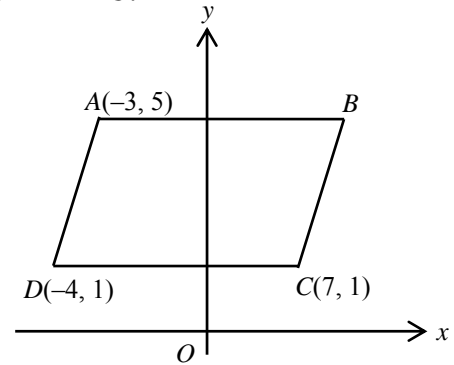


## TB(1B) Ch. 10 Introduction to Coordinates Conventional Questions

**1. [13-14 Final Exam Q9]**

In **Figure 5**,  $ABCD$  is a parallelogram such that  $AB = CD$  and  $AD = BC$ .

- (a) Find the coordinates of  $B$ . **(2 marks)**
- (b) Find the area of parallelogram  $ABCD$ . **(2 marks)**
- (c)  $L$  is a line parallel to the  $y$ -axis. It intersects the  $x$ -axis at  $(k, 0)$ .  $B$  is reflected about  $L$  to  $B'$  such that  $AB' = CD$ .  
Write down a possible value of  $k$ . **(1 mark)**



**Figure 5**

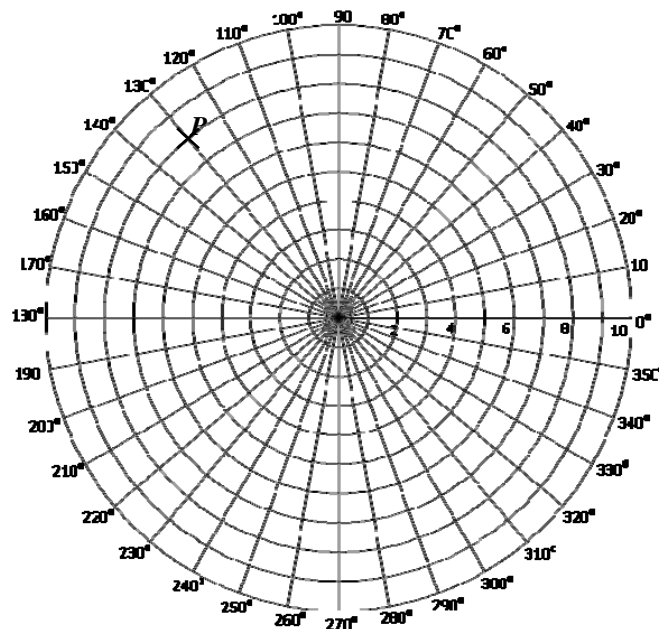
**2. [13-14 Final Exam Q12]**

$A(-1, 8)$ ,  $B(-1, 2)$  and  $C(m + 2, n)$  form a right-angled triangle where  $AB \perp BC$  and  $m < -3$ .  $C$  is rotated clockwise about the origin  $O$  through  $90^\circ$  to  $D$ .

- (a) Find the coordinates of  $D$  in terms of  $m$ . **(2 marks)**
- (b) If the area of  $\triangle ABD$  is half of the area of  $\triangle ABC$ , find the coordinates of  $C$ . **(3 marks)**

**3. [14-15 Standardized Test Q3]**

Refer to **Figure 1**.



**Figure 1**

- (a) Write down the polar coordinates of point  $P$ . **(1 mark)**
- (b)  $Q(5, 40^\circ)$  is a point on the polar coordinate plane.
  - (i) Find  $\angle POQ$ . **(1 mark)**

(ii) Find the area of  $\triangle POQ$ .

