Mark Scheme (Results)

Summer 2019

Pearson Edexcel GCE
In Mathematics (6663) Paper 1 Core Mathematics 1

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

PEARSON EDEXCEL GCE MATHEMATICS

General Instructions for Marking

1. The total number of marks for the paper is 75

2. The Edexcel Mathematics mark schemes use the following types of marks:

- **M** marks: Method marks are awarded for 'knowing a method and attempting to apply it', unless otherwise indicated.
- **A** marks: Accuracy marks can only be awarded if the relevant method (M) marks have been earned.
- **B** marks are unconditional accuracy marks (independent of M marks)
- Marks should not be subdivided.

3. Abbreviations

   These are some of the traditional marking abbreviations that will appear in the mark schemes.

   - bod – benefit of doubt
   - ft – follow through
   - the symbol $\sqrt{}$ will be used for correct ft
   - cao – correct answer only
   - cso - correct solution only. There must be no errors in this part of the question to obtain this mark
   - isw – ignore subsequent working
   - awrt – answers which round to
   - SC: special case
   - oe – or equivalent (and appropriate)
   - d… or dep – dependent
   - indep – independent
   - dp decimal places
   - sf significant figures
   - ✱ The answer is printed on the paper or ag- answer given
   - └ or d… The second mark is dependent on gaining the first mark

4. All A marks are 'correct answer only' (cao.), unless shown, for example, as A1 ft to indicate that previous wrong working is to be followed through. After a misread however, the subsequent A marks affected are treated as A ft, but manifestly absurd answers should never be awarded A marks.

5. For misreading which does not alter the character of a question or materially simplify it, deduct two from any A or B marks gained, in that part of the question affected.

6. If a candidate makes more than one attempt at any question:
    - If all but one attempt is crossed out, mark the attempt which is NOT crossed out.
    - If either all attempts are crossed out or none are crossed out, mark all the attempts and score the highest single attempt.

7. Ignore wrong working or incorrect statements following a correct answer.

General Principles for Core Mathematics Marking

(But note that specific mark schemes may sometimes override these general principles).

Method mark for solving 3 term quadratic:

1. Factorisation

$(x^2 + bx + c) = (x + p)(x + q)$, where $|pq| = |c|$, leading to x = ...

$(ax^2 + bx + c) = (mx + p)(nx + q)$, where $|pq| = |c|$ and $|mn| = |a|$, leading to x = ...

2. Formula

Attempt to use the correct formula (with values for a, b and c).

3. Completing the square

Solving $x^2 + bx + c = 0$: $\left(x \pm \frac{b}{2}\right)^2 \pm q \pm c = 0, \quad q \neq 0$, leading to x = ...

Method marks for differentiation and integration:

1. Differentiation

Power of at least one term decreased by 1. ($x^n \to x^{n-1}$)

2. Integration

Power of at least one term increased by 1. ($x^n \to x^{n+1}$)

Use of a formula

Where a method involves using a formula that has been learnt, the advice given in recent examiners' reports is that the formula should be quoted first.

Normal marking procedure is as follows:

Method mark for quoting a correct formula and attempting to use it, even if there are small errors in the substitution of values.

Where the formula is not quoted, the method mark can be gained by implication from correct working with values, but may be lost if there is any mistake in the working.

Exact answers

Examiners' reports have emphasised that where, for example, an exact answer is asked for, or working with surds is clearly required, marks will normally be lost if the candidate resorts to using rounded decimals.

Question Number	Scheme	Notes	Marks
1.(a)	$\left(3\sqrt{7}\right)^2 = 63$	Cao	B1
			[1]
(b)	$\frac{\sqrt{3}}{5\sqrt{3}+6\sqrt{2}} \times \frac{5\sqrt{3}-6\sqrt{2}}{5\sqrt{3}-6\sqrt{2}}$	For rationalising the denominator by a correct method (i.e. multiply numerator and denominator by $5\sqrt{3}-6\sqrt{2}$). This statement is sufficient.	M1
	$= \frac{15-6\sqrt{6}}{\dots}$ **or** $= \frac{\dots}{75-72}$	For 15 – 6√6 (or $3\times5-6\sqrt{6}$) in the numerator **or** 75 – 72 (or 3 from correct work) in the denominator seen at some point i.e. apply isw	A1 **(M1 on Epen)**
	$= \frac{15-6\sqrt{6}}{\dots}$ **and** $= \frac{\dots}{75-72}$	For 15 – 6√6 (or $3\times5-6\sqrt{6}$) in the numerator **and** 75 – 72 (or 3 from correct work) in the denominator seen at some point i.e. apply isw	A1
	$5-2\sqrt{6}$	Fully correct expression. Allow *a* = 5 *b* = – 2, *c* = 6 but apply isw e.g. 5 – 2√6 followed by *a* = 5 *b* = 2, *c* = 6	A1
			[4]
			5 marks

