

## DSE Must-Win Pack

- 1 DSE Tips for Junior Sec Difficulties ..... P.2
- 2 DSE Training of Questions without Figures  
Provided ..... P.20
- 3 DSE Paper 2 Skills ..... P.39



\*Both Chinese and English versions of the materials are available:



# 1 DSE Tips for Junior Sec Difficulties

The following tips are excerpted from the supplement **DSE Junior Sec Foundation Topics Supplement** of ‘Senior Secondary Oxford Mathematics for the New Century’.

## Contents

<b>Introduction</b> .....	P.2
<b>Chapter 6 Section 6.2 Mensuration (Advanced)</b> .....	P.3

## Introduction

**DSE Junior Sec Foundation Topics Supplement** is specially designed in accordance with Senior Secondary Oxford Mathematics for the New Century. It aims to help students revise foundation topics learnt in junior secondary level.

Each chapter consists of the following parts:

- (i) **Key Review** — concise notes for revision
- (ii) **Exercise A** — abundant exam-type *Conventional Questions* with public *Exam References* for practice
- (iii) **Exercise B** — abundant exam-type *MC Questions* with public *Exam References* for practice

Name: \_\_\_\_\_

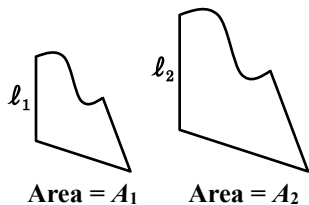
Class: \_\_\_\_\_ ( )

## DSE Topics Supplement

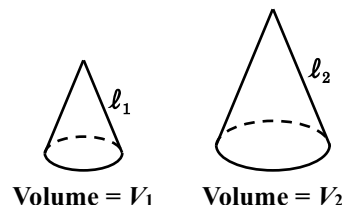
### 6.2 Mensuration (Advanced) Junior Sec Foundation Topics

#### Similar Plane Figures and Similar Solids

(i)  $\frac{A_1}{A_2} = \left(\frac{\ell_1}{\ell_2}\right)^2$

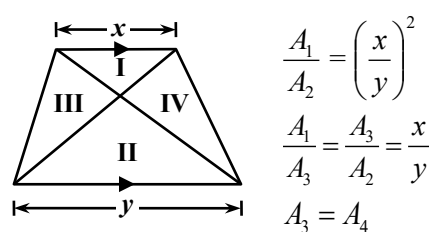
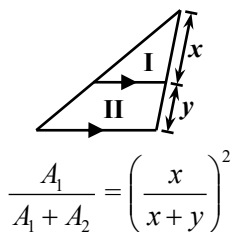
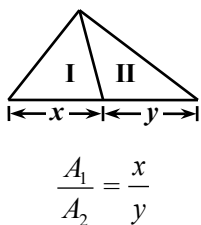
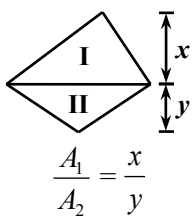


(ii)  $\frac{V_1}{V_2} = \left(\frac{\ell_1}{\ell_2}\right)^3$



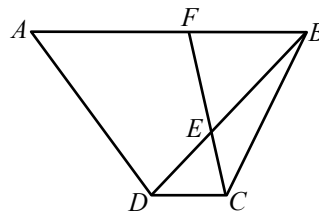
#### Important Exam Skills

Let  $A_1$  = area of I,  $A_2$  = area of II,  $A_3$  = area of III and  $A_4$  = area of IV.



#### Example

In the figure,  $ABCD$  is a trapezium with  $AB \parallel DC$  and  $AB : DC = 7 : 2$ .  $F$  is a point on  $AB$  such that  $AF : FB = 4 : 3$ .  $BD$  and  $CF$  intersect at  $E$ . If the area of  $\triangle CDE$  is  $16 \text{ cm}^2$ , find the area of  $ADEF$ .



#### Solution

Join  $DF$ . Note that  $BCDF$  is a trapezium with  $FB : DC = 3 : 2$ .

$$\frac{\text{Area of } \triangle DEF}{16 \text{ cm}^2} = \frac{3}{2}$$

$$\text{Area of } \triangle DEF = 24 \text{ cm}^2$$

$$\frac{\text{Area of } \triangle BEF}{16 \text{ cm}^2} = \left(\frac{3}{2}\right)^2$$

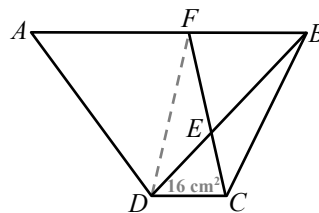
$$\text{Area of } \triangle BEF = 36 \text{ cm}^2$$

$$\frac{\text{Area of } \triangle ADF}{\text{Area of } \triangle BDF} = \frac{AF}{FB}$$

$$\frac{\text{Area of } \triangle ADF}{(24 + 36) \text{ cm}^2} = \frac{4}{3}$$

$$\text{Area of } \triangle ADF = 80 \text{ cm}^2$$

$$\text{Area of } ADEF = (80 + 24) \text{ cm}^2 = \underline{104 \text{ cm}^2}$$























Name: \_\_\_\_\_

Class: \_\_\_\_\_ ( )

**DSE Topics Supplement****6.2 Mensuration (Advanced)** **Junior Sec** **Foundation Topics****Exercise 6.2B MC Questions**

1. If the volume of a right circular cone of base radius  $4x$  cm and height  $5y$  cm is  $160 \text{ cm}^3$ , then the volume of a right circular cylinder of base radius  $5x$  cm and height  $4y$  cm is

- A.  $480 \text{ cm}^3$ .
- B.  $600 \text{ cm}^3$ .
- C.  $960 \text{ cm}^3$ .
- D.  $1\,800 \text{ cm}^3$ .

**Exam Reference**

HKDSE 2022 (Paper 2) Q15  
HKDSE 2020 (Paper 2) Q16  
HKDSE 2017 (Paper 2) Q15

2. The radius of a solid hemisphere and the base radius of a solid right circular cone are equal. If the base diameter of the circular cone is 1.5 times its height, then the ratio of the total surface area of the hemisphere to the total surface area of the circular cone is

- A. 1 : 4.
- B. 2 : 5.
- C. 9 : 5.
- D. 9 : 8.

**Exam Reference**

HKDSE 2022 (Paper 2) Q15  
HKDSE 2020 (Paper 2) Q16  
HKDSE 2017 (Paper 2) Q15

3. The scale of a map is 1 : 40 000. If the area of a lake on the map is  $500 \text{ cm}^2$ , then the actual area of the lake is

- A.  $0.8 \text{ km}^2$ .
- B.  $20 \text{ km}^2$ .
- C.  $80 \text{ km}^2$ .
- D.  $200 \text{ km}^2$ .

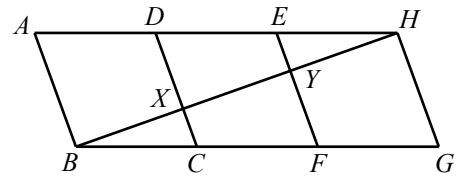
**Exam Reference**

HKDSE 2020 (Paper 2) Q10  
HKDSE 2017 (Paper 2) Q11  
HKDSE 2013 (Paper 2) Q12

4. The actual area of a park is  $15\,000\text{ m}^2$ . If the area of the park on a map is  $24\text{ cm}^2$ , then the scale of the map is
- A. 1 : 16.  
 B. 1 : 256.  
 C. 1 : 2 500.  
 D. 1 : 6 250 000.

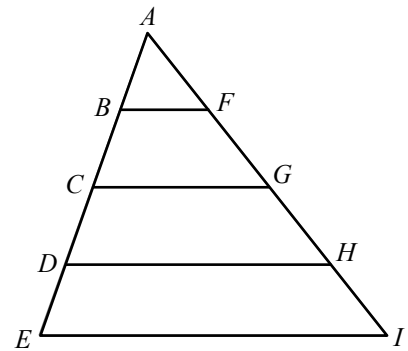
**Exam Reference**  
 HKDSE 2020 (Paper 2) Q10  
 HKDSE 2017 (Paper 2) Q11  
 HKDSE 2013 (Paper 2) Q12

5. In the figure,  $ABCD$ ,  $CDEF$  and  $EFGH$  are rhombus.  $BH$  cuts  $CD$  and  $EF$  at  $X$  and  $Y$  respectively. Find the ratio of the area of quadrilateral  $FGHY$  to the area of quadrilateral  $ABGH$ .
- A. 1 : 4  
 B. 2 : 7  
 C. 5 : 18  
 D. 9 : 28



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q17  
 HKDSE 2016 (Paper 2) Q20

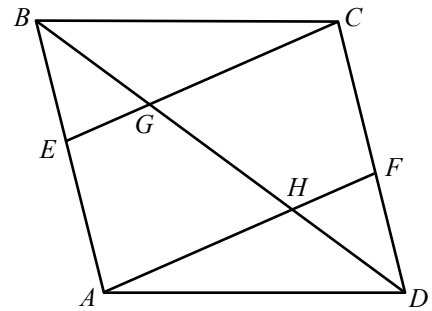
6. In the figure,  $B$ ,  $C$  and  $D$  are points lying on  $AE$  while  $F$ ,  $G$  and  $H$  are points lying on  $AI$  such that  $AB = BC = CD = DE$  and  $BF \parallel CG \parallel DH \parallel EI$ . The ratio of the area of the trapezium  $BCGF$  to the area of the trapezium  $DEIH$  is
- A. 1 : 2.  
 B. 1 : 4.  
 C. 2 : 5.  
 D. 3 : 7.



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q17  
 HKDSE 2016 (Paper 2) Q20

7. In the figure,  $ABCD$  and  $AECF$  are parallelograms.  $E$  is a point lying on  $AB$  such that  $AE : EB = 5 : 4$ .  $BD$  cuts  $EC$  and  $AF$  at  $G$  and  $H$  respectively. If the area of  $\triangle ADH$  is  $36 \text{ cm}^2$ , then the area of the quadrilateral  $CFHG$  is

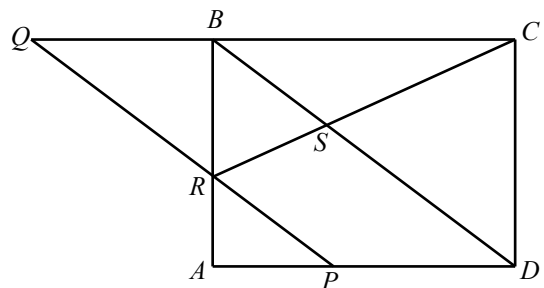
- A.  $65 \text{ cm}^2$ .
- B.  $81 \text{ cm}^2$ .
- C.  $101 \text{ cm}^2$ .
- D.  $117 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

8. In the figure,  $ABCD$  is a rectangle. Let  $P$  be a point lying on  $AD$  such that  $AP : PD = 2 : 3$ .  $CB$  is produced to the point  $Q$  such that  $QB = PD$ . Denote the point of intersection of  $AB$  and  $QP$  by  $R$ . It is given that  $BD$  and  $RC$  intersect at the point  $S$ . If the area of  $\triangle APR$  is  $32 \text{ cm}^2$ , then the area of  $\triangle CDS$  is

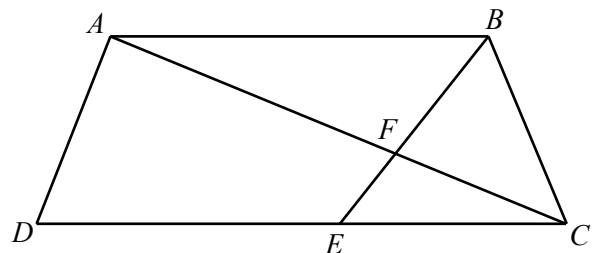
- A.  $75 \text{ cm}^2$ .
- B.  $120 \text{ cm}^2$ .
- C.  $125 \text{ cm}^2$ .
- D.  $200 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

9. In the figure,  $ABCD$  is a trapezium where  $AB \parallel DC$ .  $E$  is a point on  $DC$  such that  $AB : CE : DE = 5 : 3 : 4$ . If  $BE$  and  $AC$  intersect at  $F$  such that the area of  $\triangle BFC$  is  $60 \text{ cm}^2$ , find the area of the quadrilateral  $ADEF$ .

