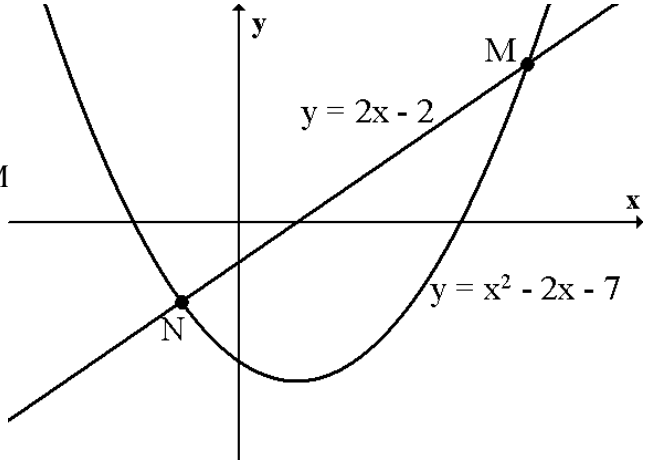
Intersection of lines and curves

1. The lines $y = 4x - 11$ and $3y = 2x - 13$ intersect at the point P.
   Find the coordinates of P.

2. The lines $2x + 3y - 14 = 0$ and $3x - y - 10 = 0$ intersect at the point A. Find the coordinates of A.

3. The diagram shows the parabola $y = x^2 - 2x - 7$ and the line $y = 2x - 2$.
   The line and the parabola intersect at the points M N.

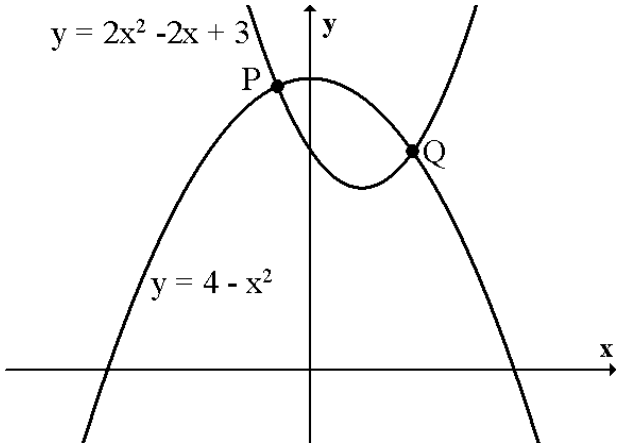
   Find the coordinates of M and N.



4. The diagram shows the parabolas

   $y = 4 - x^2$ and $y = 2x^2 - 2x + 3$.

   Find the coordinates of P and Q.

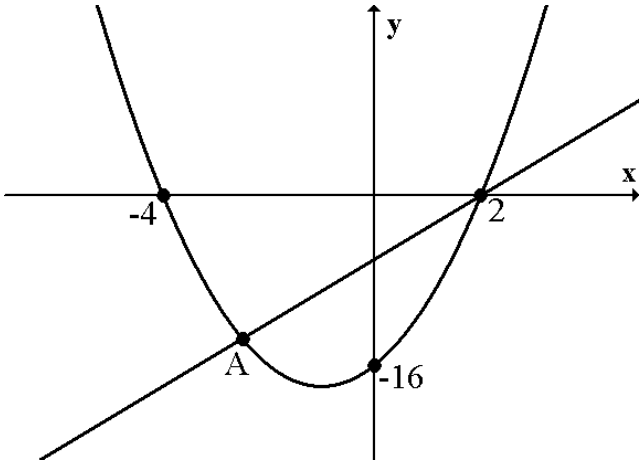


5. (a) The diagram shows a parabola f(x).

   Find a formula for f(x).

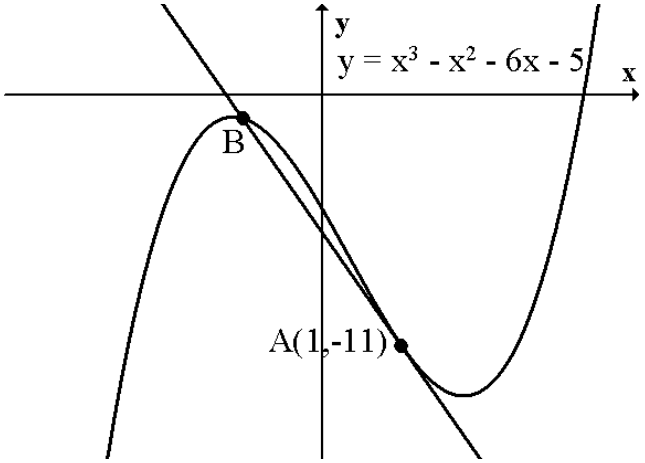
   (b) The line with equation $y = 3x - 6$ is also drawn on the graph.

   Find the coordinates of A.



6. The diagram shows the graph of $y = x^3 - x^2 - 6x - 5$ and a tangent to this curve at the point A(1,-11).

(a) Find the equation of this tangent.
(b) Find the coordinates of B, the point where the tangent meets the curve again.



7. The line $y = 4x + 10$ and the curve $y = x^3 + 6x^2 + 3x - 20$ intersect at 3 points. One of these points is (-3,-2). Find the coordinates of the other points.