	(b) Alternative		
	$\frac{\sqrt{3}}{5\sqrt{3}+6\sqrt{2}} = \frac{1}{5+2\sqrt{6}}$		
	$\frac{1}{5+2\sqrt{6}} \times \frac{5-2\sqrt{6}}{5-2\sqrt{6}}$	For rationalising the denominator by a correct method (i.e. multiply numerator and denominator by $5-2\sqrt{6}$). This statement is sufficient.	M1
	$= \frac{5-2\sqrt{6}}{\dots}$ **or** $= \frac{\dots}{25-24}$	For 5 – 2√6 in the numerator **or** 25 – 24 (or 1) in the denominator seen at some point i.e. apply isw	A1
	$= \frac{5-2\sqrt{6}}{\dots}$ **and** $= \frac{\dots}{25-24}$	For 5 – 2√6 in the numerator **and** 25 – 24 (or 1) in the denominator seen at some point i.e. apply isw	A1
	$5-2\sqrt{6}$	Fully correct expression. Allow *a* = 5 *b* = – 2, *c* = 6 but apply isw e.g. 5 – 2√6 followed by *a* = 5 *b* = 2, *c* = 6	A1

Question Number	Scheme	Notes	Marks
2.(a)	$\left(\frac{dy}{dx}=\right) 15+54x^{-\frac{1}{2}}+10x^{\frac{3}{2}}$	For $15x \rightarrow 15$ or $x^{\frac{1}{2}} \rightarrow x^{-\frac{1}{2}}$ or $x^{\frac{5}{2}} \rightarrow x^{\frac{3}{2}}$	M1
		Any 2 correct terms, may be simplified or unsimplified.	A1
		All correct and simplified on one line. Allow equivalent forms for the powers of *x* e.g. $\frac{1}{x^{\frac{1}{2}}}, \frac{1}{\sqrt{x}}$ for $x^{-\frac{1}{2}}$ $\sqrt{x^3}, x\sqrt{x}$ for $x^{\frac{3}{2}}$	A1
			[3]
(b)	$\left(\frac{d^2y}{dx^2}=\right) -27x^{-\frac{3}{2}}+15x^{\frac{1}{2}}$	For $x^n \rightarrow x^{n-1}$ on one of their terms from (a) but **not** for $k \rightarrow 0$	M1
		For a correct simplified answer on one line or for $Ax^{-\frac{3}{2}}+Bx^{\frac{1}{2}}$ where *A* and *B* are simplified and follow their "54" and "10" from (a) all on one line.	A1ft
			[2]
	Penalise the occurrence of "+ *c*" in (a) or (b) only once and penalise it the first time it occurs.		
(c)	When $x = 9$, $\left(\frac{d^2y}{dx^2}=\right) -1+45=44$	44 only	B1
			[1]
			6 marks