(1 mark)

4. [14-15 Standardized Test Q6]

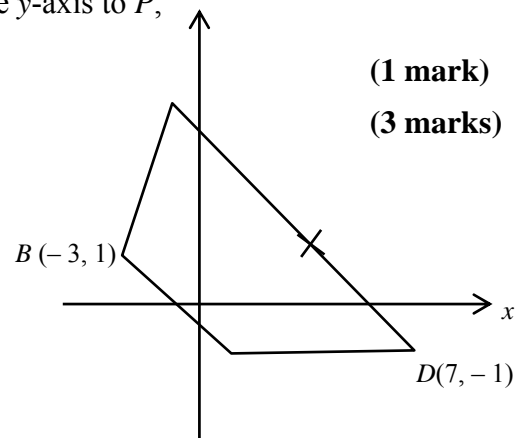
In **Figure 3**,  $A(-1, 3)$ ,  $B(-3, 1)$ ,  $C(1, -1)$  and  $D(7, -1)$  form a quadrilateral on a rectangular coordinate plane. If  $BC \parallel AD$  and  $B$  is reflected about the  $y$ -axis to  $P$ ,

(a) write down the coordinates of  $P$ .

(1 mark)

(b) find the area of the quadrilateral  $ABCD$ .

(3 marks)



5. [14-15 Final Exam Q10]

In **Figure 5**,  $A(-3, 0)$  and  $B(-3, 5)$  are two points on a coordinate plane. It is given that  $A$  is rotated anti-clockwise through  $270^\circ$  about the origin to  $A'$ , and  $B$  is reflected about the  $x$ -axis to  $B'$ .

(a) Write down the coordinates of  $A'$  and  $B'$ .

(2 marks)

(b)  $L$  is a line parallel to  $x$ -axis and passes through  $A'$ . If  $B$  is reflected about the line  $L$  to  $B''$ , find the distance between  $B''$  and  $B'$ .

(2 marks)

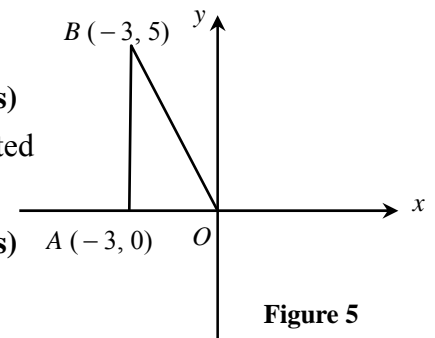


Figure 5

6. [14-15 Final Exam Q12]

In **Figure 6(a)**,  $AOBC$  is a square.  $D$  is a point on  $AC$  and  $E$  is a point on  $CB$  produced such that  $\angle DOE = 90^\circ$ . Let  $\angle AOD = a$ .

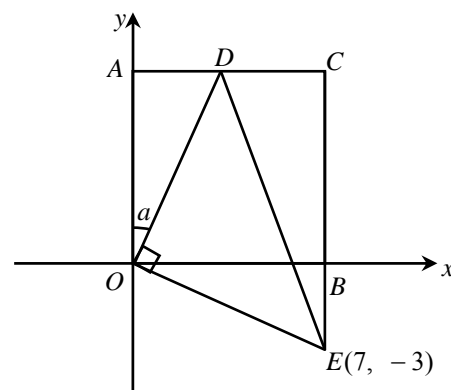
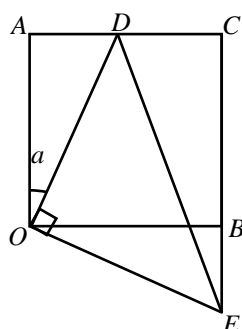


Figure 6(a)

Figure 6(b)

- (a) Prove that  $\triangle DAO \cong \triangle EBO$ . (3 marks)
- (b) A rectangular coordinate system is introduced to Figure 6(a) such that  $O$  is the origin and the coordinates of  $E$  are  $(7, -3)$  as shown in Figure 6(b). Find the area of  $\triangle DOE$ . (2 marks)

7. [15-16 Final Exam, #7]

Figure 3 shows a rectangular coordinate plane. Three points  $A(-4, 4)$ ,  $B(4, -2)$  and  $C(2, 4)$  form  $\triangle ABC$ .