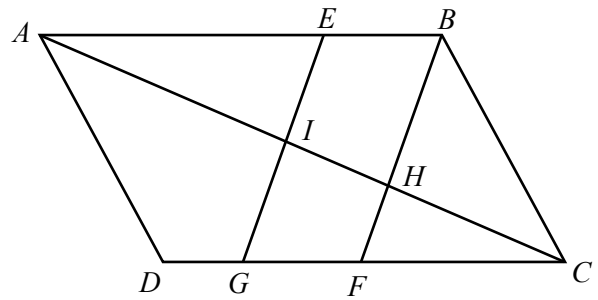
- A.  $88 \text{ cm}^2$
- B.  $124 \text{ cm}^2$
- C.  $188 \text{ cm}^2$
- D.  $224 \text{ cm}^2$



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

- 10.** In the figure,  $ABCD$  is a parallelogram.  $E$  is a point lying on  $AB$  such that  $AE : EB = 7 : 3$ .  $F$  and  $G$  are points lying on  $CD$  such that  $BFGE$  is a parallelogram and  $F$  is the mid-point of  $CD$ .  $EG$  and  $BF$  cut  $AC$  at  $I$  and  $H$  respectively. If the area of  $\triangle BCH$  is  $100 \text{ cm}^2$ , then the area of  $\triangle AEI$  is

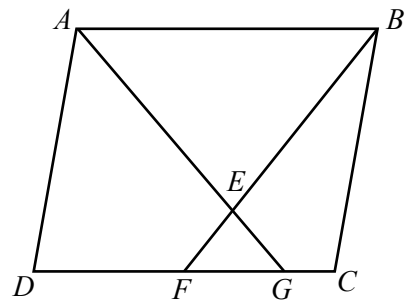
- A.  $98 \text{ cm}^2$ .
- B.  $100 \text{ cm}^2$ .
- C.  $140 \text{ cm}^2$ .
- D.  $147 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

- 11.** In the figure,  $ABCD$  is a parallelogram.  $F$  and  $G$  are points on  $DC$  such that  $DF : FG : GC = 3 : 2 : 1$ .  $AG$  cuts  $BF$  at  $E$ . If the area of the quadrilateral  $BCGE$  is  $1265 \text{ cm}^2$ , then the area of  $\triangle EBA$  is

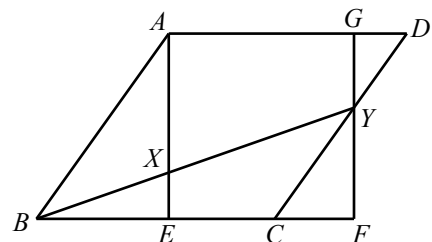
- A.  $1980 \text{ cm}^2$ .
- B.  $2277 \text{ cm}^2$ .
- C.  $2530 \text{ cm}^2$ .
- D.  $3036 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

- 12.** In the figure,  $ABCD$  is a parallelogram and  $AEFG$  is a square. It is given that  $BE : EC : CF = 5 : 4 : 3$ . Denote the point of intersection of  $CD$  and  $FG$  by  $Y$ .  $AE$  and  $BY$  intersect at  $X$ . If the area of  $\triangle DGY$  is  $16 \text{ cm}^2$ , then the area of the quadrilateral  $CYXE$  is

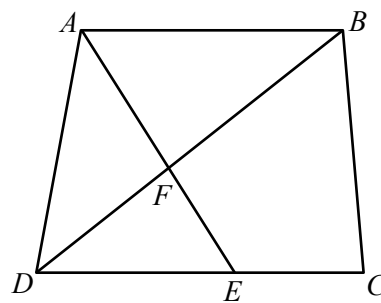
- A.  $36 \text{ cm}^2$ .
- B.  $48 \text{ cm}^2$ .
- C.  $75 \text{ cm}^2$ .
- D.  $83 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

- 13.** In the figure,  $ABCD$  is a trapezium, where  $AB \parallel DC$  and  $AB : DC = 4 : 5$ .  $E$  is a point on  $DC$  such that  $DE : EC = 3 : 2$ .  $AE$  and  $BD$  intersect at  $F$ . If the area of  $\triangle AFD$  is  $108 \text{ cm}^2$ , then the area of the quadrilateral  $BCEF$  is

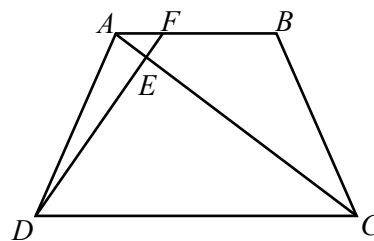
- A.**  $180 \text{ cm}^2$ .  
**B.**  $234 \text{ cm}^2$ .  
**C.**  $261 \text{ cm}^2$ .  
**D.**  $315 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

- 14.** In the figure,  $ABCD$  is a trapezium with  $AB \parallel DC$  and  $AB : DC = 1 : 2$ .  $F$  is a point lying on  $AB$  such that  $AF : FB = 1 : 3$ .  $E$  is the point of intersection of  $DF$  and  $AC$ . If the area of  $\triangle CED$  is  $64 \text{ cm}^2$ , then the area of  $ABCD$  is

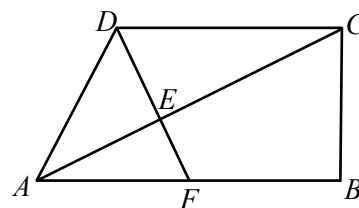
- A.**  $96 \text{ cm}^2$ .  
**B.**  $105 \text{ cm}^2$ .  
**C.**  $108 \text{ cm}^2$ .  
**D.**  $128 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

- 15.** In the figure,  $ABCD$  is a trapezium with  $AB \parallel DC$  and  $AB : DC = 4 : 3$ .  $F$  is the mid-point of  $AB$ .  $AC$  and  $DF$  intersect at  $E$ . If the area of  $\triangle ADE$  is  $24 \text{ cm}^2$ , then the area of  $ABCD$  is

- A.**  $\frac{340}{3} \text{ cm}^2$ .  
**B.**  $140 \text{ cm}^2$ .  
**C.**  $160 \text{ cm}^2$ .  
**D.**  $180 \text{ cm}^2$ .



**Exam Reference**  
 HKDSE 2020 (Paper 2) Q18  
 HKDSE 2019 (Paper 2) Q16  
 HKDSE 2017 (Paper 2) Q16

**Answers****6.2 Mensuration (Advanced)****Exercise 6.2A**

1. (a)  $2\,304\pi\text{ cm}^3$   
(b) no
2. (a) 16 cm  
(b) no  
(c) no
3. (a)  $48\text{ cm}^3$   
(b)  $864\text{ cm}^2$
4. (a)  $3\,200\text{ cm}^3$   
(b)  $360\text{ cm}^2$
5. (a)  $2\,240\pi\text{ cm}^3$   
(b)  $408\pi\text{ cm}^2$
6. (a)  $2\,592\pi\text{ cm}^3$   
(b) no
7. (a)  $1\,296\pi\text{ cm}^2$   
(b)  $7\,812\pi\text{ cm}^3$
8. (a)  $144\pi\text{ cm}^3$   
(b)  $783\pi\text{ cm}^2$
9. (a) 27 cm  
(b) no
10. (a)  $3\,888\pi\text{ cm}^3$   
(b) 36 cm  
(c) no

**Exercise 6.2B**

- |       |       |
|-------|-------|
| 1. B  | 2. D  |
| 3. C  | 4. C  |
| 5. C  | 6. D  |
| 7. A  | 8. C  |
| 9. C  | 10. A |
| 11. B | 12. D |
| 13. B | 14. C |
| 15. B |       |

## 2 DSE Training of Questions without Figures Provided

The following training is excerpted from the supplement **DSE Sketch it Out Practice** of ‘Senior Secondary Oxford Mathematics for the New Century’.

### Contents

<b>Introduction</b> .....	P.20
<b>Chapter 3 Special Lines and Centres of Triangles (excerpt)</b> .....	P.22

### Introduction


**DSE Sketch it Out Practice** is specially designed in accordance with ‘Senior Secondary Oxford Mathematics for the New Century’ Series. It aims to help students tackle problems on coordinate geometry in which figures are not given. It covers topics from basic concepts (e.g. points and lines) to complicated questions (e.g. circles and centres of triangles).

Each chapter consists of the following parts:

- (i) **Example** — guided example with ‘Points to Note’
- (ii) **Instant Drill** — questions similar to the example for students to try
- (iii) **Integrated Exercise** — questions which require several skills learnt in the examples

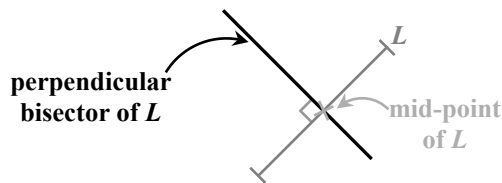
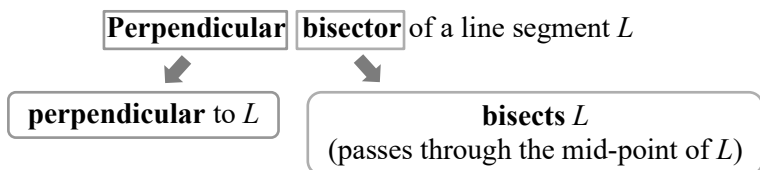
Listed below are the topics of DSE Sketch it Out Practice.

