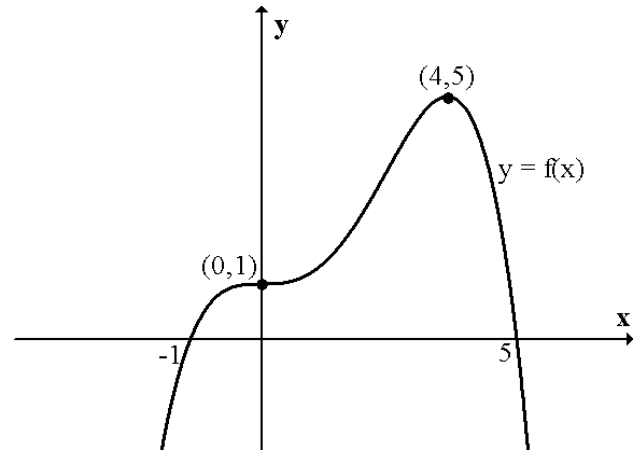
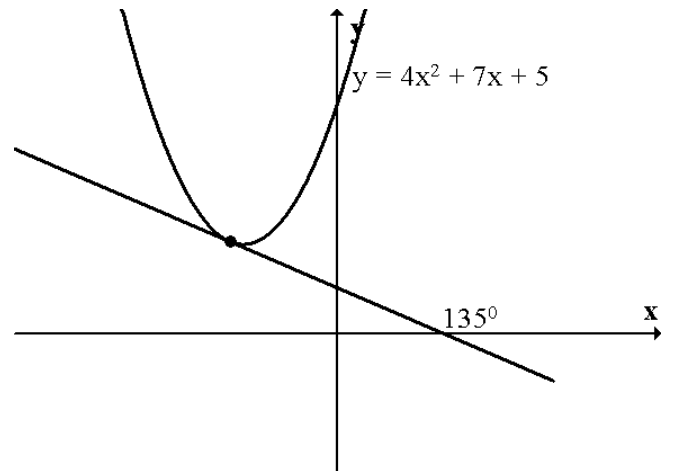


1. The diagram opposite shows the graph of  $y = f(x)$ .  
Sketch the graph of  $y = f'(x)$ .



2. A tangent to the curve  $y = 4x^2 + 7x + 5$  makes an angle of  $135^\circ$  with the positive direction of the  $x$ -axis.  
Find the equation of this tangent.



3. When  $2x^3 + 4x^2 + px - 4$  is divided by  $(x - 1)$ , the remainder is 2. Find the value(s) of  $p$ .
4. A function  $f$  is defined by the formula  $f(x) = 2x^3 - 7x^2 + 9$ .  
Find the greatest and least values of  $f$  in the interval  $-4 \leq x \leq 2$ .
5. Simplify  $\sin(x - 120)^\circ - \cos(x + 150)^\circ$ .
6. Two vectors are represented by  $\underline{u} = \begin{pmatrix} 1 \\ -2 \\ -1 \end{pmatrix}$  and  $\underline{v} = \begin{pmatrix} 2 \\ 3 \\ p \end{pmatrix}$ . If the vectors are perpendicular, find the value of  $p$ .
7. Explain why the recurrence relation  $u_{n+1} = 0.4u_n + 3$  has a limit and find this limit.
8. Express  $3\sin x^\circ - 4\cos x^\circ$  in the form  $k\cos(x - a)^\circ$   $0^\circ \leq a \leq 360^\circ$
9. Simplify  $\log_2 32 + \log_7 7 - \log_6 1$ .
10. Solve  $\cos 2x - \cos x = 0$  for  $0 < x < 2\pi$ .