- (a) Find the area of  $\triangle ABC$ . (2 marks)
- (b) Suppose point  $B$  is translated to the right by 16 units to  $B'$ .
- (i) Find the coordinates of  $B'$ . (1 mark)
- (ii) Find the area of  $\triangle AB'C$ . (1 mark)

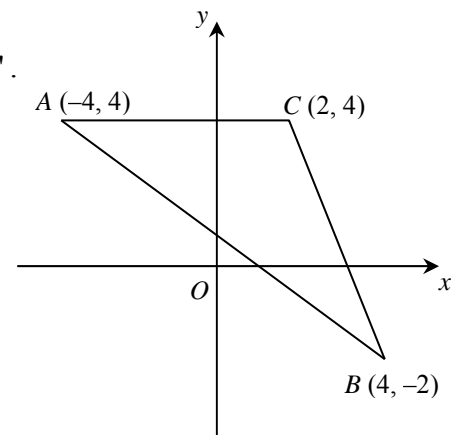


Figure 3

8. [15-16 Final Exam, #12]

Figure 7(a) is formed by four identical right-angled triangles.

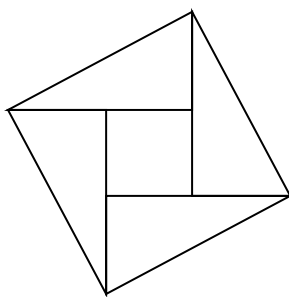


Figure 7(a)

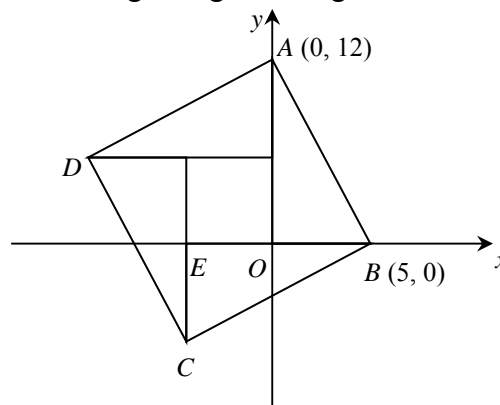


Figure 7(b)

- (a) Write down the number of axes of reflectional symmetry and the order of rotational symmetry of Figure 7(a) in the table below. (1 mark)

Number of axes of reflectional symmetry	
Order of rotational symmetry	

- (b) A rectangular coordinate plane with  $O$  as the origin,  $B$  introduced to Figure 7(a) so that the

coordinates of  $A$  and  $B$  are  $(0, 12)$  and  $(5, 0)$  respectively. (see **Figure 7(b)**)

(i) Write down the coordinates of  $E$ .

(1 mark)

(ii) Find the length of  $AB$ .

(2 marks)

**9. [15-16 Standardized Test, #4]**

In the polar coordinate system,  $O$  is the pole. The polar coordinates of the points  $A$ ,  $B$  and  $C$  are  $(2, 83^\circ)$ ,  $(3, 173^\circ)$  and  $(4, 353^\circ)$  respectively.

(a) Find  $\angle AOB$ .

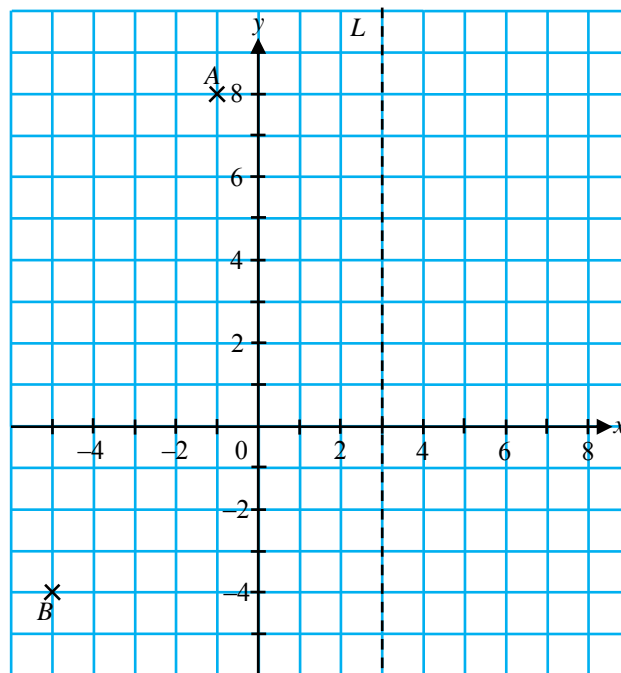
(1 mark)