Question Number	Scheme	Notes	Marks
3.	$2(9-x^2)=3x+20$ **or** $y=9-\left(\frac{(2y-20)}{3}\right)^2$	Makes one variable the subject of the formula and substitutes into the other equation	M1
	$2x^2+3x+2=0\ \left(x^2+\frac{3}{2}x+1=0\right)$ **or** $4y^2-71y+319=0$	Correct 3 term quadratic. The " = 0" may be implied by subsequent work.	A1
	$2x^2+3x+2=0 \Rightarrow b^2-4ac=3^2-4\times2\times2$ **or** $x^2+\frac{3}{2}x+1=0 \Rightarrow b^2-4ac=\left(\frac{3}{2}\right)^2-4\times1\times1$ **or** $4y^2-71y+319=0 \Rightarrow b^2-4ac=71^2-4\times4\times319$ **or e.g.** $2x^2+3x+2=0 \Rightarrow x^2+\frac{3}{2}x+1=0$ $\Rightarrow \left(x+\frac{3}{4}\right)^2-\left(\frac{3}{4}\right)^2+1=0 \Rightarrow \left(x+\frac{3}{4}\right)^2=\left(\frac{3}{4}\right)^2-1$ **or e.g.** $2x^2+3x+2=0 \Rightarrow 2\left(x^2+\frac{3}{2}x\right)+2=0$ $\Rightarrow 2\left(\left(x+\frac{3}{4}\right)^2-\left(\frac{3}{4}\right)^2\right)+2=0 \Rightarrow 2\left(x+\frac{3}{4}\right)^2=2\left(\frac{3}{4}\right)^2-2$ Correct attempt to evaluate the discriminant for their 3 term quadratic. Allow this to appear as part of the quadratic formula. **or** A fully correct attempt to complete the square and reaches as far as $(x+p)^2=q$ or $p(x+q)^2=r$		M1
	Reason and conclusion that follows **fully correct** numerical work with **no contradictions** or **ambiguity**. <u>Examples of a **reason**:</u> • $3^2-4\times2\times2<0$ or e.g. 9 < 16 • You cannot square root a negative number • Not possible <u>Examples of a **conclusion**:</u> • They do not intersect • No intersection • The 2 lines do not intersect • *C* and *l* do not intersect		A1
			[4]
			4 marks

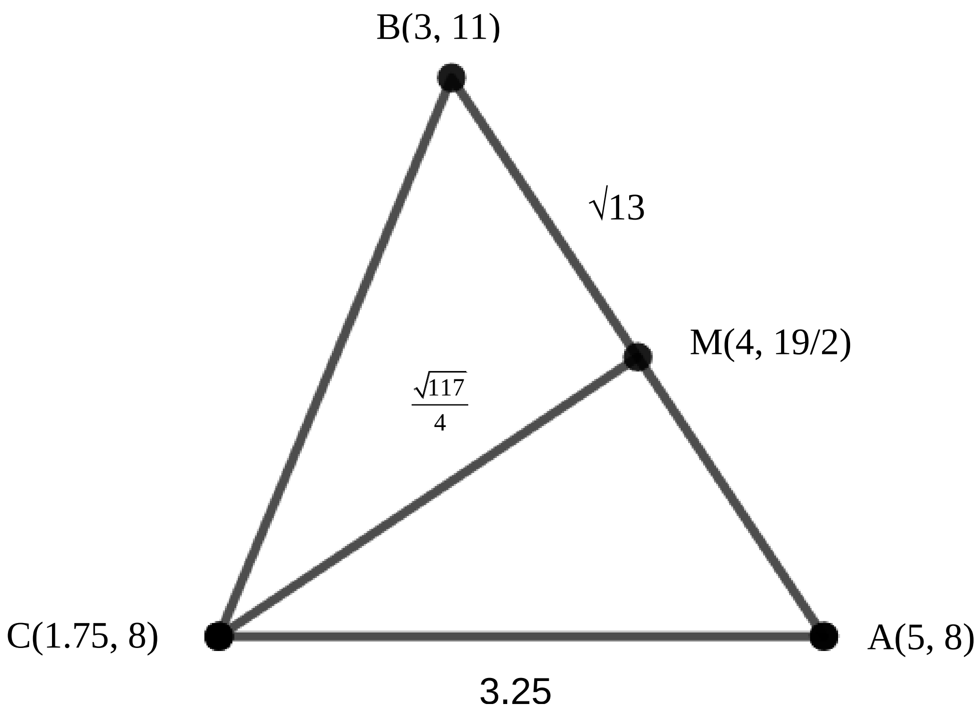
Question Number	Scheme	Notes	Marks
4.	$a_1 = 8,\ a_{n+1} = 4(a_n - c),\ n \geqslant 1$		
(a)	$(a_2 =)\,4(8-c)$	Allow equivalent correct expressions e.g. 32 – 4*c* and isw once a correct answer is seen	B1
			[1]
(b)	$a_3 = 4\left("4\left(8-c\right)" - c\right) = 28$	Uses another iteration **correctly** with their a_2 in terms of *c* and puts equal to 28 to obtain an equation in *c*.	M1
	Note that $a_3 = 4\left("4\left(8-c\right)"\right) = 28$ scores M0 here and leads to *c* = 6.25 and $\sum_{i=1}^{4} a_i = 130$ and scores a maximum of 3/6 **in (b)** e.g. M0M1A0M1M1A0		
	$4(32-5c) = 28 \Rightarrow c = ...$	Uses their a_2 in terms of *c* and the 28 and solves a linear equation to find *c*	M1
	$c = 5$	Correct value for *c* (may be implied by correct final answer)	A1
	$a_4 = 4(28 - "5") = ...$	Uses $a_3 = 28$ and their *c* to obtain a value for a_4. If they attempt a_4 in terms of *c* first, it must be a correct application of the iteration formula i.e. $a_4 = 4(\text{their } a_3 \text{ in terms of } c - c)$ followed by substituting their *c*.	M1
	$a_2 = "4(8-c)" = ...$ $\Rightarrow \sum_{i=1}^{4} a_i = 8 + "12" + 28 + "92"$	Attempts to find a value for a_2 using their answer to (a) and their value for *c* attempts 8 + 28 + their a_2 + their a_4 where their a_2 and a_4 are numeric.	M1
	= 140	cao	A1
	Note that some candidates work entirely in *c* to get $a_1 = 8,\ a_2 = 32 - 4c,\ a_3 = 128 - 20c,\ a_4 = 512 - 84c\left(\text{or } 112 - 4c\right) \Rightarrow \sum_{i=1}^{4} a_i = 680 - 108c\left(\text{or } 180 - 8c\right)$ In this case the 3rd and 4th method marks can be implied if a numerical value for the sum is found		
			[6]
			7 marks

