

# Chapter 7+8 Straight Lines 2 Exam Questions

READ THESE INSTRUCTIONS FIRST

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use correction fluid.

Answer all the questions.

**Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.**

You are reminded of the need for clear presentation in your answers.

Jun\_04 P1 q.120

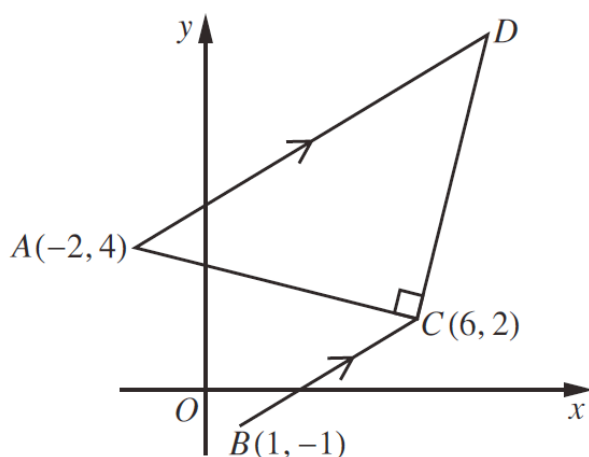
The table shows experimental values of the variables  $x$  and  $y$  which are related by the equation  $y = Ab^x$ , where  $A$  and  $b$  are constants.

$x$	2	4	6	8	10
$y$	9.8	19.4	37.4	74.0	144.4

- (i) Use the data above in order to draw, on graph paper, the straight line graph of  $\lg y$  against  $x$ , using 1 cm for 1 unit of  $x$  and 10 cm for 1 unit of  $\lg y$ . [2]
- (ii) Use your graph to estimate the value of  $A$  and of  $b$ . [5]
- (iii) On the same diagram, draw the straight line representing  $y = 2^x$  and hence find the value of  $x$  for which  $Ab^x = 2^x$ . [3]

Jun\_04 P2 q.10

**Solutions to this question by accurate drawing will not be accepted.**



In the diagram the points  $A$ ,  $B$  and  $C$  have coordinates  $(-2, 4)$ ,  $(1, -1)$  and  $(6, 2)$  respectively. The line  $AD$  is parallel to  $BC$  and angle  $ACD = 90^\circ$ .

- (i) Find the equations of  $AD$  and  $CD$ . [6]
- (ii) Find the coordinates of  $D$ . [2]
- (iii) Show that triangle  $ACD$  is isosceles. [2]

Nov\_04 P2 q.9

In order that each of the equations

(i)  $y = ab^x$ ,

(ii)  $y = Ax^k$ ,

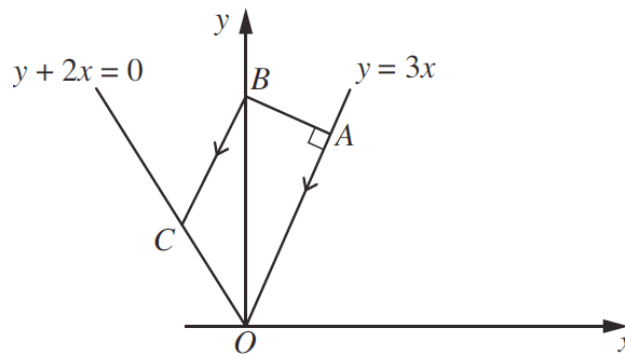
(iii)  $px + qy = xy$ ,

where  $a, b, A, k, p$  and  $q$  are unknown constants, may be represented by a straight line, they each need to be expressed in the form  $Y = mX + c$ , where  $X$  and  $Y$  are each functions of  $x$  and/or  $y$ , and  $m$  and  $c$  are constants. Copy the following table and insert in it an expression for  $Y, X, m$  and  $c$  for each case.

	$Y$	$X$	$m$	$c$
$y = ab^x$				
$y = Ax^k$				
$px + qy = xy$				

[7]

