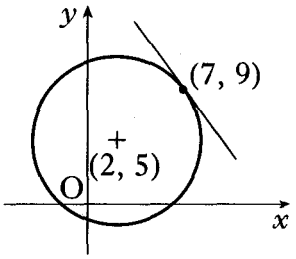
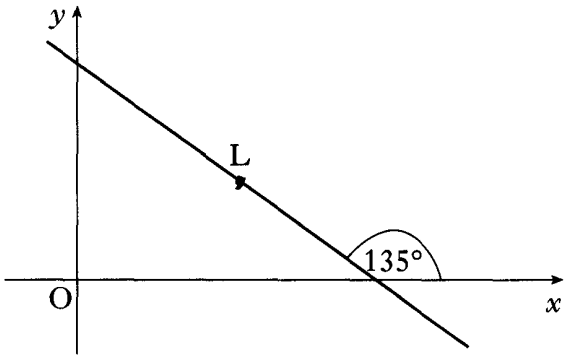
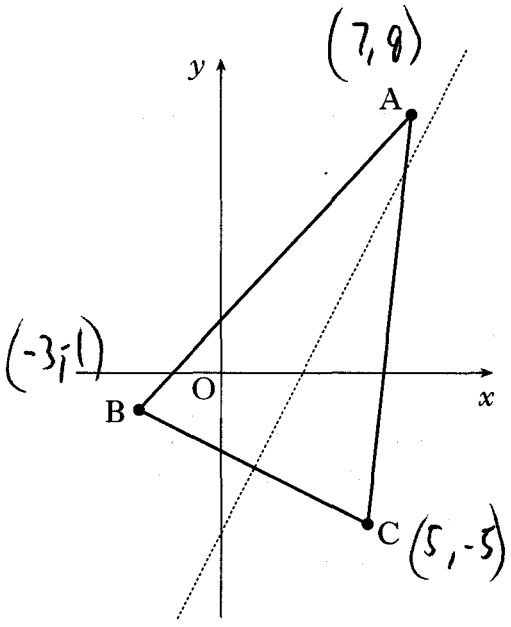
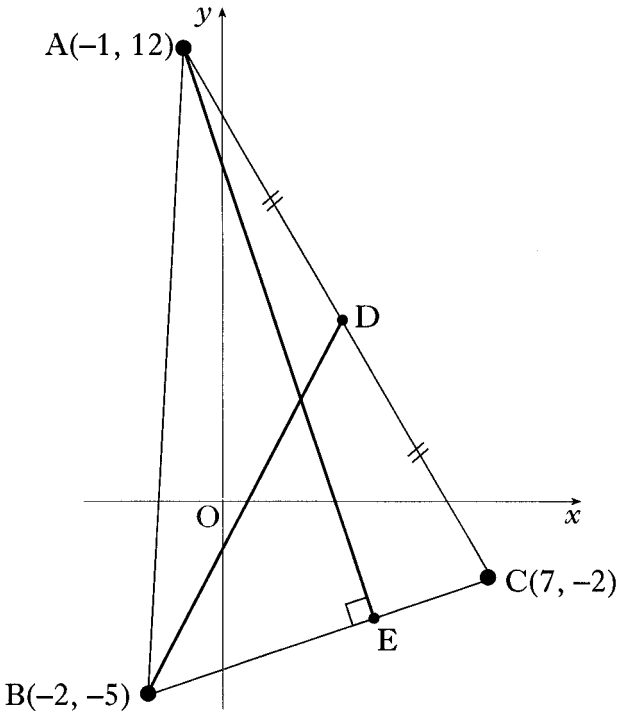
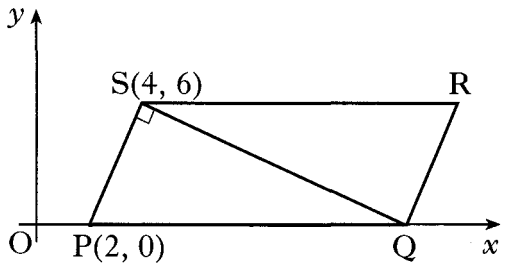
Higher : Straight Line Revision