Question Number	Scheme		Marks
5.(a)	$3-2x<6+4x$ $\Rightarrow 6x>-3$ or $-6x<3$	Reaches $px > q$ or $px < q$ with one or both of p or q correct	M1
	$x>-0.5$ or e.g. $-0.5<x$	Accept alternatives to –0.5 such as $-\frac{3}{6}$ and isw if necessary. A correct answer implies M1A1	A1
			(2)
(b)			
	$3x^2+20x-7=0$ $\Rightarrow (3x-1)(x+7)=0 \Rightarrow x=...$ or $x=\frac{-20\pm\sqrt{400+84}}{6}$	Attempt to solve by factorising, formula or completion of the square with the usual rules (see general guidance)	M1
	$x=\frac{1}{3}$, -7	$\frac{1}{3}$ and –7 seen as critical values. Allow $\frac{-20\pm 22}{6}$ if the formula is used but must reach at least this far with the square root evaluated.	A1
	$-7<x<\frac{1}{3}$ or $\left(-7, \frac{1}{3}\right)$ or $x>-7$ **and** $x<\frac{1}{3}$	Attempts inside region for their values	M1
		Correct answer using –7 and $\frac{1}{3}$ only	A1
	Note: $-7 \le x \le \frac{1}{3}$ scores M1A1M1A0 as do ($x > -7$ or $x < \frac{1}{3}$), ($x > -7$, $x < \frac{1}{3}$) (with or without the comma)		
			(4)
(c)	$-\frac{1}{2}<x<\frac{1}{3}$ or $\left(-\frac{1}{2}, \frac{1}{3}\right)$ or $x>-\frac{1}{2}$ **and** $x<\frac{1}{3}$	This is correct answer only and can be marked independently.	B1 **(A1 on epen)**
			(1)
			(7 marks)