(b) Find the area of  $\triangle ABC$ .

(2 marks)

**10. [15-16 Standardized Test, #7]**

In **Figure 6**, the coordinates of  $A$  and  $B$  are  $(-1, 8)$  and  $(-5, -4)$  respectively.  $A$  is reflected about line  $L$ , and then translated downwards by 6 units to point  $C$ .



**Figure 6**

(a) Write down the coordinates of  $C$ .

(1 mark)

(b) Find the area of  $\triangle ABC$ .

(2 marks)

(c) If  $\triangle ABC$  is reduced by a scale factor of 0.5, find the area of the image.

(1 mark)

**11. [16-17 Standardized Test, #5]**

In **Figure 1**, it is given that  $A(5, 60^\circ)$  and  $B(6, 150^\circ)$  are two points in the polar coordinate plane and  $O$  is the pole.

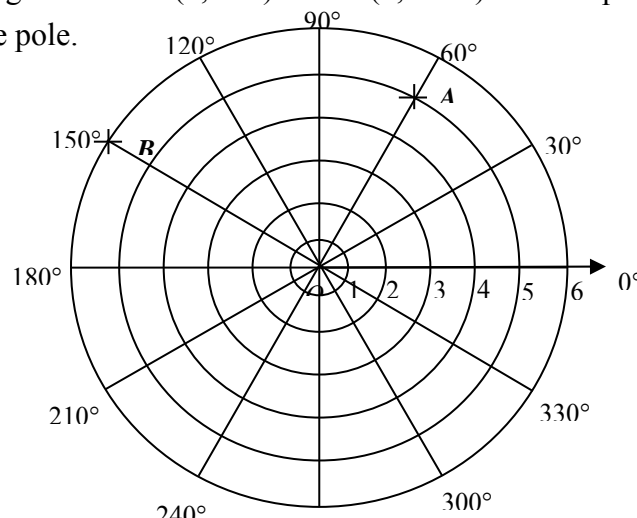


Figure 1

- (a) Plot  $C(4, 240^\circ)$  on the given polar coordinate plane. (1 mark)
- (b) Write down the length of  $AC$ . (1 mark)
- (c) Find the area of  $\triangle ABC$ . (1 mark)

12. [16-17 Standardized Test, #8]

The coordinates of  $A$  are  $(-5, -2)$ .  $A$  is translated to the right by 12 units to  $B$ .

- (a) Write down the coordinates of  $B$ . (1 mark)
- (b) It is given that the  $y$ -coordinate of  $C$  is 8.
  - (i) Find the area of  $\triangle ABC$ . (3 marks)
  - (ii) If  $C$  is translated downwards by  $n$  units, find the possible value(s) of  $n$  such that the area of triangle is decreased by 40%. (3 marks)

13. [16-17 Final Exam, #13]

$A(-4, -8)$  is a point on the rectangular coordinate plane.  $A$  is first rotated anti-clockwise about the origin through  $90^\circ$  and then translated 10 units to the left to  $B$ .  $B$  is then reflected about the  $x$ -axis to  $C$ .