Chapter	Section	Objectives	Related Content
1. Points	1.1 Position of a Point in a Rectangular Coordinate Plane	- Identify the quadrant and position in which a point lies	Junior Secondary Topics
	1.2 Transformation of a Point	- Translation, reflection and rotation of a point	
	1.3 Objects involving Two Points	- Identify two points on a vertical/horizontal line - Identify relative position between two points	
	1.4 Objects involving Three or More Points	- Identify triangles and calculate their areas - Identify special quadrilaterals and calculate their areas	
2. Lines	2.1 Sketching Straight Lines	- Sketch a vertical / horizontal line - Sketch an oblique line	Book 4A Chapter 2 Equations of Straight Lines
	2.2 Parallel Lines	- Sketch parallel lines	
	2.3 Perpendicular Lines	- Sketch perpendicular lines	
	2.4 Linear Inequalities in Two Unknowns	- Sketch the required solution region	Book 6 Chapter 3 Linear Inequalities in Two Unknowns and Linear Programming
	2.5 Linear Programming	- Sketch the required feasible region and find the maximum/minimum value	

Chapter	Section	Objectives	Related Content
3. Special Lines and Centres of Triangles 	3.1 Angle Bisectors and Incentres	- Sketch the angle bisectors and the incentre of a triangle	Junior Secondary Topics & Book 4A Chapter 2 Equations of Straight Lines
	3.2 Perpendicular Bisectors and Circumcentres	- Sketch the perpendicular bisectors and the circumcentre of a triangle	
	3.3 Medians and Centroids	- Sketch the medians and the centroid of a triangle	
	3.4 Altitudes and Orthocentres	- Sketch the altitudes and the orthocentre of a triangle	
4. Parabolas	4.1 Parabolas in the form $y = ax^2 + bx + c$	- Sketch a parabola according to its features	Book 4A Chapter 5 Quadratic Functions
	4.2 Parabolas in the form $y = a(x - h)^2 + k$	- Sketch a parabola according to its features	
5. Locus	5.1 A Moving Point Maintains a Fixed Distance from a Point	- Sketch the required locus (a circle)	Book 5B Chapter 7 Locus
	5.2 A Moving Point Equidistant from Two Points	- Sketch the required locus (the perpendicular bisector)	
	5.3 A Moving Point Maintains a Fixed Distance from a Line	- Sketch the required locus (a pair of straight lines)	
	5.4 A Moving Point Maintains an Equal Distance from Two Parallel Lines	- Sketch the required locus (a straight line)	
	5.5 A Moving Point Maintains an Equal Distance from Two Intersecting Lines	- Sketch the required locus (the angle bisectors)	
6. Circles	6.1 One Circle	- Sketch a circle (standard form / general form)	Book 5B Chapter 8 Equations of Circles
	6.2 Two Circles	- Sketch two circles and identify their relations	
	6.3 A Circle and a Straight Line	- Sketch a straight line and a circle with two points of intersection - Sketch a circle and its tangent	

# Chapter 3 Special Lines and Centres of Triangles

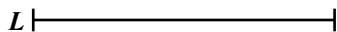
## 3.2 Perpendicular Bisectors and Circumcentres



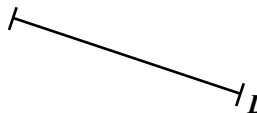
### Example 1

In each of the following, draw the perpendicular bisector of the line segment  $L$ .

(a)



(b)

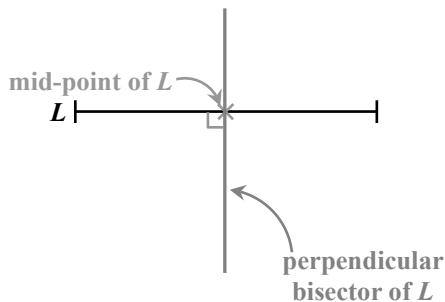


### → Solution

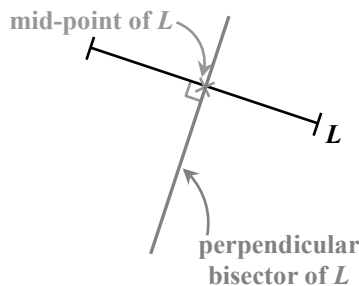
★ Points to note:

- ① Locate the mid-point of  $L$ .
- ② Draw a line:
  - perpendicular to  $L$ , and
  - passing through the mid-point of  $L$ .

(a)



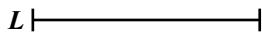
(b)



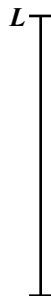
**Instant Drill 1.1**

In each of the following, draw the perpendicular bisector of the line segment  $L$ .

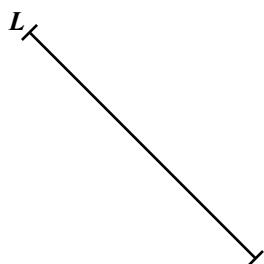
(a)



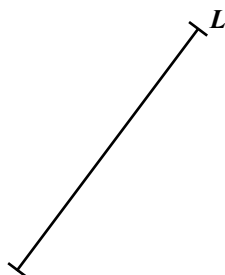
(b)



(c)



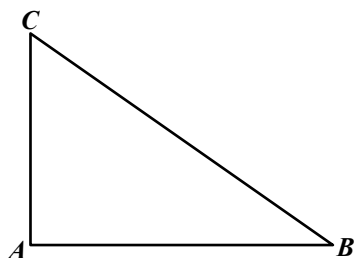
(d)



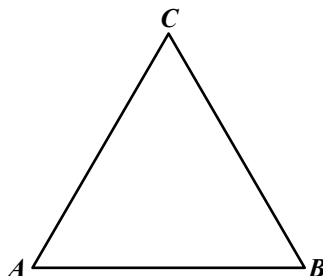
**Instant Drill 1.2**

In each of the following, draw the perpendicular bisector of the side  $AB$  of  $\triangle ABC$ .

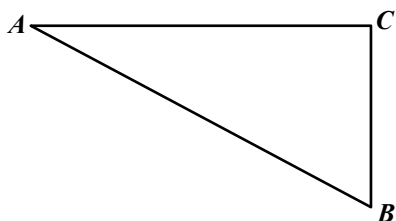
(a)



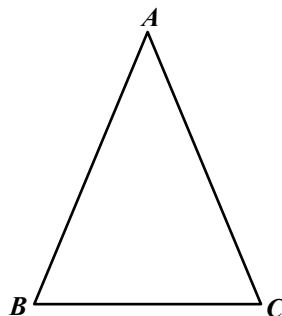
(b)



(c)



(d)



**Example 2**

In each of the following, draw the line segment  $AB$  and the perpendicular bisector of  $AB$  on a graph paper.

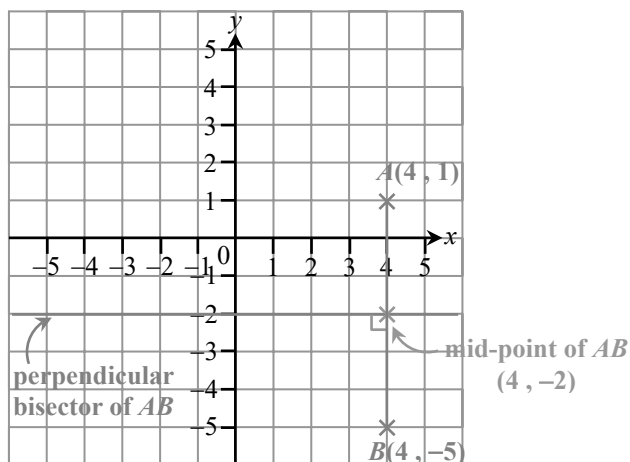
(a)  $A(4, 1), B(4, -5)$

(b)  $A(1, 1), B(5, 5)$

**→ Solution**

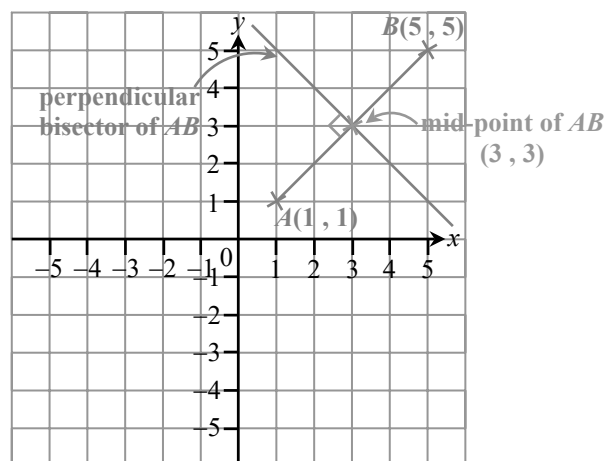
(a) \* Points to note:

- $AB$  is a vertical line segment.
- The perpendicular bisector of  $AB$  is a horizontal line.



(b) \* Points to note:

- The slope of  $AB$  is positive.
- The slope of the perpendicular bisector of  $AB$  is negative.



**Instant Drill 2.1**

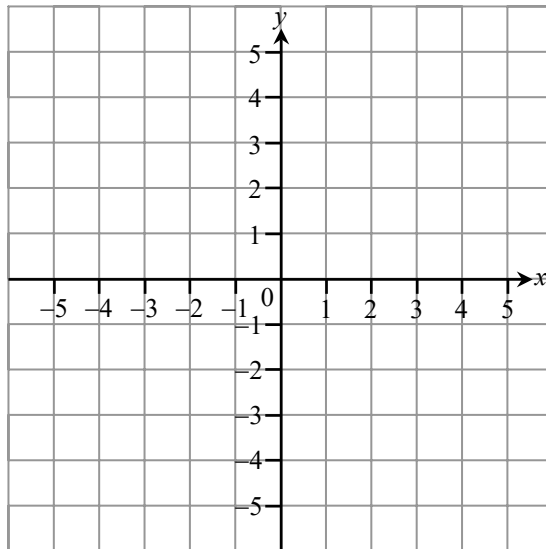
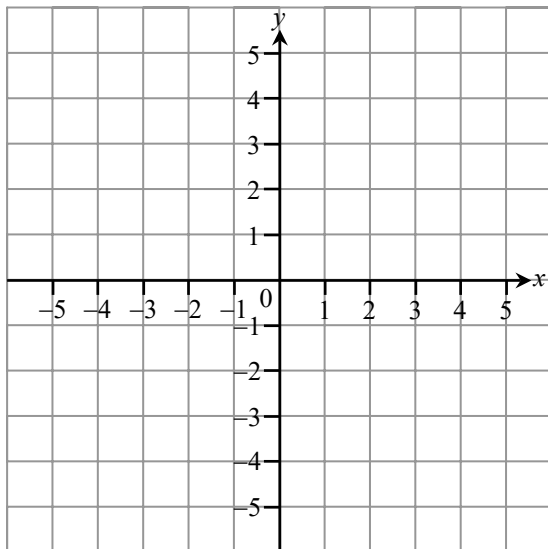
In each of the following, draw the line segment  $AB$  and the perpendicular bisector of  $AB$  on a graph paper.

**(a)**  $A(2, -1), B(2, -5)$

**(b)**  $A(1, -3), B(5, -3)$

Key Point

- What are the coordinates of the mid-point of  $AB$ ?
- Is the perpendicular bisector of  $AB$  vertical or horizontal?

**Instant Drill 2.2**

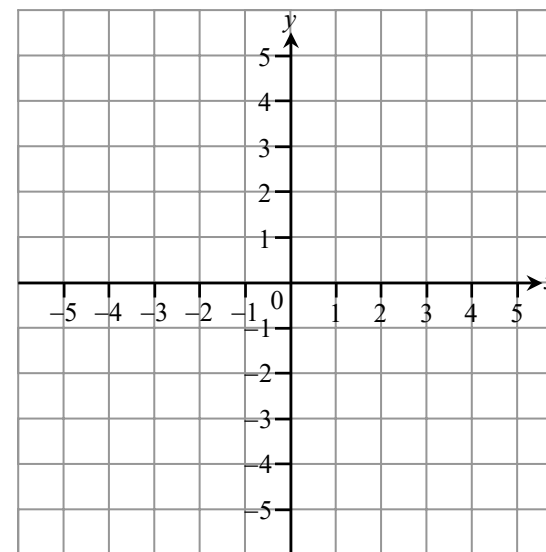
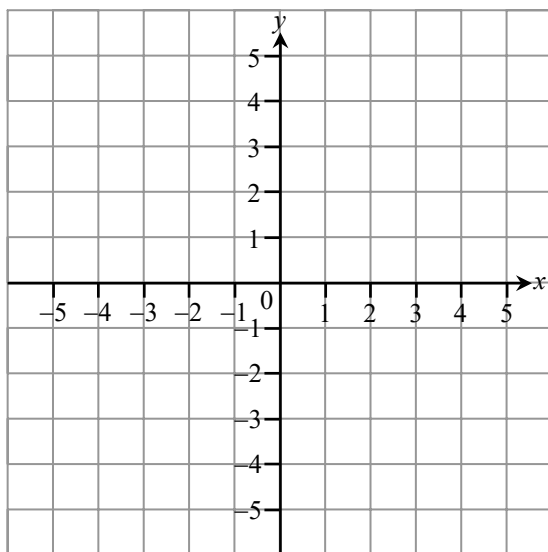
In each of the following, draw the line segment  $CD$  and the perpendicular bisector of  $CD$  on a graph paper.

