MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

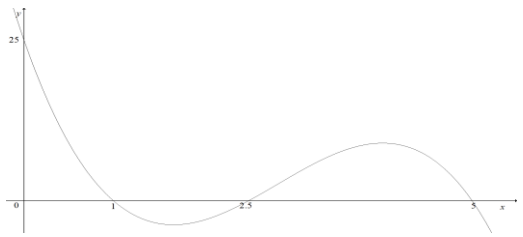
A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation 'dep' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

awrt answers which round to
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
nfww not from wrong working
oe or equivalent
rot rounded or truncated
SC Special Case
soi seen or implied

Question	Answer	Marks	Guidance
1(a)		3	**B1** for the correct shape with a distinct minimum in 4th quadrant and a distinct maximum in the first quadrant. No turning over at end points, suggesting further stationary points. **B1** for 1, 2.5 and 5 on the x-axis or stated. Independent mark for critical values seen correctly marked on the x-axis or stated with **no contradiction** and no other critical x-values **B1** for 25 marked correctly on the y-axis or stated with **no contradiction**. Independent mark.

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Question	Answer	Marks	Guidance
1(b)	$1 \leqslant x \leqslant 2.5$	**B1**	Mark final answer
	$x \geqslant 5$	**B1**	Mark final answer
2(a)	$\left(\text{p}(-2) =\right)\ -16+4a-26+b=0$	**B1**	
	$\left(\text{p}(-1) =\right)\ -2+a-13+b=6$	**B1**	
	$a=7,\ b=14$	**2**	**M1** to solve *their* equations to obtain at least one value, must be using $\text{p}(-2)$ or $\text{p}(-1)$
2(b)	$(x+2)\left(2x^2+3x+7\right)=0$ soi	**2**	**M1** for attempt to factorise or use of long division on *their* $\text{p}(x)$
	Correct use of discriminant on *their* quadratic factor or correct attempt to solve *their* quadratic factor equated to zero with valid conclusion	**B1**	**FT** on *their* quadratic factor. Quadratic factor must have a negative discriminant and have a correct value if evaluated
3(a)	$a+ar=9$ or $\dfrac{a\left(1-r^2\right)}{1-r}=9$ or $\dfrac{a\left(r^2-1\right)}{r-1}=9$	**B1**	
	$\dfrac{a}{1-r}=25$	**B1**	
	$r^2=\dfrac{16}{25}$	**B1**	**Dep B** mark on both previous **B** marks
	$r=\pm\dfrac{4}{5}$ or ± 0.8	**B1**	**Dep B1** mark on all previous **B** marks
3(b)	$a=5,\ 45$	**2**	**B1** for each
4(a)	$2\left(x+\dfrac{5}{4}\right)^2-\dfrac{1}{8}$	**2**	**B1** for $2\left(x+\dfrac{5}{4}\right)^2$ **B1** for $-\dfrac{1}{8}$
4(b)	$\left(-\dfrac{5}{4},\ -\dfrac{1}{8}\right)$	**2**	**B1FT** on *their* – *a* **B1FT** on *their b* **B0** if calculus used as question says 'Hence'
4(c)(i)	$-\dfrac{5}{4}$ or $p=-\dfrac{5}{4}$ or $x \geqslant -\dfrac{5}{4}$	**B1**	**FT** on *their* – *a* from part **(a)**. Allow if from calculus