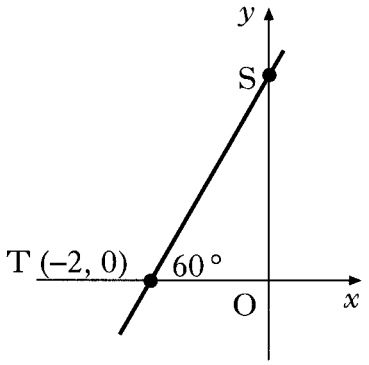
2008 P1	**5.** The diagram shows a circle, centre (2, 5) and a tangent drawn at the point (7, 9). What is the equation of this tangent?  A $y-9=-\frac{5}{4}(x-7)$ B $y+9=-\frac{4}{5}(x+7)$ C $y-7=\frac{4}{5}(x-9)$ D $y+9=\frac{5}{4}(x+7)$	2
Ans	A	

2008 P1	**7.** The diagram shows a line L; the angle between L and the positive direction of the x-axis is 135°, as shown.  What is the gradient of line L? A $-\frac{1}{2}$ B $-\frac{\sqrt{3}}{2}$ C -1 D $\frac{1}{2}$	2
Ans	C	
2008 P2	**1.** The vertices of triangle ABC are A(7, 9), B(–3, –1) and C(5, –5) as shown in the diagram. The broken line represents the perpendicular bisector of BC. (*a*) Show that the equation of the perpendicular bisector of BC is $y = 2x - 5$. (*b*) Find the equation of the median from C. (*c*) Find the coordinates of the point of intersection of the perpendicular bisector of BC and the median from C.  	4 3 3
Ans	*(a) Proof (b) y = -3x+10 (c) (3,1)*	

2007 P1	**1.** Find the equation of the line through the point (–1, 4) which is parallel to the line with equation $3x - y + 2 = 0$.	3
Ans	$y = 3x + 7$	
2006 P1	**1.** Triangle ABC has vertices A(–1, 12), B(–2, –5) and C(7, –2). (*a*) Find the equation of the median BD. (*b*) Find the equation of the altitude AE. (*c*) Find the coordinates of the point of intersection of BD and AE. 	3 3 3
Ans	(*a*) $y - 5 = 2(x - 3)$ or $y + 5 = 2(x - (-2))$ etc (*b*) $y - 12 = -3(x - (-1))$ (*c*) (2, 3)	
2006 P2	**1.** PQRS is a parallelogram. P is the point (2, 0), S is (4, 6) and Q lies on the x-axis, as shown. The diagonal QS is perpendicular to the side PS.  (*a*) Show that the equation of QS is $x + 3y = 22$. (*b*) Hence find the coordinates of Q and R.	4 2
Ans	(*a*) proof $m_{PS} = 3$ $m_{QS} = -\frac{1}{3}$ $y - 6 = -\frac{1}{3}(x - 4)$ (*b*) Q = (22, 0) R = (24, 6)	

2005 P1

1. Find the equation of the line ST, where T is the point (–2, 0) and angle STO is 60 °.



3

Ans $y - 0 = \sqrt{3}(x - (-2))$

2004 P1

1. The point A has coordinates (7, 4). The straight lines with equations $x + 3y + 1 = 0$ and $2x + 5y = 0$ intersect at B.

(*a*) Find the gradient of AB. 3

(*b*) Hence show that AB is perpendicular to only one of these two lines. 5

Ans

(*a*) $m_{AB} = 3$

(*b*) $m_{AB} = 3 \Rightarrow m_{perp} = -\frac{1}{3}$

$y = -\frac{1}{3}x - \frac{1}{3}$

$m_{l_1} = -\frac{1}{3}$

$m_{l_2} = -\frac{2}{5}$

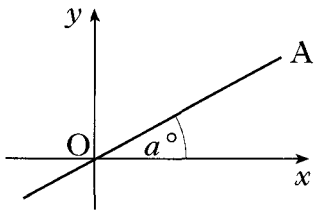
so only the 1st line is perpendicular to AB.

2004 P2

1. (*a*) The diagram shows line OA with equation $x - 2y = 0$.

The angle between OA and the x-axis is a °.

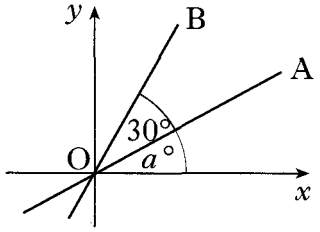
Find the value of a.



3

(*b*) The second diagram shows lines OA and OB. The angle between these two lines is 30 °.