**(a)**  $C(-3, 3), D(1, -1)$

**(b)**  $C(0, -4), D(4, 0)$

Key Point

- What are the coordinates of the mid-point of  $CD$ ?
- Is the slope of the perpendicular bisector of  $CD$  positive or negative?



**Example 3**

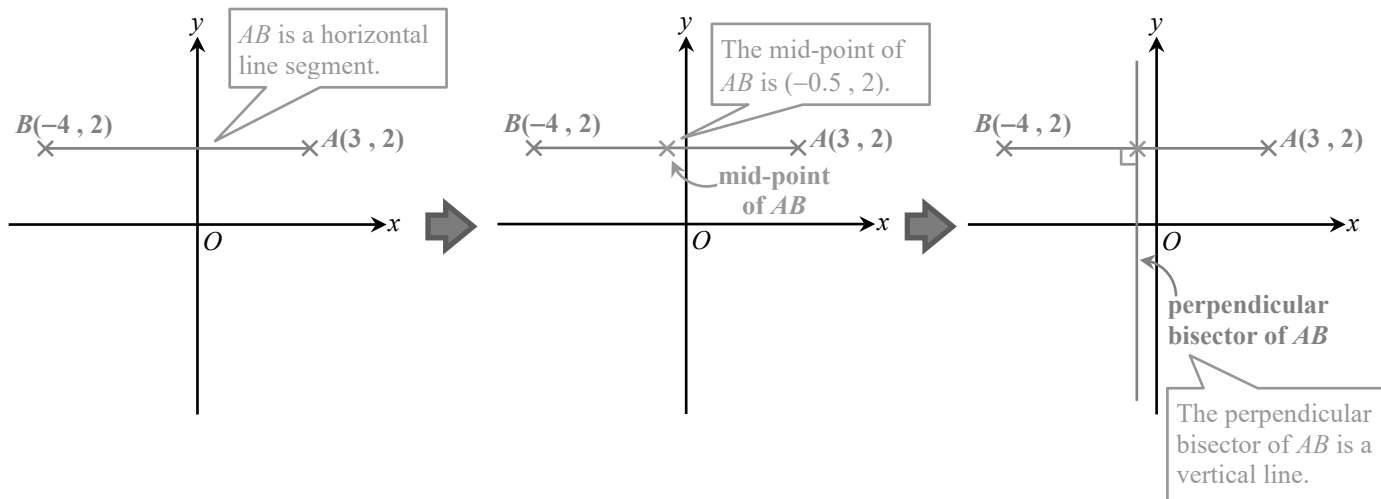
In each of the following, sketch the line segment  $AB$  and the perpendicular bisector of  $AB$  on a graph.

(a)  $A(3, 2), B(-4, 2)$

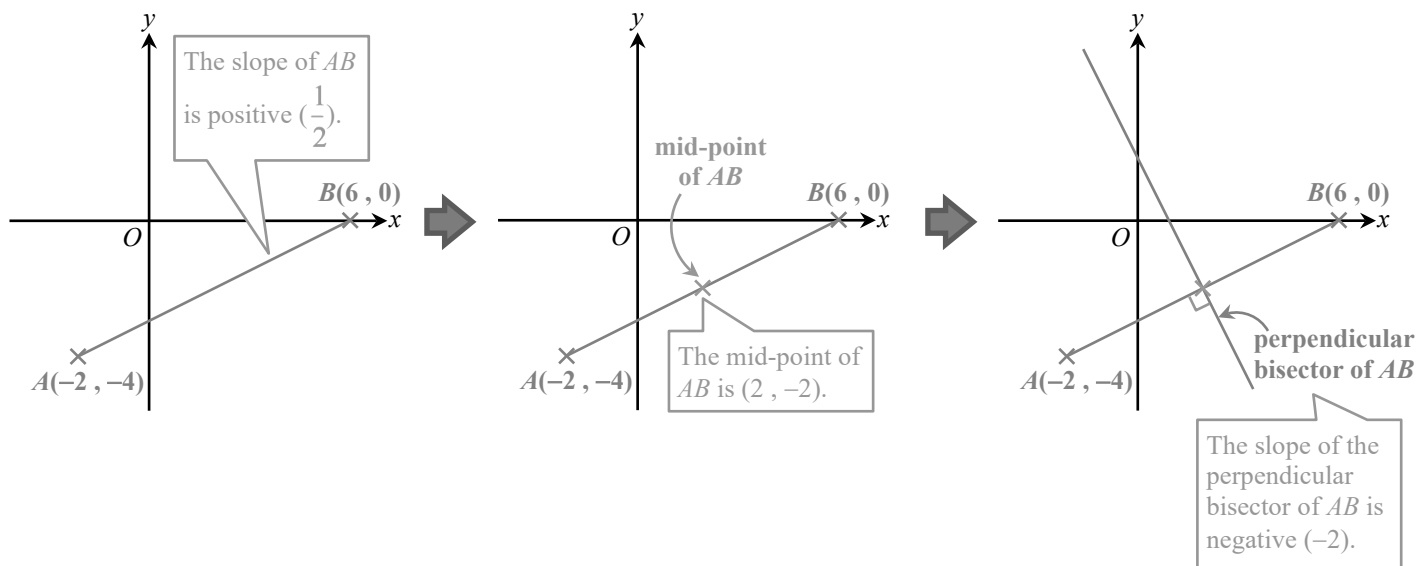
(b)  $A(-2, -4), B(6, 0)$

→ **Solution**

(a)



(b)



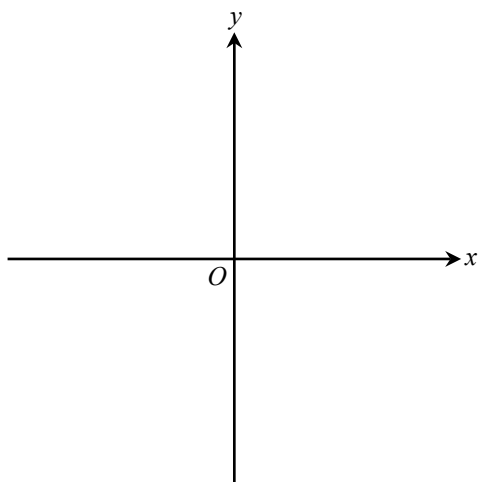
**Instant Drill 3.1**

In each of the following, sketch the line segment  $AB$  and the perpendicular bisector of  $AB$  on the graph provided.

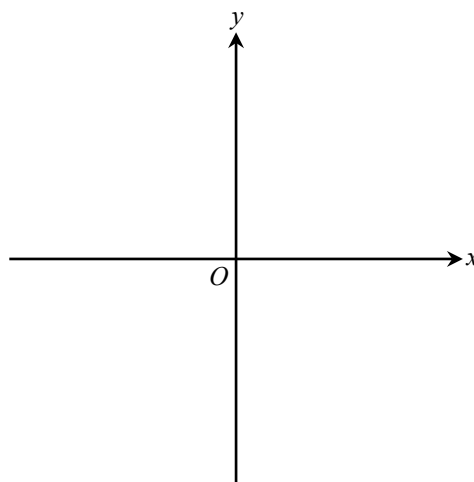
★ Key Point

- What are the coordinates of the mid-point of  $AB$ ?
- Is the perpendicular bisector of  $AB$  vertical or horizontal?

(a)  $A(0, 1), B(4, 1)$



(b)  $A(-2, -3), B(-2, 5)$

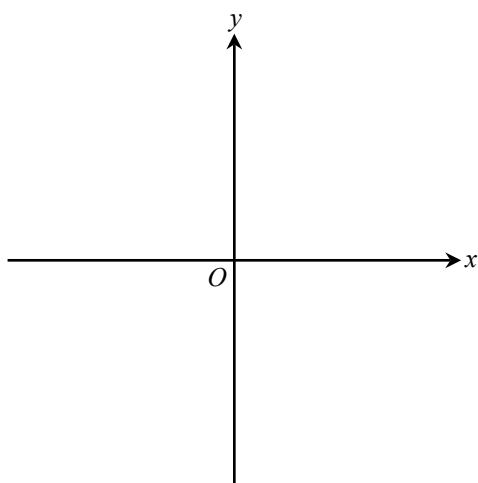
**Instant Drill 3.2**

In each of the following, sketch the line segment  $CD$  and the perpendicular bisector of  $CD$  on the graph provided.

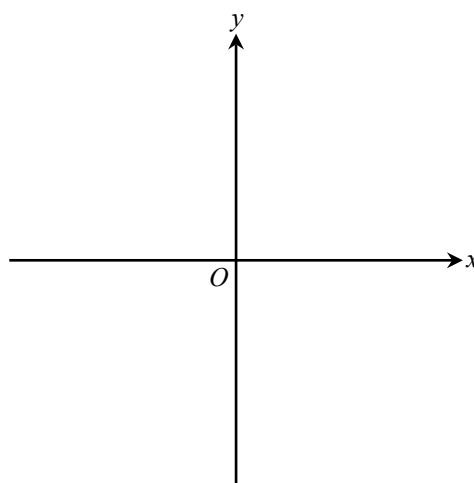
★ Key Point

- What are the coordinates of the mid-point of  $CD$ ?
- Is the slope of the perpendicular bisector of  $CD$  positive or negative?

(a)  $C(0, 2), D(4, 0)$



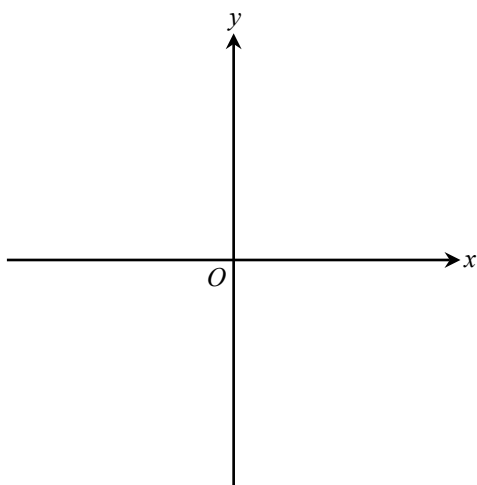
(b)  $C(3, -1), D(5, 1)$



**Instant Drill 3.3**

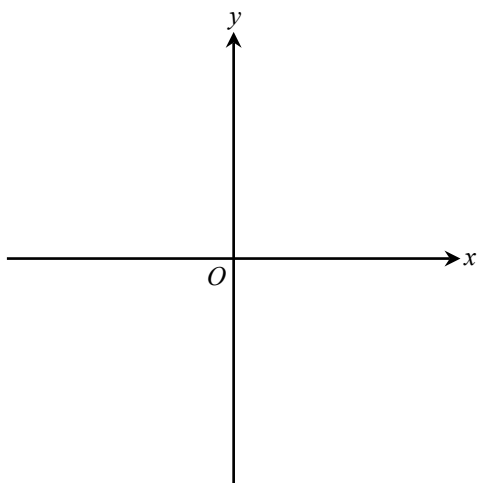
The straight line  $L: 2x + 3y - 6 = 0$  cuts the  $x$ -axis and  $y$ -axis at  $A$  and  $B$  respectively.

- (a) Sketch  $L$  on the graph provided.  
(b) Sketch the perpendicular bisector of  $AB$  on the same graph.

**Instant Drill 3.4**

The straight line  $L: 3x - 5y + 15 = 0$  cuts the  $x$ -axis and  $y$ -axis at  $C$  and  $D$  respectively.

