AS Maths Key Skills Check 9 CM

Name: ___________________________________

1. $A(-3, 4)$ and $B(1, 6)$. The perpendicular bisector of AB intersects the coordinate axes at the points C and D. (a) Find the equation of the perpendicular bisector of AB. (b) Find the points C and D and hence find the area of the triangle OCD, where O is the origin.	(a) $y=-2x+3$
2. Find the set of values of x that satisfy $\frac{27}{2x-1}<3$	Multiply by $(2x-1)^2$ to ensure positivity or consider the cases of $x < ½$, $x > ½$ separately and "glue" solutions together Range of values are $x>5,\ x<\frac{1}{2}$. Solution set is $\left\{x\in\mathbb{R}: x>5 \text{ or}/\cup\ x<\frac{1}{2}\right\}$
3. $f(x)=2x^3+ax^2-x+6$ has a factor $(x+1)$ Find the value of a and hence factorise $f(x)$ fully into a product of linear factors.	Using $f(-1) = 0$ gives $a = -5$ Then you will find that $f(x) = (x + 1)(x - 2)(2x - 3)$
4. The line l has equation $y = 5 - 2x$. The line l is parallel to the tangent to the curve $y=\frac{1}{2}x^4-\frac{5}{3}x^3-\frac{1}{2}x^2+4x+1$ at the point P. Find the possible coordinates of the point P. [hint: your answer to Q3 will be helpful]	$\frac{dy}{dx}=2x^3-5x^2-x+4$. If l is parallel to the tangent, then $2x^3-5x^2-x+4=-2$, which gives $2x^3-5x^2-x+6=0$ as options for the x coordinates of P. Using Q3, the x coordinates are thus -1, 2 and 3/2. Then substituting into the curve to find the y coordinates (**NOT** l since l is only parallel to the tangent) gives $\left(-1,-\frac{4}{3}\right)$, $\left(2,\frac{5}{3}\right)$ and $\left(\frac{3}{2},\frac{89}{32}\right)$