Question Number	Scheme	Notes	Marks
6.	$\int 12x^2 dx = kx^3$	Integrates the first term to kx^3	M1
	$\int 12x^2 dx = 4x^3$	Allow unsimplified e.g. $\frac{12x^3}{3}$	A1
	$\frac{4x+2}{3x^4} = Ax^{-3} + Bx^{-4}$	Splits the fraction to obtain an expression of the form $Ax^{-3} + Bx^{-4}$ or $\frac{A}{x^3} + \frac{B}{x^4}$ where A and B are constants.	B1
	$\int \frac{4x+2}{3x^4} \mathrm{d}x = \frac{Ax^{-2}}{-2} + \frac{Bx^{-3}}{-3}$	$x^{-3} \to x^{-2}$ **or** $x^{-4} \to x^{-3}$	M1
	$\int \frac{4}{3x^3} \mathrm{d}x = \frac{\frac{4}{3}x^{-2}}{-2}$ or $\int \frac{2}{3x^4} \mathrm{d}x = \frac{\frac{2}{3}x^{-3}}{-3}$	For $+\frac{\frac{4}{3}x^{-2}}{-2}$ **or** for $+\frac{\frac{2}{3}x^{-3}}{-3}$ (i.e. one correct unsimplified or simplified fraction term)	A1
	$\int \frac{4x+2}{3x^4} \mathrm{d}x = \frac{\frac{4}{3}x^{-2}}{-2} + \frac{\frac{2}{3}x^{-3}}{-3} (+c)$	For a fully correct integration for the fractional part. Simplification not required. (A constant of integration not required for this mark)	A1
	$x = 1, y = 4 \Rightarrow 4 = 4 - \frac{2}{3} - \frac{2}{9} + c \Rightarrow c = ...$	Uses $x = 1$ and $y = 4$ in an attempt to find their constant of integration. There must have been a constant of integration to access this mark.	M1
	$y = 4x^3 - \frac{2x^{-2}}{3} - \frac{2x^{-3}}{9} + \frac{8}{9}$	All correct and simplified including the constant so do **not** allow $\frac{4}{6}$ for $\frac{2}{3}$ or $\frac{16}{18}$ for $\frac{8}{9}$ and do **not** allow '+ –' for '–'. Accept equivalent simplified answers e.g. $y = 4x^3 - \frac{2}{3x^2} - \frac{2}{9x^3} + \frac{8}{9}$ The $y = \ldots$ must appear at some stage if it is not with the final answer.	A1
			8 marks

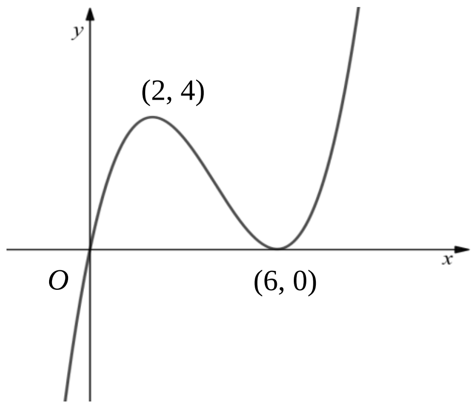
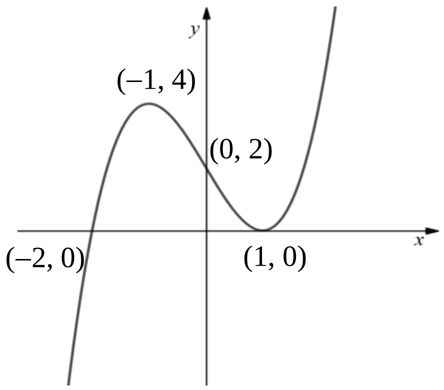
Question Number	Scheme		Marks
7.(a)	l: passes through (5, 8) and (3,11)		
	Gradient of l is $\frac{11-8}{3-5}\left(=\frac{3}{-2}\right)$	A correct gradient in any form, simplified or unsimplified. (May be implied by subsequent work)	B1
	$y-8=-\frac{3}{2}(x-5)$ **or** $y=-\frac{3}{2}x+c$ **and** $8=-\frac{3}{2}(5)+c \Rightarrow c=\frac{31}{2}$	$y-11=m(x-3)$ or $y-8=m(x-5)$ with their gradient **or** uses $y=mx+c$ with $(3, 11)$ or $(5, 8)$ and their gradient and reaches as far as $c = \ldots$	M1
	$y=-\frac{3}{2}x+\frac{31}{2}$	Correct equation of l in **any form**.	A1
	$3x+2y-31=0$ or e.g. $0=-2y-3x+31$	Correct equation in the **required form**. (Allow any integer multiple)	A1
			[4]
(b)	$AB=\sqrt{(5-3)^2+(8-11)^2}$ **or** $AB^2=(5-3)^2+(8-11)^2$	Fully correct method for the length of AB or AB^2	M1
	$=\sqrt{13}$	Cao	A1
			[2]
(c) Way 1	$\sqrt{(t-3)^2+(8-11)^2}=(5-t)$	Correct use of Pythagoras for BC and sets equal to $(5 - t)$ (Allow $(t - 5)$)	M1
	$t^2-6t+18=25-10t+t^2 \Rightarrow t=\ldots$	Solves for t using correct processing. **Dependent on the previous mark.**	**d**M1
	$(x=\text{ or } t=)\frac{7}{4}$	Allow equivalent answers e.g. 1.75 (allow x = .. or t = … or just the correct value)	A1
			[3]
(c) Way 2	Midpoint of (5, 8) and (3, 11) is (4, 9.5) $\Rightarrow y-9.5=\frac{2}{3}(x-4)$	Finds equation of perpendicular bisector using perpendicular gradient and midpoint. Must be a correct method for the midpoint and a correct straight line method using the negative reciprocal gradient from (a)	M1
	$y=8\Rightarrow x=\ldots$	Substitutes $y = 8$ into their perpendicular bisector and solves for x. **Dependent on the previous mark.**	**d**M1
	$(x=\text{ or } t=)\frac{7}{4}$	Allow equivalent answers e.g. 1.75 (allow x = .. or t = … or just the correct value)	A1
			[3]