Calculate the gradient of line OB correct to 1 decimal place.

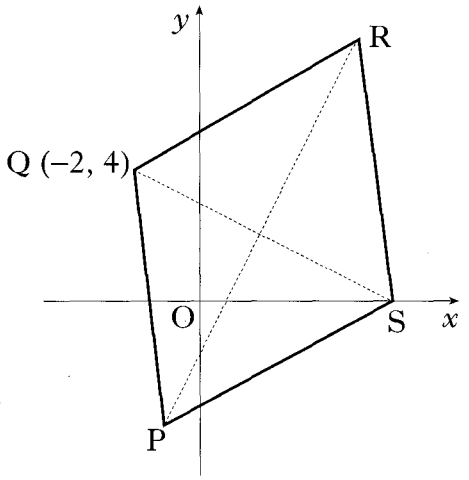
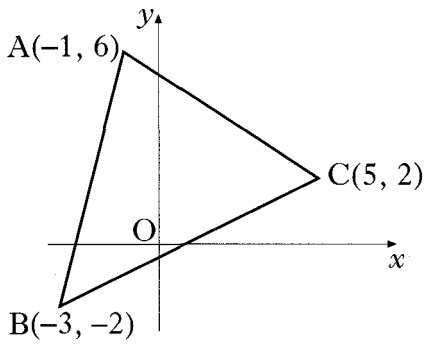


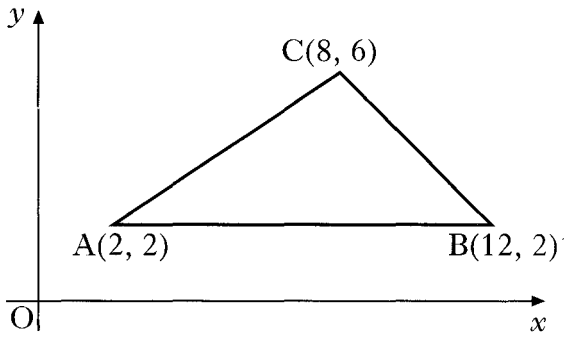
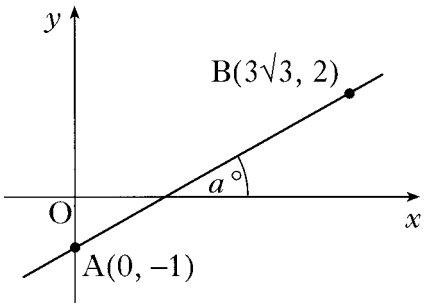
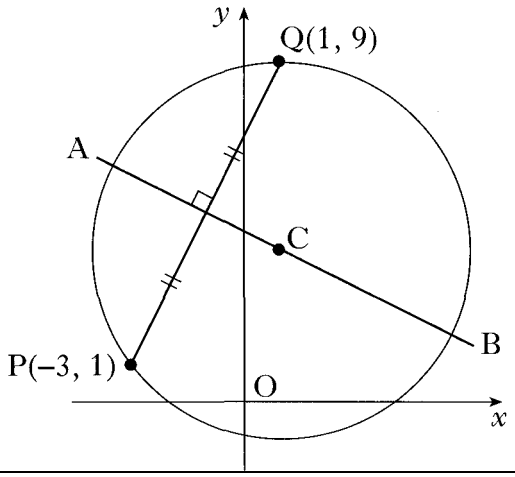
1

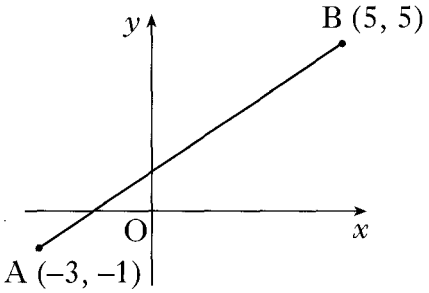
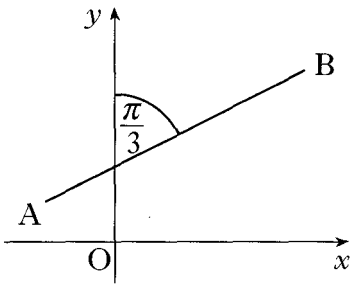
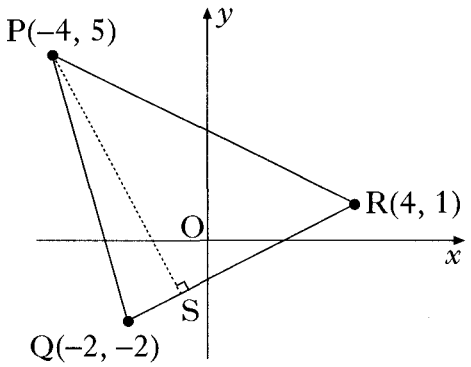
Ans