Nov\_04 P2 q.11



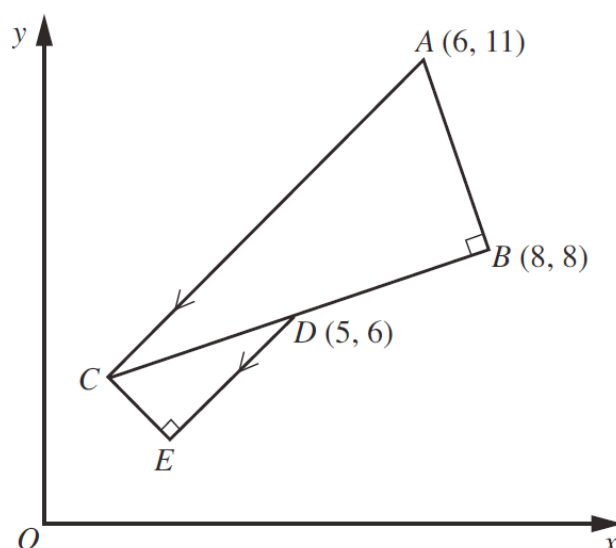
The diagram shows a trapezium  $OABC$ , where  $O$  is the origin. The equation of  $OA$  is  $y = 3x$  and the equation of  $OC$  is  $y + 2x = 0$ . The line through  $A$  perpendicular to  $OA$  meets the  $y$ -axis at  $B$  and  $BC$  is parallel to  $AO$ . Given that the length of  $OA$  is  $\sqrt{250}$  units, calculate the coordinates of  $A$ , of  $B$  and of  $C$ . [10]

$x$	10	100	1000	10 000
$y$	1900	250	31	4

The table above shows experimental values of the variables  $x$  and  $y$  which are related by an equation of the form  $y = kx^n$ , where  $k$  and  $n$  are constants.

- (i) Using graph paper, draw the graph of  $\lg y$  against  $\lg x$ . [3]
- (ii) Use your graph to estimate the value of  $k$  and of  $n$ . [4]

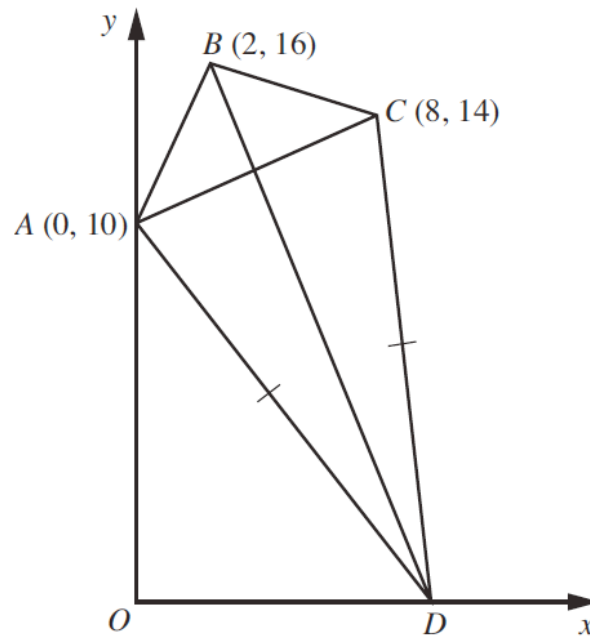
**Solutions to this question by accurate drawing will not be accepted.**



The diagram, which is not drawn to scale, shows a right-angled triangle  $ABC$ , where  $A$  is the point  $(6, 11)$  and  $B$  is the point  $(8, 8)$ .

The point  $D(5, 6)$  is the mid-point of  $BC$ . The line  $DE$  is parallel to  $AC$  and angle  $DEC$  is a right-angle. Find the area of the entire figure  $ABDECA$ . [11]

**Solutions to this question by accurate drawing will not be accepted.**



The diagram, which is not drawn to scale, shows a quadrilateral  $ABCD$  in which  $A$  is  $(0, 10)$ ,  $B$  is  $(2, 16)$  and  $C$  is  $(8, 14)$ .

- (i) Show that triangle  $ABC$  is isosceles. [2]

The point  $D$  lies on the  $x$ -axis and is such that  $AD = CD$ . Find

- (ii) the coordinates of  $D$ , [4]  
 (iii) the ratio of the area of triangle  $ABC$  to the area of triangle  $ACD$ . [3]

Nov\_05 P1 q.12E

Variables  $x$  and  $y$  are related by the equation  $yx^n = a$ , where  $a$  and  $n$  are constants. The table below shows measured values of  $x$  and  $y$ .

$x$	1.5	2	2.5	3	3.5
$y$	7.3	3.5	2.0	1.3	0.9

- (i) On graph paper plot  $\lg y$  against  $\lg x$ , using a scale of 2 cm to represent 0.1 on the  $\lg x$  axis and 1 cm to represent 0.1 on the  $\lg y$  axis. Draw a straight line graph to represent the equation  $yx^n = a$ . [3]  
 (ii) Use your graph to estimate the value of  $a$  and of  $n$ . [4]  
 (iii) On the same diagram, draw the line representing the equation  $y = x^2$  and hence find the value of  $x$  for which  $x^{n+2} = a$ . [3]