(d) Way 1	$\frac{1}{2}(5-"\frac{7}{4}")\times 3$	Fully correct method following through their non-zero value for *t*	M1
	$=\frac{39}{8}$	Area of triangle is $\frac{39}{8}$ or equivalent fraction e.g. $\frac{78}{16}$, $4\frac{7}{8}$, 4.875	A1
			[2]
(d) Way 2	$\frac{1}{2}\begin{vmatrix}5 & "\frac{7}{4}" & 3 & 5\\ 8 & 8 & 11 & 8\end{vmatrix}=\frac{1}{2}\left(5\times 8+"\frac{7}{4}"\times 11+3\times 8-8\times "\frac{7}{4}"-8\times 3-11\times 5\right)$ Fully correct method following through their non-zero value for *t*		M1
	$=\frac{39}{8}$	Area of triangle is $\frac{39}{8}$ or equivalent fraction e.g. $\frac{78}{16}$, $4\frac{7}{8}$, 4.875	A1
			[2]
(d) Way 3	$\frac{1}{2}\sqrt{\left("4"-"\frac{7}{4}"\right)^2+\left("\frac{19}{2}"-8\right)^2}\times\sqrt{13}$	Fully correct method following through their non-zero value for *t* and their midpoint	M1
	$=\frac{39}{8}$	Area of triangle is $\frac{39}{8}$ or equivalent fraction e.g. $\frac{78}{16}$, $4\frac{7}{8}$, 4.875 or possibly $\frac{\sqrt{1521}}{8}$	A1
			[2]
			11 marks



Question Number	Scheme	Notes	Marks
8.(a)	Chloe; arithmetic series, $a = 80$, $d = 20$.		
	$U_n = 80 + (n-1)\times 20 = 80 + 17\times 20$ or $U_n = 80 + (n-1)\times 20 = 80 + 16\times 20$	Uses 80 + (n – 1)20 with n = 17 or 18 **but** $80+17\times 20$ **on its own** scores M0	M1
	= (£) 400	Correct value	A1
	Correct answer only score M1A1		
			[2]
(b)	$S_n = \frac{n}{2}(160 + (n-1)(20))$ $= \frac{25}{2}(160 + (25-1)(20))$	Uses $S_n = \frac{n}{2}(160 + (n-1)(20))$ with n = 25	M1
	= (£) 8000	Correct value (units not needed)	A1
	Correct answer only score M1A1		
			[2]
(c)	Jack; arithmetic series a = 16, d = ?		
	$S_n = \frac{n}{2}(32 + (n-1)(d))$ $\Rightarrow 4000 = \frac{25}{2}(32 + 24d)$	Uses a = 16 and n = 25 in a correct sum formula and sets equal to 4000	M1
	$4000 = \frac{25}{2}(32 + 24d) \Rightarrow d = ...$	Solves to find a value for d. **Dependent on the previous mark.**	**d**M1
	d = 12	Correct value	A1
	$U_{17} = 16 + (n-1)\times "12" = 16 + 16\times "12"$	Uses $16 + (n-1)\times "12"$ with n = 17 or 18 **but** $16+17\times "12"$ **on its own** scores M0	M1
	= (£) 208	Correct value (units not needed)	A1
			[5]
			9 marks