(*a*) $a = 26{\cdot}6°$

(*b*) 1·5

2003 P1	**1.** Find the equation of the line which passes through the point (–1, 3) and is perpendicular to the line with equation $4x + y - 1 = 0$.	3
Ans	$x - 4y + 13 = 0$	
2002W P1	**1.** (*a*) Find the equation of the straight line through the points A(–1, 5) and B(3, 1). (*b*) Find the size of the angle which AB makes with the positive direction of the x-axis.	2 2
Ans	(*a*) $y + x = 4$ (*b*) $135°$	
2002W P2	**1.** The diagram shows a rhombus PQRS with its diagonals PR and QS. PR has equation $y = 2x - 2$. Q has coordinates (–2, 4). (*a*) (i) Find the equation of the diagonal QS. (ii) Find the coordinates of T, the point of intersection of PR and QS. (*b*) R is the point (5, 8). Write down the coordinates of P. 	6 2
Ans	(*a*) $2y + x = 6$, T(2, 2) (*b*) P(–1, –4)	
2002 P2	**1.** Triangle ABC has vertices A(–1, 6), B(–3, –2) and C(5, 2). Find (*a*) the equation of the line p, the median from C of triangle ABC. (*b*) the equation of the line q, the perpendicular bisector of BC. (*c*) the coordinates of the point of intersection of the lines p and q. 	3 4 1
Ans	(*a*) $y = 2$ (*b*) $y = -2x + 2$ (*c*) (0, 2)	

2001 P1	**1.** Find the equation of the straight line which is parallel to the line with equation $2x + 3y = 5$ and which passes through the point $(2, -1)$.	3
Ans	$2x + 3y = 1$	
2001 P2	**7.** Triangle ABC has vertices A(2, 2), B(12, 2) and C(8, 6). (*a*) Write down the equation of l_1, the perpendicular bisector of AB. (*b*) Find the equation of l_2, the perpendicular bisector of AC. (*c*) Find the point of intersection of lines l_1 and l_2. (*d*) Hence find the equation of the circle passing through A, B and C. 	1 4 1 2
Ans	(*a*) $x = 7$ (*b*) $3x + 2y = 23$ (*c*) $(7, 1)$ (*d*) $(x - 7)^2 + (y - 1)^2 = 26$	
2000 P1	**3.** Find the size of the angle $a°$ that the line joining the points A(0, −1) and B($3\sqrt{3}$, 2) makes with the positive direction of the x-axis. 	3
Ans	30 degrees	
2000 P2	**2.** (*a*) Find the equation of AB, the perpendicular bisector of the line joining the points P(−3, 1) and Q(1, 9). 	4

Ans	(*a*) $x + 2y = 9$	
Specimen 2 P1	**2.** A and B are the points (–3, –1) and (5, 5). Find the equation of the perpendicular bisector of AB. 	4
Ans	$m_{AB} = \frac{3}{4} \Rightarrow m_{perp} = -\frac{4}{3}$ midpoint $= (1,2)$ $y - 2 = -\frac{4}{3}(x-1)$	
Specimen 2 P1	**4.** The line AB makes an angle of $\frac{\pi}{3}$ radians with the y-axis, as shown in the diagram. Find the exact value of the gradient of AB. 	2
Ans	angle between line and x-axis $= \frac{\pi}{2} - \frac{\pi}{3}$ gradient $= \tan\frac{\pi}{6} = \frac{1}{\sqrt{3}}$	
Specimen 1 P1	**1.** P(–4, 5), Q(–2, –2) and R(4, 1) are the vertices of triangle PQR as shown in the diagram. Find the equation of PS, the altitude from P. 	3
Ans	$y = -2x - 3$	
Specimen 1 P2	**1.** ABCD is a parallelogram. A, B and C have coordinates (2, 3), (4, 7) and (8, 11). Find the equation of DC.	3
Ans	$y = 2x - 5$	