- (a) Sketch  $L$  on the graph provided.  
(b) Sketch the perpendicular bisector of  $CD$  on the same graph.



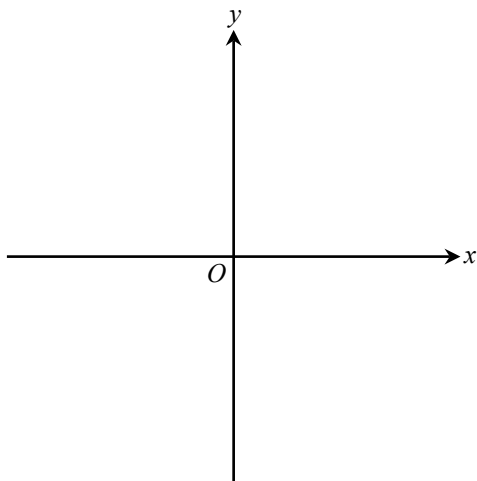
**Instant Drill 3.5**

A straight line  $L$  passes through  $E(3, 1)$  and the slope of  $L$  is 2.  $L$  cuts the  $y$ -axis at  $F$ .

- (a) Sketch  $L$  on the graph provided.  
(b) Sketch the perpendicular bisector of  $EF$  on the same graph.

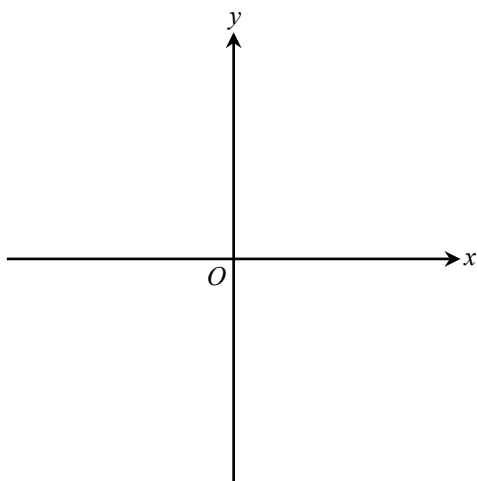
**Key Point**

- Note that the slope of  $L > 1$ .  
Does  $F$  lie on the positive  $y$ -axis or the negative  $y$ -axis?

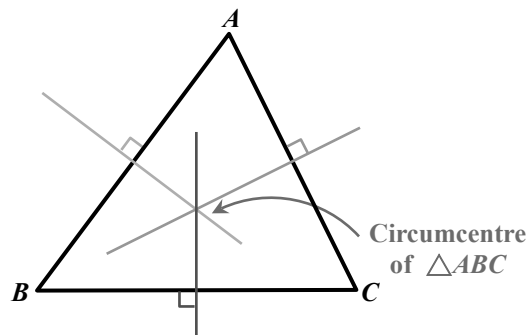
**Instant Drill 3.6**

A straight line  $L$  passes through  $G(-2, 6)$  and the slope of  $L$  is  $-\frac{2}{3}$ .  $L$  cuts the  $x$ -axis at  $H$ .

- (a) Sketch  $L$  on the graph provided.  
(b) Sketch the perpendicular bisector of  $GH$  on the same graph.

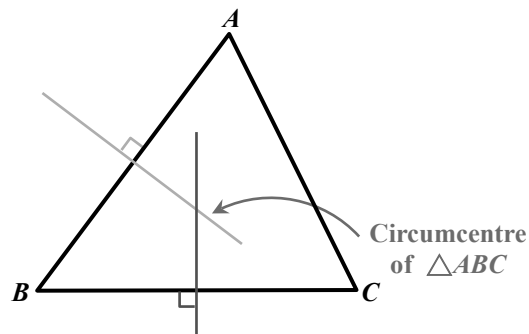


**Circumcentre of  $\triangle ABC$**   
 ↓  
 Point of intersection of the  
**3 perpendicular bisectors of  $\triangle ABC$**



**Note:**

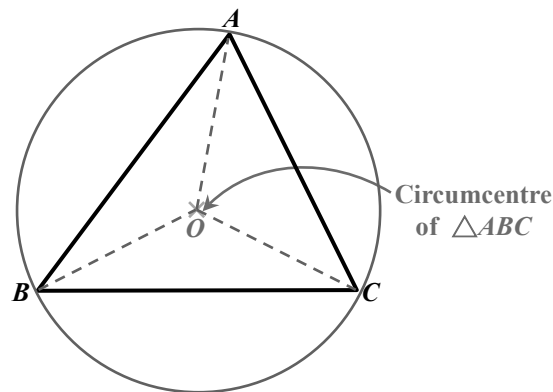
1. To locate the circumcentre of a triangle, we only need to draw 2 of the perpendicular bisectors.



2. We can draw a circle with the **circumcentre as the centre** that **passes through the three vertices** of the triangle.

This circle is called the **circumcircle** of the triangle.

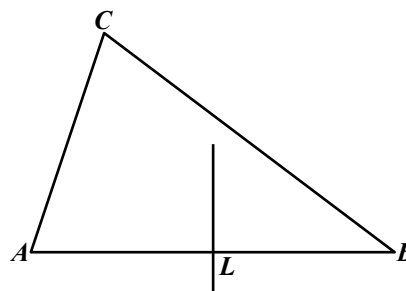
In the figure,  $OA = OB = OC =$  radius of the circumcircle.



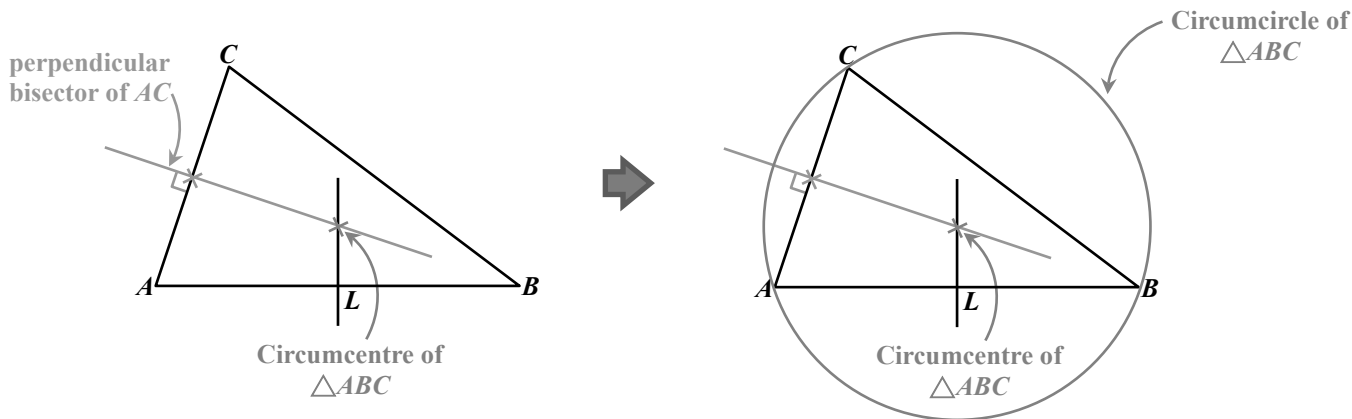
3.	Acute-angled triangle	Obtuse-angled triangle	Right-angled triangle
	<p style="text-align: center;"><b>circumcentre</b></p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;">                     The circumcentre lies inside the triangle.                 </div>	<p style="text-align: center;"><b>circumcentre</b></p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;">                     The circumcentre lies outside the triangle.                 </div>	<p style="text-align: center;"><b>circumcentre</b></p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;">                     The circumcentre lies at the mid-point of the hypotenuse.                 </div>

**Example 4**

In the figure,  $L$  is the perpendicular bisector of  $AB$ .  
 Draw the circumcentre and circumcircle of  $\triangle ABC$ .

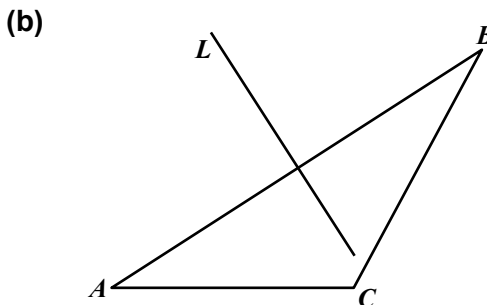
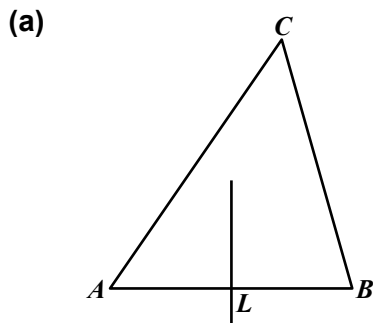


→ **Solution**



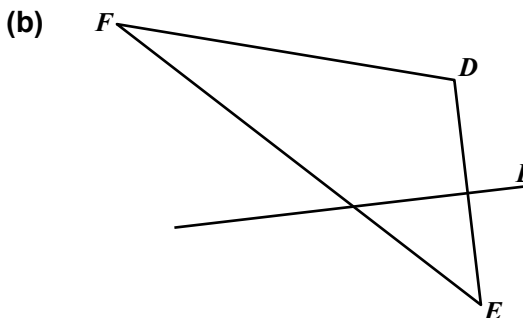
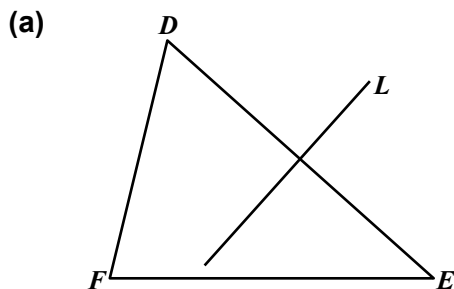
**Instant Drill 4.1**

In each of the following,  $L$  is the perpendicular bisector of  $AB$ . Draw the circumcentre of  $\triangle ABC$ .



**Instant Drill 4.2**

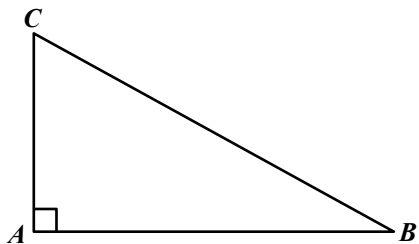
In each of the following,  $L$  is the perpendicular bisector of  $DE$ . Draw the circumcentre and circumcircle of  $\triangle DEF$ .



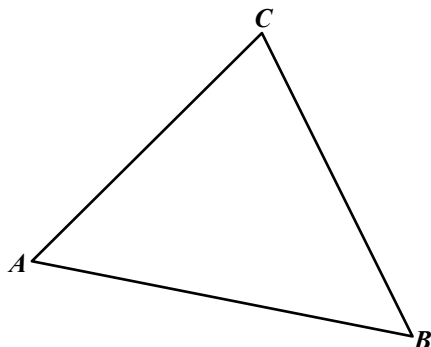
**Example 5**

In each of the following, draw the circumcentre of  $\triangle ABC$ .