- (a) Write down the coordinates of  $B$  and  $C$ . (2 marks)
- (b)  $L$  is a straight line parallel to the  $y$ -axis and cuts the  $x$ -axis at  $(k, 0)$ , where  $k$  is a positive number. It is given that  $\triangle ABC$  is reflected about the line  $L$  to  $\triangle A'B'C'$ .
  - (i) Write down the coordinates of  $A'$  in terms of  $k$ . (1 mark)
  - (ii) It is given that  $AA'C'C$  is a trapezium. If the area of  $AA'C'C$  is 144 sq. units, find the value of  $k$ . (2 marks)

(Hint: You can use **Figure 5** to help you in this question.)

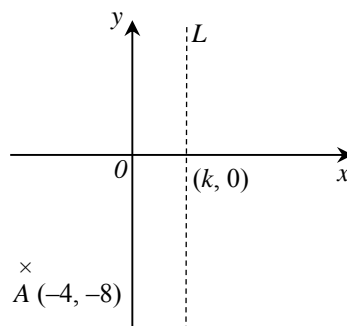


Figure 5

14. [17-18 Final Exam, #6]

In **Figure 3**,  $O$  is the origin and the coordinates of  $A$  are  $(9, 3)$ . If  $B$  is formed by reflecting  $A$  about  $y$ -axis and  $C$  is formed by rotating  $A$  through  $90^\circ$  clockwise about  $O$ .

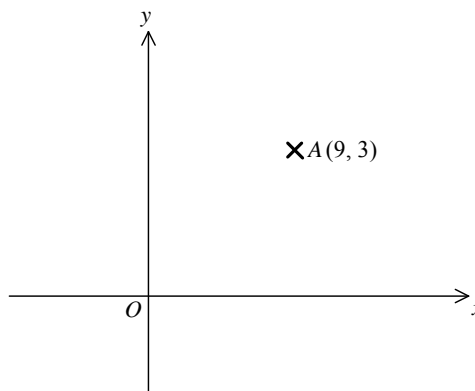


Figure 3

- (a) Write down the coordinates of  $B$  and  $C$ . (2 marks)
- (b) Find the area of  $\triangle ABC$ . (2 marks)

15. [17-18 Final Exam, #14]

- (a) **Figure 10(a)** shows a rectangle  $ABCD$ . Prove that the area of the rectangle is 50 square units. (3 marks)

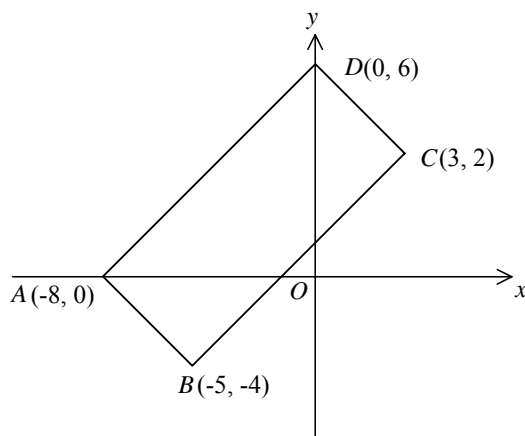


Figure 10(a)

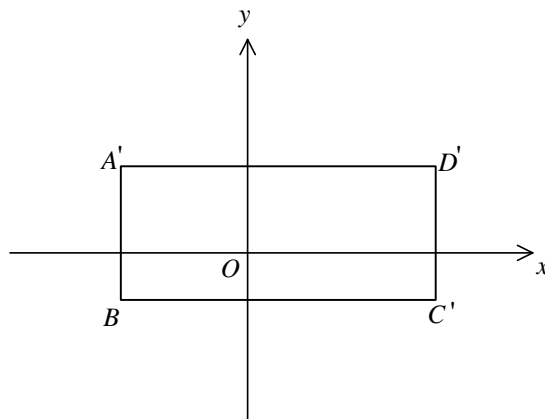


Figure 10(b)

- (b) The rectangle  $ABCD$  is rotated about  $B$  to a position  $A'BC'D'$  as shown in **Figure 10(b)**

such that  $BC'$  is parallel to the  $x$ -axis. If  $A'B = 5$  units, find the coordinates of  $D'$ . (1 mark)

~ End ~