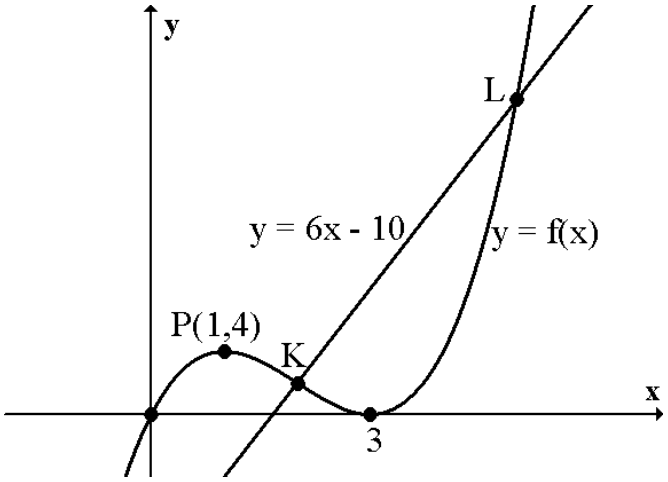
8. The tangent to the curve $y = x^3 - 7x + 6$ at the point (-1,12) has equation $y + 4x = 8$. Find the coordinates of the other point of intersection of the curve and this tangent.

9. (a) The diagram shows the graph of $y = f(x)$.
f(x) has a maximum turning at P(1,4)

Find a formula for f(x).

(b) The curve f(x) and the line $y = 6x - 10$ intersect at 3 points. One of these points is (-1,-16).

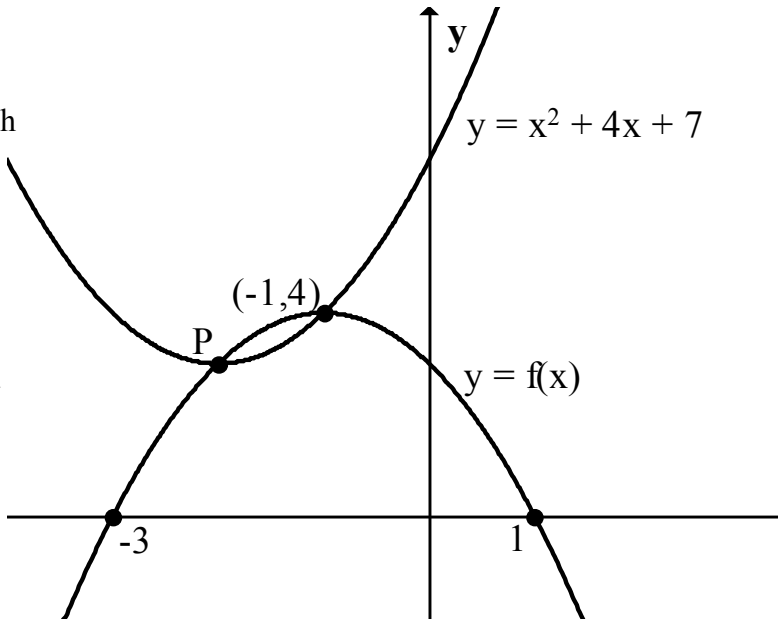
Find the coordinates of K and L the other points of intersection.



10. (a) The diagram opposite shows the graph of $y = f(x)$.

Find a formula for f(x).

(b) Find the coordinates of the point P, the other point of intersection of f(x) and the parabola $y = x^2 + 4x + 7$.



11. A curve has equation $y = x^3 - 3x^2 + 2x$.

(a) Find the equation of the tangent to this curve at the point where $x = 2$.

(b) Find the coordinates of D, the point where this tangent meets the curve again.

12. The line $y = 2x$ intersects the circle $x^2 + y^2 + 8x - 4y - 20 = 0$ at 2 points.

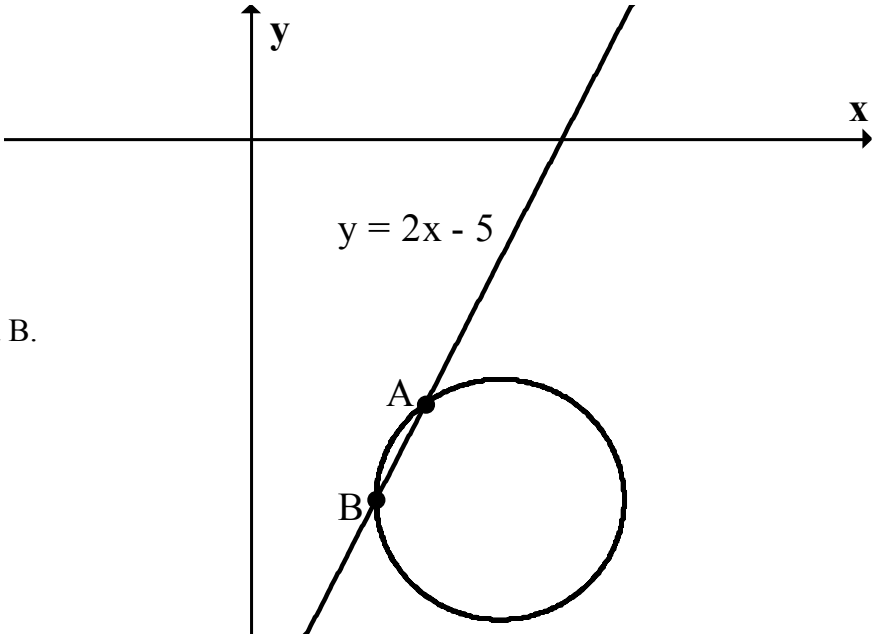
Find the coordinates of these points.

13. The line $y = 2x - 5$ intersects the circle with equation

$x^2 + y^2 - 4x + 6y + 12 = 0$

at 2 points, A and B.

Find the coordinates of A and B.



14. (a) Find the equation of the tangent to the curve $y = x^3 + 2x^2 - 3x + 2$ at the point where $x = 1$.

(b) This line is also a tangent to the circle $x^2 + y^2 - 12x - 10y + 44 = 0$.
Find the point of contact.