(a)  $\angle BAC = 90^\circ$



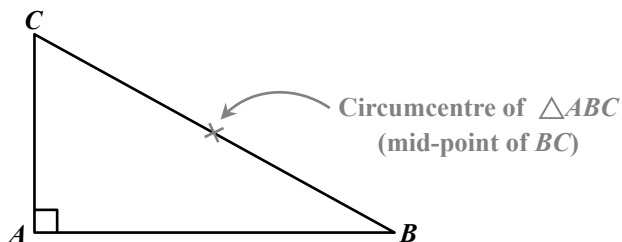
(b)



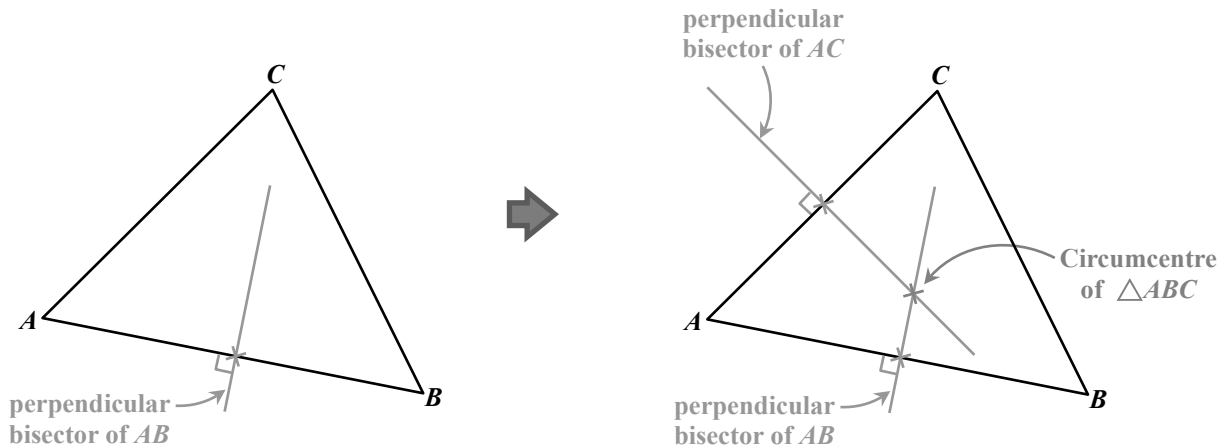
**Solution**

(a) **Key Point**

As  $\triangle ABC$  is a right-angled triangle, the circumcentre lies at the mid-point of the hypotenuse  $BC$ .



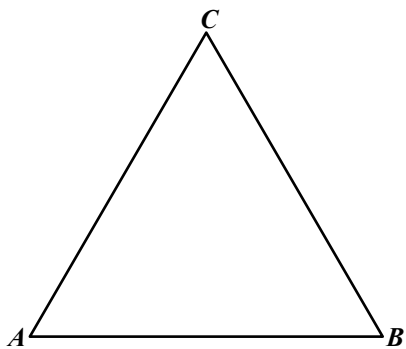
(b)



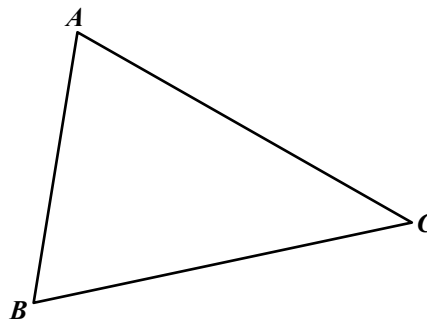
**Instant Drill 5.1**

In each of the following, draw the circumcentre of  $\triangle ABC$ .

(a)

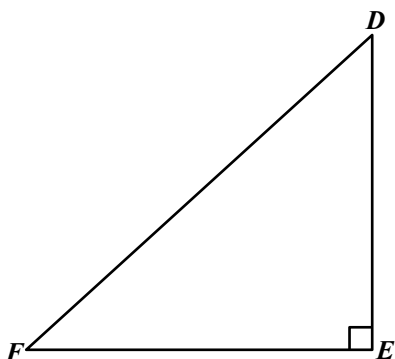


(b)

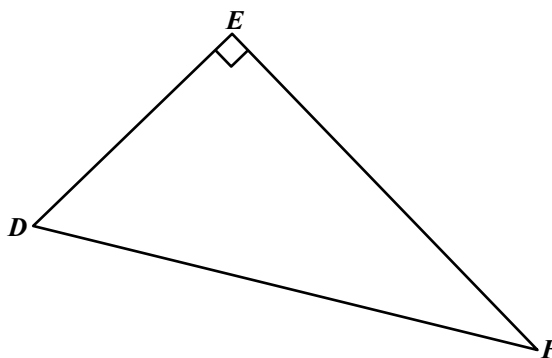
**Instant Drill 5.2**

In each of the following, draw the circumcentre of  $\triangle DEF$ , where  $\angle DEF = 90^\circ$ .

(a)

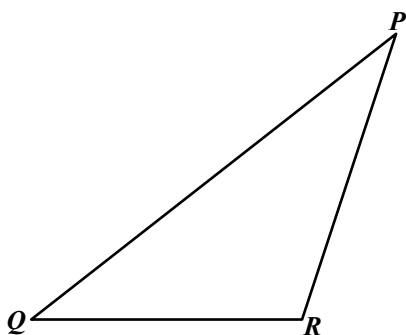


(b)

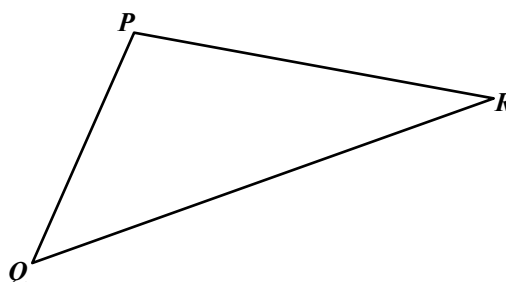
**Instant Drill 5.3**

In each of the following, draw the circumcentre of  $\triangle PQR$ .

(a)



(b)

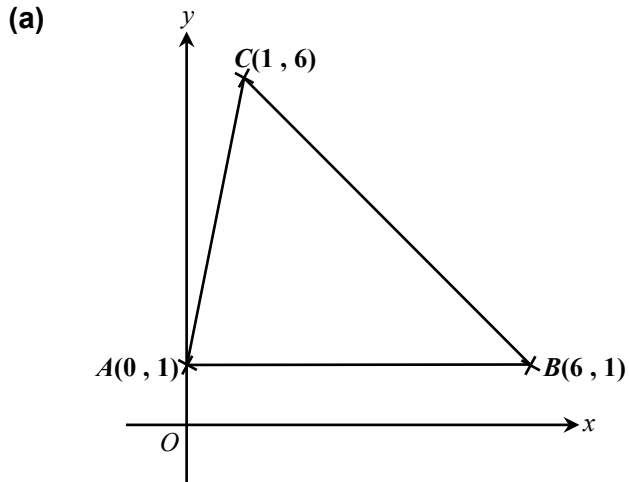


**Example 6**

Three points  $A(0, 1)$ ,  $B(6, 1)$  and  $C(1, 6)$  are given.

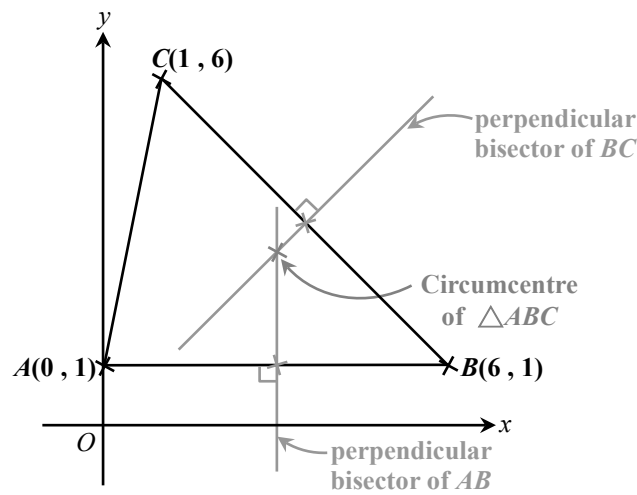
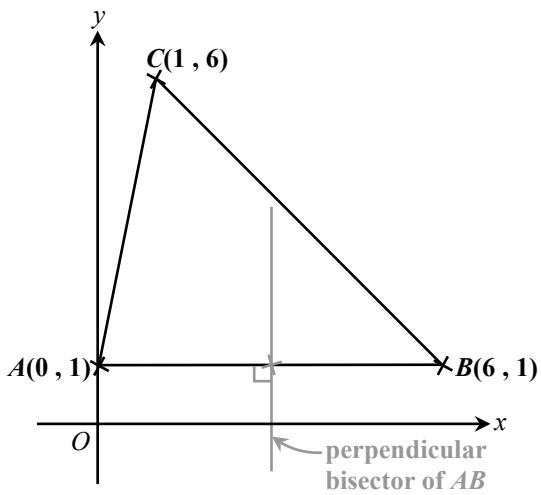
- (a) Sketch  $\triangle ABC$  on a graph.
- (b) Sketch the circumcentre of  $\triangle ABC$  on the same graph.

→ **Solution**



- (b) **Key Point**

Note that  $AB$  is a horizontal line segment.  
It would be easier to sketch the perpendicular bisector of  $AB$ .



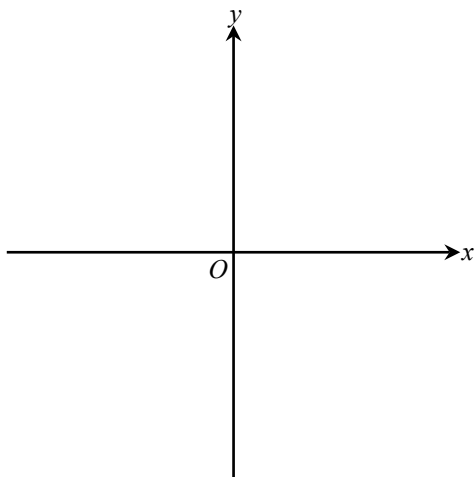
◆ Key Point

- Identify any vertical or horizontal side of the triangle.

**Instant Drill 6.1**

Three points  $A(1, 2)$ ,  $B(5, 2)$  and  $C(4, 5)$  are given.

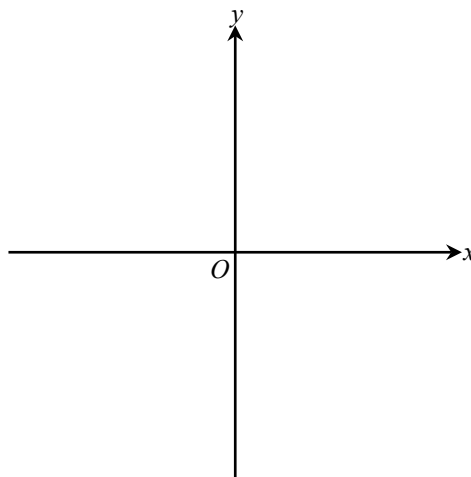
- (a) Sketch  $\triangle ABC$  on the graph provided.  
 (b) Sketch the circumcentre of  $\triangle ABC$  on the same graph.



**Instant Drill 6.2**

Three points  $D(1, -2)$ ,  $E(1, 4)$  and  $F(-4, 3)$  are given.

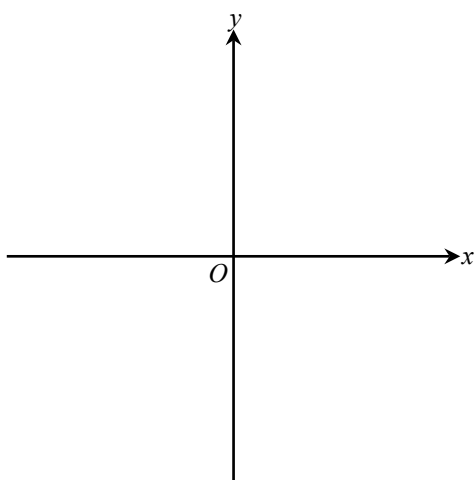
- (a) Sketch  $\triangle DEF$  on the graph provided.  
 (b) Sketch the circumcentre of  $\triangle DEF$  on the same graph.



