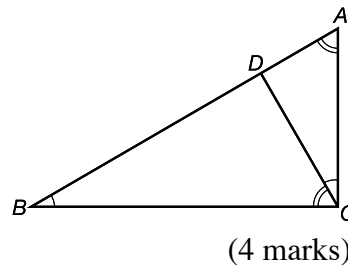
15. If  $M(2, 4)$  is the mid-point of  $A(-2, 8)$  and  $B$ , the coordinates of  $B$  are

- A.  $(0, 6)$ .
- B.  $(6, 0)$ .
- C.  $(-6, 0)$ .
- D.  $(-2, 2)$ .



Section B: Short Question (37 marks)

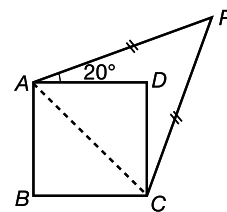
16. The figure shows a triangle  $ABC$ .  $\angle DBC = \angle DCA$  and  $\angle DCB = \angle DAC$ . If  $ADB$  is a straight line, show that  $CD$  is an altitude on  $AB$  of the triangle.



17. In the figure,  $ABCD$  is a square and  $PA = PC$ .

If  $\angle PAD = 20^\circ$ , find

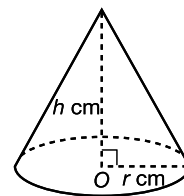
- (a)  $\angle PAC$ ;
- (b)  $\angle APC$ .



(5 marks)

18. In the figure, the volume of a cone is  $96\pi \text{ cm}^3$  and  $h : r = 4 : 3$ .

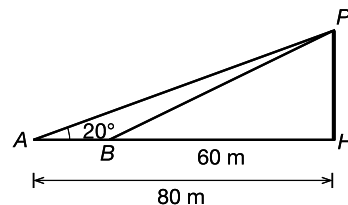
- (a) Find the values of  $h$  and  $r$ .
- (b) Find the curved surface area of the cone in terms of  $\pi$ .



(6 marks)

19. In the figure, the angle of elevation of the top of the pole from  $A$  is  $20^\circ$ . If  $AH = 80 \text{ m}$  and  $HB = 60 \text{ m}$ , find

- (a) the height of the pole;
  - (b) the angle of elevation of  $P$  from  $B$ .
- (Give the answers correct to 3 significant figures.)

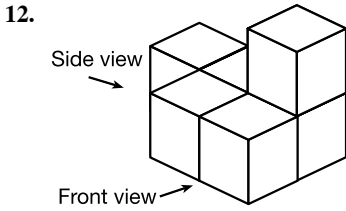
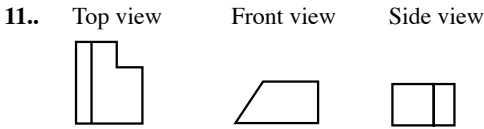


(5 marks)

# 成績指標

1. 同學完成每課練習後，請計算自己所得的分數。
2. 得分計算方法：每題練習答對可得 1 分，答錯得 0 分。  
如該題分為數個部分，則每部分答對可得 1 分。  
例 1：第 1 章的基礎題，所包含的短題目中的第 12 題有 (a) – (d) 4 部分，故第 12 題的總分為 4 分。  
例 2：第 1 章的基礎題，所包含的短題目中的第 22 題並沒有分為數部分，故第 22 題的總分為 1 分。
3. 同學們可參考下列積分表，評估個人的成績。

| 章節         | 日期 |    | 你的表現如何？請加上「✓」號。 |      |      |
|------------|----|----|-----------------|------|------|
|            | 開始 | 完成 | 表現良好            | 繼續努力 | 有待改善 |
| Chapter 1  |    |    |                 |      |      |
| Chapter 2  |    |    |                 |      |      |
| Chapter 3  |    |    |                 |      |      |
| Chapter 4  |    |    |                 |      |      |
| Chapter 5  |    |    |                 |      |      |
| Chapter 6  |    |    |                 |      |      |
| Chapter 7  |    |    |                 |      |      |
| Chapter 8  |    |    |                 |      |      |
| Chapter 9  |    |    |                 |      |      |
| Chapter 10 |    |    |                 |      |      |
| Chapter 11 |    |    |                 |      |      |



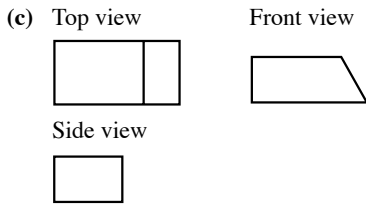
13. (a)  $AE$  is perpendicular to the plane  $EFGH$ .  
 $\therefore$  The angle between  $AE$  and  $EG$  is  $90^\circ$ .  
 (b)  $FA = AH = FH$   
 $\therefore \triangle FAH$  is an equilateral triangle.  
 $\therefore$  The angle between  $FA$  and  $HA$  is  $60^\circ$ .  
 (c)  $\angle GBF$  is the required angle.  
 $\therefore \angle GBF = 45^\circ$

14. (a)  $F$                       (b)  $BF$   
 (c)  $\angle DBF$                 (d)  $\angle DCF$   
 (e)  $\angle DCF$

15. (a) (i)  $HF$                       (ii)  $EH$   
 (b) (i)  $\angle BCG/\angle ADH$       (ii)  $\angle CGA$

16. (a)  $\angle APC$   
 (b)  $\triangle PBC$  is an equilateral triangle.  
 $\therefore \angle BPC = 60^\circ$   
 (c)  $RB$  and  $RC$  where  $R$  is the mid-point of  $BD$  and  $AC$ .  
 (d)  $\angle BRC = 90^\circ$   
 No, the angles are not equal.  
 (e)  $\angle PSR$  where  $S$  the mid-point of  $BC$ .

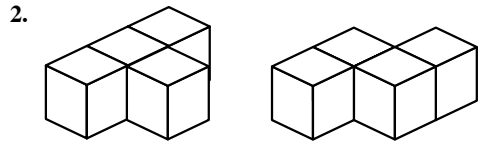
17. (a) 1  
 (b)  $F = 6, V = 8, E = 12$   
 $F + V - E = 6 + 8 - 12$   
 $= 2$



18. (a) (i) Pentagonal pyramid  
 (ii) Octahedron  
 (b) (i) 5  
 (ii) 5  
 (c) (i)  $F = 6, E = 10$   
 (ii)  $F = 8, E = 12$   
 (d) (i)  $F + V - E = 6 + 6 - 10 = 2$   
 (ii)  $F + V - E = 8 + 6 - 12 = 2$

**Open-ended Question**

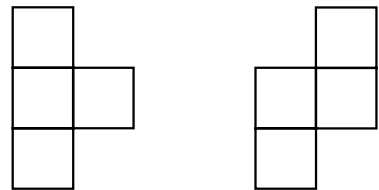
1. Any reasonable answers



Both have same side view and front view



But their top views are different:



(or other reasonable answers.)