Question Number	Scheme	Notes	Marks
9.(a)	$y=\frac{12}{x}+5 \Rightarrow \frac{\mathrm{d}y}{\mathrm{d}x}=-\frac{12}{x^2}$	$\frac{12}{x}\to\frac{k}{x^2}\left(\text{or } kx^{-2}\right)$	M1
	At $x=-2$ $\frac{\mathrm{d}y}{\mathrm{d}x}=-\frac{12}{4}$ or -3	Correct value (may be implied by later work)	A1
	Gradient of normal is $-1\div-\frac{12}{4}\left(=\frac{1}{3}\right)$	Correct application of the perpendicular gradient rule. May be implied by use of $-\frac{1}{12}$ as the normal gradient for those candidates who think the gradient is 12.	M1
	$y+1=\text{"}\frac{1}{3}\text{"}(x+2)$ **or** $y=\text{"}\frac{1}{3}\text{"}x+c$ **and** $-1=\text{"}\frac{1}{3}\text{"}(-2)+c\Rightarrow c=...$	A correct straight line method using their changed gradient and the point (–2, –1). This must follow use of calculus to find the gradient.	M1
	$3y-x+1=0$	Correct equation in the required form. (Allow any integer multiple)	A1
			[5]
(b)	Gradient of given line is $\frac{3}{4}$	May be implied by use of $-\frac{4}{3}$	B1
	$\frac{x^2}{12}=\frac{3}{4}\Rightarrow x=...$	Sets up a correct equation using what they think is the gradient of the given line and attempts to solve.	M1
	$x=\pm 3$	Both correct values required	A1
	$x=...\Rightarrow\frac{12}{x}+5=...$	Uses at least one x to find a value for y using $y=\frac{12}{x}+5$. **Dependent on the first method mark.**	**d**M1
	(3 , 9) and (–3, 1) or e.g. $x=3, y=9$ $x=-3, y=1$	Correct coordinates correctly paired	A1
			[5]
			10 marks

Question Number	Scheme		Marks
10.(a)(i)		Similar shape to the given figure passing through *O* (be generous if it just misses *O* but the intention is clear) **and** with evidence of a horizontal stretch taken from the *x* coordinates of the max/min point(s) but with no contradiction if both points are given. There should be no change in the *y* coordinates. **The origin does not need to be labelled.**	B1
		Maximum at (2, 4)	B1
		Minimum at (6, 0)	B1
	The coordinates may appear on the sketch, or separately in the text. If a point on an axis appears on the sketch it is not necessary to give both coordinates. So, for example, 6 or (0, 6) on the *x* - axis would get credit, but if the answer is given in the text (6, 0) is needed. If there is any ambiguity, the sketch has precedence.		
(a)(ii)		Similar shape translated horizontally. Ignore any coordinates given.	M1
		Minimum at (1, 0) and crosses or at least reaches *x*-axis at (–2, 0)	A1
		Maximum at (–1, 4) – must correspond to a maximum in the 2nd quadrant **and** crosses the *y*-axis at (0, 2)	A1
			[6]
	The coordinates may appear on the sketch, or separately in the text. If a point on an axis appears on the sketch it is not necessary to give both coordinates. So, for example, 2 or (2, 0) on the *y*-axis would get credit but if the answer is given in the text (0, 2) is needed. If there is any ambiguity, the sketch has precedence.		
(b)	$a = 1$ **or** $k = -4$	One correct value	B1
	$a = 1$ **and** $k = -4$	Both correct	B1
	Note that these marks may be implied by sight of e.g. “f(*x*) – 4” and/or “(1, 0)”		
	Note that the answer to (b) often appears at the bottom of page 1		
			[2]
			8 marks

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