**Instant Drill 6.3**

Three points  $P(-3, 4)$ ,  $Q(-3, -2)$  and  $R(3, -2)$  are given.

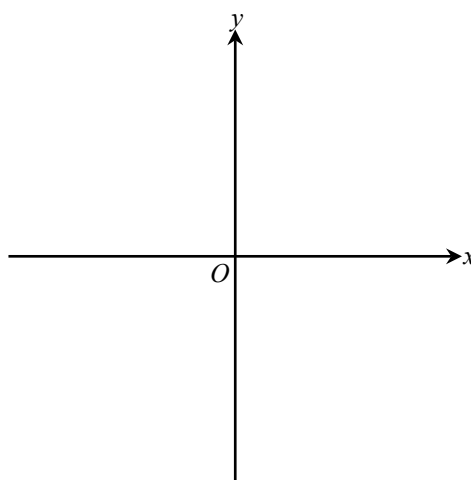
- (a) Sketch  $\triangle PQR$  on the graph provided.  
 (b) Sketch the circumcentre of  $\triangle PQR$  on the same graph.



**Instant Drill 6.4**

Three points  $S(0, 3)$ ,  $T(3, 2)$  and  $U(4, -1)$  are given.

- (a) Sketch  $\triangle STU$  on the graph provided.  
 (b) Sketch the circumcentre of  $\triangle STU$  on the same graph.



**Integrated Exercise 3**

In this exercise, you are advised to **SKETCH A DIAGRAM** before calculation.

**Perpendicular Bisectors**

Book 4A Supplementary Exercise 2 (P.2.53)

55. Find the equation of the perpendicular bisector of the line segment joining  $A(2, 3)$  and  $B(4, 7)$ .

Book 4A Class Practice 2.3 (P.2.34)

2. The straight line  $L_1: 3x - 2y = 12$  cuts the  $x$ -axis and the  $y$ -axis at the points  $A$  and  $B$  respectively.
- Find the coordinates of  $A$  and  $B$ .
  - The straight line  $L_2$  is the perpendicular bisector of  $AB$ . Find the equation of  $L_2$ .

Book 4A Exercise 2A (P.2.21)

33. Two points  $A(1, 6)$  and  $B(9, 2)$  are given. The straight line  $L$  is the perpendicular bisector of  $AB$ .
- Find the equation of  $L$ .
  - If  $C(c, c)$  lies on  $L$ , find the value of  $c$ .

**Book 4A Exam Type Questions (P.2.64)**

- 6.** The straight line  $L: x + ay + 8b = 0$  cuts the  $x$ -axis and the  $y$ -axis at the points  $P$  and  $Q$  respectively. If the straight line  $4x - y - 30 = 0$  is the perpendicular bisector of  $PQ$ , find the value of  $b$ .

**Book 4A Exercise 2C (P.2.46)**

- 31.** The straight line  $L_1$  is perpendicular to the straight line  $L_2: x - 3y - 8 = 0$  and intersects  $L_2$  at the point  $(5, -1)$ .
- (a)** Find the equation of  $L_1$ .
- (b)**  $P$  and  $Q$  are two points lying on  $L_2$  such that  $L_1$  is the perpendicular bisector of  $PQ$ . If  $R$  is a point lying on  $L_3: x + 6y - 16 = 0$  such that  $PR = QR$ , find the coordinates of  $R$ .

**Circumcentres****Book 4A Exam Type Questions (P.2.64)**

9. The equations of the three sides of a triangle are  $x + y = -6$ ,  $x + 3y = 0$  and  $x - 4y = 14$ . Given that the circumcentre of the triangle lies on the  $y$ -axis, find the  $y$ -coordinate of the circumcentre.

**Book 4A Exercise 2C (P.2.46)**

33. The equations of  $AB$ ,  $BC$  and  $AC$  are  $x + y = 0$ ,  $x - 4y = 0$  and  $3x + 8y + 40 = 0$  respectively.
- (a) Find the coordinates of  $A$ ,  $B$  and  $C$ .
- (b) Find the coordinates of the circumcentre of  $\triangle ABC$ .

**Book 4A Supplementary Exercise 2 (P.2.53)**

49. The equations of the three sides of a triangle are  $x + 2y = 2a$ ,  $x - 2y = -2a$  and  $y = 1$ , where  $a > 1$ . If the  $y$ -coordinate of the circumcentre of the triangle is  $-2$ , find the value of  $a$ .

### **3 DSE Paper 2 Skills**

The following skills are excerpted from the supplement **DSE MC Time Management Practice** of ‘Senior Secondary Oxford Mathematics for the New Century’.

#### **Contents**

<b>Composition and Tactics of DSE Compulsory Part Paper 2</b> .....	P.39
<b>Design Concept of DSE MC Time Management</b> .....	P.41
<b>Practice Paper and Suggested Strategies</b> (excerpt) .....	P.42
<b>Extra Practice Paper (Set 1)</b> (please refer to ‘DSE MC Time Management Practice’)	

### **Composition and Tactics of DSE Compulsory Part Paper 2**

In Compulsory Part Paper 1 of HKDSE Mathematics examination, it consists of conventional questions only. Candidates are required to use traditional method to attain the marks within 2 hours and 15 minutes. On the other hand, Paper 2 consists of multiple-choice questions only. Within 1 hour and 15 minutes, candidates can attain the marks as long as they choose the correct option. So the key point is the **time management** in answering the questions and the way to **analyze the questions**.

Consequently, when candidates handle Paper 2 of HKDSE,

- (i) they should **arrange the time** in answering each question effectively, and
- (ii) they should use **appropriate strategies** to shorten the time in answering the questions,

so that they can achieve their target levels in DSE.

Some statistical data of the previous DSE are good reference that we can approximate the required numbers of correct questions for attaining different DSE levels (see the table below). It also includes the **suggested time for each question, strategies and rationale** based on the advices from some experienced teachers.

Target DSE Level	Number of correct questions	Suggested time for each question	Strategies and rationale
2 or 3	22–25	Easier question: 1–2 minutes	<u>Use calculators as much as possible.</u> Find the answer by ‘ <b>Method of Substitution</b> ’ to avoid making mistake because of using wrong formulae.  For harder or more complicated questions in the paper, students can save time by <b>making a wild guess</b> if they are not confident in working out the correct answer.
4 or 5	30–36	Easier question: 30–60 seconds  Harder question: 2–4 minutes	After doing enough practice, students are able to <b>finish easier questions precisely and quickly.</b>  For harder or more complicated questions in the paper, students can <b>leave a ‘mark’</b> on each of them if they are not confident in working out the correct answer shortly. Instead, students can <b>handle these questions later</b> if time is allowed.  For the hardest questions in the paper, students can save time by <b>making a wild guess</b> and if they are not confident in working out the correct answer.
5* or above	39 or above	Easier question: 20–40 seconds  Harder question: 1.5–3 minutes	After doing enough practice, students are able to <b>understand the questions quickly.</b> They are able to finish most of the questions quickly to <b>ensure that they have sufficient time to check the answers</b> to avoid careless mistakes.

## Design Concept of DSE MC Time Management

**DSE MC Time Management Practice** of ‘Senior Secondary Oxford Mathematics for the New Century’ aims to provide effective strategies in solving the questions so that candidates can achieve their target DSE levels. It includes:

- (i) Practice Paper Set
- **Skills involved**—list the skills involved in each question
  - **Characteristics of the question**—list some characteristics to identify the skills involved
  - **Tactics, time allowed, suggested strategy**—list the times allowed and strategies according to the target DSE levels
- (ii) Extra Practice Paper Set—questions are **similar** to those in Practice Paper Set. Students can record the time spent for each question on the answer sheet and seek improvement systematically. Teachers could consider adopting these strategies according to students’ abilities.

There are 30 questions in both Practice Paper and Extra Practice Paper (Set 1), which cover the popular question types in DSE.

According to each DSE target level, the reference time for finishing this Practice Paper is listed below

<b>DSE Target Level</b>	2 or 3	4 or 5	5* or above
<b>Reference Time</b>	< 55 minutes	< 45 minutes	< 30 minutes

Some common strategies for questions of different strands are listed below:

### Algebra

Strategy	Corresponding Questions in Practice Paper (Set 1)
Using traditional method	7, 8, 9, 11, 12, 13, 15
Using ‘Method of Substitution’ to find or check the answer	1, 2, 3, 4, 6, 10
Using calculator program to find the answer	5
Order of judging the statements to eliminate some choices	14

### Geometry

Strategy	Corresponding Questions in Practice Paper (Set 1)
Using traditional method	16, 17, 18, 19, 20, 21, 22, 24, 25, 26
Making use of Pythagoras’ Triple (i.e. Combinations such as ‘3-4-5’, ‘5-12-13’ and ‘8-15-17’)	18, 23
Using the given data to eliminate unreasonable choices	17, 18, 19, 21
Order of judging the statements to eliminate some choices	27

### Statistics

Strategy	Corresponding Questions in Practice Paper (Set 1)
Using traditional method	28
Order of judging the statements to eliminate some choices	29, 30

# Practice Paper and Suggested Strategies (Set 1)

There are 30 questions.

The diagrams in this paper are not necessarily drawn to scale.

Choose the best answer for each question.

1.  $\frac{(3^n)(9^{-2n})^2}{27^{3n}} =$
- A. 1.
- B.  $3^{18n}$ .
- C.  $\frac{1}{3^{12n}}$ .
- D.  $\frac{1}{3^{16n}}$ .

## Skills involved:

Laws of Indices

## Characteristics of the question:

To simplify an expression with several indices.

DSE Target Level	Tactic	Time Allowed	Suggested Strategy ‡
2 or 3	must do	2 minutes	代入法 把適當的 $n$ 值代入題目的數式及各選項並作比較，以選出答案。  提示：代入 $n=0$ 會導致選項的值相同，而無法確定答案。一般可考慮代入 $n=1$ 或 $2$ 。
4 or 5	must do	1 minute	傳統方法 必須緊記各個指數定律 (laws of indices)。
5* or above	must do	30 seconds	提示：覆檢時可代入適當的 $n$ 值，以檢查答案是否合理。

‡ Note: All the suggested strategies are written in Chinese for easy understanding.

5. If  $m - 2n - 6 = 5 = 3m + n$ , then  $n =$

- A. -6.
- B. -4.
- C. 4.
- D. 6.

**Skills involved:**

Simultaneous equations

**Characteristics of the question:**

There are 2 unknowns in the question and you are asked to find its (or their) value(s).

