Question	Scheme	Mark
1	Uses b^2-4ac with the correct values for a, b and c $a=2\ b=p\ c=p-1$ $b^2-4ac=p^2-4\times2\times(p-1)$ accept $<$, $=$ or $>$ for this mark	M1
	Forms 3 term quadratic and sets <0 $p^2-8p-8<0$	A1
	Attempts to solve their 3 term quadratic to find the critical values (provided it is a 3 term quadratic) $(p-4)^2-16+8=0\Rightarrow(p-4)^2=8\Rightarrow(p=4\pm\sqrt{8})$	M1
	Finds the correct critical values $p=4\pm\sqrt{8}$ or $p=4\pm2\sqrt{2}$	A1
	Uses their critical values to form a correct inequality $'4-\sqrt{8}'<p<'4+\sqrt{8}'$	M1
	$4-\sqrt{8}<p<4+\sqrt{8}$ or $4-2\sqrt{2}<p<4+2\sqrt{2}$	A1
		Total 6 marks

Question	Scheme	Mark
2	Rearranges the equation $3y-6x+1=0$ into the form $y=mx+c$ $3y=6x-1 \Rightarrow y=\dfrac{6x-1}{3}$	M1
	For the correct gradient of the line; (ignore an incorrect $-\frac{1}{3}$) $m=2$	A1
	For the correct gradient of the perpendicular $m_p=-\dfrac{1}{2}$	B1
	For using the formula and their perpendicular gradient to find an equation of the line l $y-2=\text{'}-\dfrac{1}{2}\text{'}(x-[-1])$ **ALT** If they use $y=mx+c$ they must obtain c before this mark is awarded	M1
	For the correct equation of the line l in any form: $y-2=-\dfrac{1}{2}(x+1)$	A1
	For the correct equation of the line in the required form: $2y+x-3=0$	A1 [6]
		Total 6 marks

Question	Scheme	Mark
	$y = x^3 - 5x^2 + 5x + 4$	
3(a)	For an attempt to differentiate the equation. An attempt is defined as a reduction in power of 1 of at least one term and an increase in power of none. $\frac{dy}{dx} = 3x^2 - 10x + 5$	M1
	For at least on term in x fully correct and simplified $\frac{dy}{dx} = 3x^2 - 10x + 5$	A1
	For a fully correct expression for $\frac{dy}{dx}$ $\frac{dy}{dx} = 3x^2 - 10x + 5$	A1[3]
(b)	Sets their $\frac{dy}{dx} = 2$and attempts to form a 3 term quadratic $= 0$ $3x^2 - 10x + 5 = 2 \Rightarrow 3x^2 - 10x + 3 = 0$	M1
	For the correct 3 term quadratic $3x^2 - 10x + 3 = 0$	A1
	Attempts to solve their 3 term quadratic $3x^2 - 10x + 3 = (3x - 1)(x - 3) = 0 \Rightarrow x = \ldots$	M1
	For the correct coordinate of x $x = 3$	A1 [4]

Question	Scheme	Mark
(c)	The y coordinate of C when $x = 3$ $y = 1$	B1
	Forms an equation for the tangent using their coordinates of x and y $y - '1' = 2(x - '3')$ **ALT** If $y = mx + c$ is used, they must reach a value for c before this mark can be awarded.	M1
	For the correct equation in any form $y - 1 = 2(x - 3)$ $(y = 2x - 5)$	A1 [3]
		Total 10 marks

Question	Scheme	Mark
	$f'(x) = 2x^3 - \frac{1}{3x^2} + 8$	
4	For re-writing $f'(x)$ in a form suitable for integration. This mark can be implied by correct subsequent work. $f'(x) = 2x^3 - \frac{x^{-2}}{3} + 8$	B1
	For an attempt to integrate their expression. An attempt is defined as an increase in power of at least one term and a decrease in power on none. Formal notation is NOT required. $\int (2x^3 - \frac{x^{-2}}{3} + 8)\,dx = \frac{2x^4}{4} - \frac{x^{-1}}{-1\times 3} + 8x + c$	M1
	For $\frac{2x^4}{4}$ correct simplified or unsimplified.	A1
	For $-\frac{x^{-1}}{-1\times 3}$ correct simplified or unsimplified	A1
	For a fully simplified expression including a constant of integration. $y = \frac{x^4}{2} + \frac{x^{-1}}{3} + 8x + c$ or $y = \frac{x^4}{2} + \frac{1}{3x} + 8x + c$	A1 [5]
		Total 5 marks

Explanation of marking codes

Three types of marks are used in mathematics examination and it is important to understand them so you can follow mark schemes.

M mark – is a mark awarded for the use of a correct method.

For example: Factorise $2x^2 - 5x - 3$

The method mark is awarded for an **attempt** to factorise the above expression.

So in an examination we would expect to see as a minimum $(2x \pm 1)(x \pm 3)$ and the mark would be awarded even if there are incorrect signs.

A mark – is a mark awarded for a fully correct answer.

It is very important to note that an **A** mark can only be awarded if the **M** mark is awarded first. So you must always show all of your working.

B mark – is a mark awarded for a correct answer seen.

For example: Write down the gradient of the line $y = \frac{x}{2} + 3$

The answer is of course $\frac{1}{2}$ and it is either correct or incorrect.