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	must do	1 minute	利用計算機
4 or 5	must do	1 minute	利用計算機程式解聯立方程 (simultaneous equations)。(見後頁的程式)
5* or above	must do	30 seconds	傳統方法 利用代入法 (method of substitution) 或消元法 (method of elimination) 求未知數的值。  利用計算機 利用計算機程式解聯立方程。(見後頁的程式)

對於型號為 CASIO fx-50FH II 的計算機，我們可先根據以下按鍵次序設定計算機程式：

特別指令	按鍵次序
:	EXE
?	SHIFT 3 1
→	SHIFT 3 2
A/B/C/D/X/Y/M	ALPHA A (-) / ALPHA B (°) / ALPHA C hyp / ALPHA D sin / ALPHA M M+
▲	SHIFT 3 4

按鍵次序：

MODE	MODE	6	1	1	1	?	→	A	:
?	→	B	:	?	→	C	:	?	→
D	:	?	→	X	:	?	→	Y	:
A	X	-	B	D	→	M	:	(	B
Y	-	C	X	)	a b/c	M	▲	(	-
C	-	A	Ans	)	a b/c	B	MODE	1	

考慮  $\begin{cases} ax+by+c=0 \\ dx+ey+f=0 \end{cases}$ 。 ◀ 留意坊間某些計算機程式是解  $\begin{cases} ax+by=c \\ dx+ey=f \end{cases}$  的形式

的聯立方程組，使用前應先把方程移項至對應的形式。

我們可利用以下按鍵次序來求  $x$  及  $y$  的值：

Prog 1 a EXE b EXE c EXE d EXE e EXE f EXE

例如：考慮  $m - 2n - 6 = 5 = 3m + n$ ，移項 (transposing terms) 後可得：

$$\begin{cases} m - 2n - 11 = 0 \\ 3m + n - 5 = 0 \end{cases}$$

按鍵次序：

Prog 1 1 EXE -2 EXE -11 EXE 3 EXE 1 EXE -5 EXE

[顯示：3，即  $m$  的值]

EXE

[顯示：-4，即  $n$  的值]

14. Which of the following statements about the graph of  $y = 25 - (x - 3)^2$  is/are true?
- I. The graph opens upwards.
  - II. The graph passes through (4, 24).
  - III. The  $x$ -intercepts of the graph are  $-2$  and  $8$ .
- A. I only
  - B. II only
  - C. I and III only
  - D. II and III only

**Skills involved:**

Features of the graph of a quadratic function

**Characteristics of the question:**

The question asks about the graph of a quadratic function (i.e.  $y = ax^2 + bx + c$  or  $y = a(x - h)^2 + k$ ).

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	must do	3 minutes	<p>傳統方法 必須緊記各種二次函數的圖像特徵 (features of the graph of a quadratic function)。</p> <p>提示：II 及 III 只涉及代入坐標 (coordinates)，較易處理，因此可先判斷這兩句描述是否正確。有時候能幫助排除選項。</p>
4 or 5	must do	1 minute	<p>傳統方法 必須緊記各種二次函數的圖像。</p>
5* or above	must do	30 seconds	

17. The diameter of a circle is 26 cm. A chord of length 24 cm divides the circle into a major arc and a minor arc. Find the length of the minor arc correct to the nearest cm.
- A. 10 cm  
 B. 31 cm  
 C. 51 cm  
 D. 71 cm

**Skills involved:**

Mensuration (arc length)

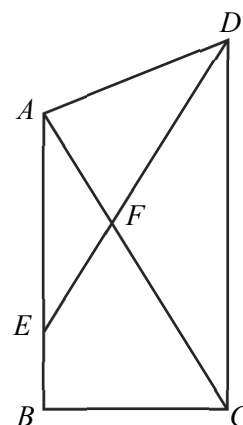
**Characteristics of the question:**

The words 'circle', 'minor arc', 'major arc' appear in the question.

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	guess within 15 seconds#	15 seconds	# 這類題目一般沒有附圖，難度較高，宜盡快選定答案，把時間分配給有把握的題目。
4 or 5	handle later†	2.5 minutes	<b>傳統方法</b> 先繪畫草圖以幫助理解題目。必須緊記有關弧長 (arc length) 的公式。
5* or above	must do	1.5 minutes	<b>排除法</b> 如未有頭緒，可透過以下方法排除部分選項： 圓周 (circumference) 是 $26\pi \text{ cm} \approx 81.681\dots \text{ cm}$ ，而劣弧 (minor arc) 的長度必定小於圓周的一半，因此答案不可能是 C 和 D。  † 如同學對繪畫草圖未熟練，宜容後處理此類題目。

19. In the figure,  $ABCD$  is a trapezium, where  $AB \parallel DC$ .  $E$  is a point on  $AB$  such that  $AE : EB : CD = 3 : 2 : 6$ . If  $AC$  and  $BE$  intersect at  $F$  such that the area of  $\triangle AEF$  is  $24 \text{ cm}^2$ , find the area of the quadrilateral  $BCFE$ .

- A.  $48 \text{ cm}^2$   
 B.  $72 \text{ cm}^2$   
 C.  $96 \text{ cm}^2$   
 D.  $264 \text{ cm}^2$



**Skills involved:**

Mensuration (area), area ratio of similar triangles

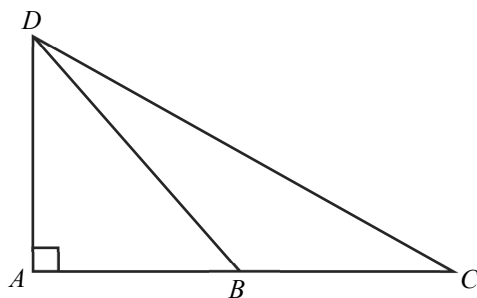
**Characteristics of the question:**

Some ratios of the lengths are given. The questions asks the area of a figure.

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	guess within 15 seconds#	15 seconds	# 這類題目一般為全卷中較難的題目，宜盡快選定答案，把時間分配給有把握的題目。
4 or 5	handle later†	4 minutes	<b>傳統方法</b> 一般需找出圖中的「相似三角形」 (similar triangles) 及「同高但不同底的三角形」，然後分別考慮它們之間的面積之比。
5* or above	must do	3 minutes	<b>排除法</b> 如未有頭緒，可觀察圖形比例與題目所描述的比例大致相近，可直觀地排除選項 A 和 D。  † 如同學不擅長觀察圖形的關係，宜容後處理此類題目。

23. In the figure,  $ABC$  is a straight line. If  $\angle ABD = x$ ,  $\angle ACD = y$  and  $BC = k$ , then  $AD =$

- A.  $k(\tan x - \tan y)$ .
- B.  $k(\tan x + \tan y)$ .
- C.  $\frac{k \tan x \tan y}{\tan x - \tan y}$ .
- D.  $\frac{k(\tan x - \tan y)}{\tan x \tan y}$ .



**Skills involved:**

Trigonometric ratios

**Characteristics of the question:**

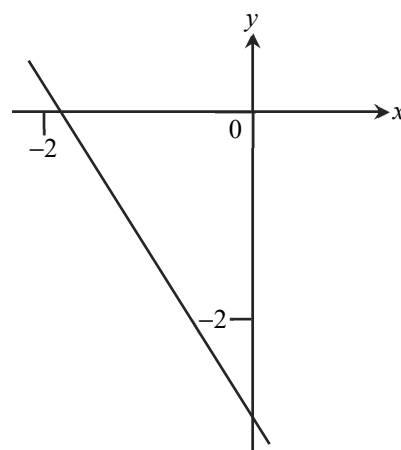
There are right-angled triangles in the figure. The trigonometric ratio ‘tan’ appears in the options.

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	must do	3 minutes	<p>代入法</p> <p>先在圖上標示所有資料。題目沒有給出角度，因此可嘗試代入 <math>x = 45^\circ</math>、<math>y = 30^\circ</math> 這些特殊角 (special angles)，以及 <math>k = 1</math> 來簡化計算。</p>
4 or 5	must do	2 minutes	<p>傳統方法</p> <p>先在圖上標示所有資料。把所有邊的長度以 <math>AD</math> 表示，然後設一個方程求 <math>AD</math>。</p>
5* or above	must do	1.5 minutes	<p>傳統方法</p> <p>先在圖上標示所有資料。只考慮與 <math>AD</math> 及 <math>BC</math> 相關的直角三角形，然後求 <math>AD</math>。</p> <p>進階技巧</p> <p>若熟識畢氏三元數 (Pythagoras' Triple)，可考慮設適合的邊長來覆檢答案，例如：</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div> <p>利用三角比 (trigonometric ratios) 求 <math>x</math> 和 <math>y</math>，然後檢查答案是否合理。</p>

25. The figure shows the graph of the straight line  $ax + by = -4$ .  
Which of the following are true?

- I.  $a > 2$   
II.  $b > 0$   
III.  $a - b > 0$

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



**Skills involved:**

Equations of straight lines

**Characteristics of the question:**

There is a graph of a straight line in the figure. There is an equation of a straight line (in the form of  $Ax + By + C = 0$ ) with some unknowns. There are some inequalities in the statements.

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	guess within 15 seconds#	15 seconds	# 此類題目要求學生擁有極高的運算能力。學生如沒有把握，不宜花時間解此類題目。
4 or 5	handle later†	3 minutes	<b>傳統方法</b> 先以 $a$ 及 $b$ 表示直線的 $x$ 截距 ( $x$ -intercept)、 $y$ 截距 ( $y$ -intercept) 及斜率 (slope)，然後根據圖像寫出對應的不等式 (inequality)。 解不等式期間要留意 $a$ 及 $b$ 的正負號。  <b>提示：</b> 覆檢時可根據所得的不等式，代入符合不等式的 $a$ 值及 $b$ 值，然後計算對應的 $x$ 截距及 $y$ 截距，檢查是否與圖像的條件一致。
5* or above	must do	2 minutes	也可透過圖像合理假設直線的 $x$ 截距及 $y$ 截距 (如分別設為 $-1.5$ 及 $-3$ )，然後找出對應的 $a$ 值及 $b$ 值，再檢查這兩個值是否符合所選的答案。  † 同學可因應所餘時間，決定是否值得把時間分配到此類題目。

27. Denote the circle  $x^2 + y^2 - 6x + 4y = 12$  by  $C$ . Which of the following are true?
- I. The circumference of  $C$  is  $10\pi$ .
  - II. The origin lies inside  $C$ .
  - III. The straight line  $2x - 3y = 0$  passes through the centre of  $C$ .
- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II and III

**Skills involved:**

Equation of circles

**Characteristics of the question:**

The word 'circle' and an equation involving  $x$  and  $y$  appear in the question.

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	must do	3 minutes	<p><b>傳統方法</b>            必須緊記求圓心的坐標 (coordinates of centre) 及半徑 (radius) 的公式。</p> <p><b>提示：</b>先判斷較易處理的 I 和 III 是否正確，有時候可幫助排除選項。</p>
4 or 5	must do	2 minutes	<p><b>傳統方法</b>            必須緊記求圓心的坐標及半徑的公式。</p>
5* or above	must do	1.5 minutes	<p><b>進階技巧</b>            如同學熟練配方法，可馬上把方程寫成 <math>(x - 3)^2 + (y + 2)^2 = 25</math>，然後找出圓心的坐標及半徑。</p>

29. The table below shows the distribution of the numbers of phone calls made on a certain day by some people.

Number of phone calls made	3	4	5	6	7
Number of people	5	6	6	10	3

Which of the following is true?

- A. The range of the distribution is 7.
- B. The inter-quartile range of the distribution is 2.
- C. The mode of the distribution is 10.
- D. The mean of the distribution is 6.

**Skills involved:**

Measures of central tendency, measures of dispersion

**Characteristics of the question:**

The words related to statistics such as ‘range’, ‘inter-quartile range’, ‘mode’ and ‘mean’ appear in the question.

DSE Target Level	Tactic	Time Allowed	Suggested Strategy
2 or 3	must do	3 minutes	傳統方法 必須緊記每個統計 (statistics) 用語的定義。  提示：可先處理較簡單的選項，例如「A」的分佈域 (range) 和「C」的眾數 (mode)。
4 or 5	must do	2 minutes	
5* or above	must do	1.5 minutes	

# Answer Sheet

	Answer	Time spent								
1.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
2.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
3.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
4.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
5.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

	Answer	Time spent								
21.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
22.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
23.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
24.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
25.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

	Answer	Time spent								
6.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
7.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
8.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
9.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
10.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

	Answer	Time spent								
26.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
27.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
28.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
29.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
30.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

	Answer	Time spent								
11.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
12.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
13.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
14.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
15.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

	Answer	Time spent								
16.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
17.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
18.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
19.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
20.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	B	C	D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____ min _____ s
A	B	C	D							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							